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Nicolai

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[54] APPLE TREE NAMED ‘M9-RN8’
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[52] U.S. Cl. Plt./34.1
[58] Field of Search Plt./34.1, 35.1,
Plt./35.2

[56] References Cited
PUBLICATIONS

Anon. *Stark Bro’s Fruit Tree Catalog & Guide for the Professional Grower* 1989 Stark Bro’s Nursery and Orchards Co., Louisiana, Mo. pp. 18 and 19.
Anon. *Oregon Rootstock, Inc. Catalog* 1985, Oregon Rootstock, Inc., Woodburn, Oregon. pp. 8–15.
Tukey, H.B., “Dwarfing Rootstocks for Apple” *Dwarfed Fruit Trees* The Macmillian Co., N.Y. 1964 pp. 123–154.
von Oosten, H.J., et al., “Differences Between Subvarieties of ‘M.9’” *De Fruitteelt* (English Translation) (all 1984) No. 32, pp. 924–926; No. 33, pp. 950–951; No. 34, pp. 968–969; and, No 35, pp. 988–989.

Masseron, A., “Study and Selection of Paradise Jaune De Metz (English Translation) Rootstock of the Apple Tree” Interprofessional Technical Center for the Fruits and Vegetables, CTIFL, Service for Improving Production, Domaine de Laxade, Prignonrieux 24130 La Force, pp. 35–57 (With Pages Missing in Between).

Ziebig, R., et al., “Autonomous Province Bozen—South Tyrol, Division VI, Agriculture and Forestry. 1992 Activity Program for the Agriculture and Forestry Experimental Center” Autonomous Province Bozen—South Tyrol, Division IV, Agriculture and Forestry. (English Translation of Document Provided by Applicant).

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[57] ABSTRACT

This invention relates to a new and distinct apple tree rootstock clone which is useful as a size-controlling rootstock. The new clone originated as a mutation of Malling 9 (M9), an unpatented dwarfing apple rootstock, Standard growing apple cultivars propagated on this new rootstock are approximately 70 % of the size of like apple trees growing on apple seedling rootstocks. In the stoolbed the clone produces few lateral limbs, large round to oval leaves with broadly acute tips and possesses a pronounced, profuse blooming characteristic. The clone produces a larger number of rooted plants in the stoolbed.

5 Drawing Sheets

BACKGROUND AND SUMMARY OF THE INVENTION

The subject clone is a sport of Malling 9 (M9), an unpatented apple rootstock clone. The original plant was selected as a mutation in 1967 from a large stoolbed of M9 plants. The stoolbed had been planted in 1960 and was growing in the Rene Nicolai nursery, Linderstroot, 22-B-3820 Alken, Belgium. The original source of the bed was the East Malling Research Station in England. The clone was one of a group of clones that were selected by Mr. Nicolai and other rootstock specialists for their differences in lateral branching, leaf development and shape, leaf color, thickness of the shoots, rooting ability in the stoolbed, bloom characteristics and other noticed differences from the mother stoolbed plants.

Following its selection, the clone was assigned a number (RN8) and was propagated for further testing and evaluation.

Since all original M9 rootstocks have been found to be virus infected, RN8 stocks were subsequently heat-treated by application of dry heat in order to obtain virus-free specimens. After heat treatment and subsequent virus testing, the new rootstock clone was again exposed to multiplication techniques (stooling) followed by continued testing and evaluation.

Virus-free RN8 progeny plants were expanded into small stoolbed plantings which were planted separately rately in order to examine the new rootstocks’s individual character-

istics in small semi-commercial stoolbed sites.

These small experimental stoolbeds of RN8 were established for such further evaluations as follows:

1. A site at Deveaux, Belgium was planted in the spring of 1974 with 555 plants of the subject clone.
2. A site at Bordeaux, France was planted in 1977 with 200 plants of the subject clone.
3. A site at Wissenhoeve, Belgium was planted in the spring of 1980 with 1,176 plants of the subject clone.
4. A site near St. Truiden, Belgium was planted in the spring of 1982 with 100 plants of the subject clone.
5. A site at Henkaenrts, Belgium was planted in the spring of 1986 with 4,600 plants of the subject clone.
6. A site at Ephrata, was planted in the spring of 1990 with 2,000 plants of the subject clone.

Clone RN8 was subsequently finally selected as a rootstock clone that continues to possess growth and rooting characteristics that are distinctly different from its M9 parent.

It distinguished itself in these beds from its M9 parent in the following ways:

1. The subject clone produces fewer lateral limbs (feathers) than its M9 parent. At the Bordeaux test site in France and at the Ephrata, Wash. site, feathers produced were about one half the number produced on its M9 parent (FIGS. 1 and 2; Tables 1 and 2). RN8 grows less robustly in the stoolbed and exhibits a shorter, stockier growth characteristic when compared to its M9 parent (FIG. 4, M9; and FIG. 5, RN8).

Nodes are spaced closer together on shoots and average stem circumference is significantly more than the average stem Circumference of M9 (Table 2). The average length of feathers on RN8 was slightly less than the average length of feathers on its M9 parent (Table 2).

TABLE 1

Percent of Layer Plants with Side Limbs (Feathers) (Test Stooling Beds at Bordeaux, France)					
Rootstock	Year				
Clone	79/80	80/81	81/82	82/83	Average
M9 (virus-free)	13	8	25	0	11.5
RN8	8	6	13	0	6.8
RN19	41	32	44	19	34.0
RN29	39	22	35	15	27.8

TABLE 2

Growth Characteristics (Test Stooling Beds at Ephrata, Washington)						
Rootstock Clone	Length of Shoot (cm)	Number of Nodes/ Shoot	Number of Spurs/ Shoot	Length of Spur (cm)	Number of Leaves/ Shoots	Circum- ference of Stem (cm)
M9	66.80*	39.20	3.00	1.50	53.00	3.24
RN8	62.10	42.10	1.80	1.20	57.20	3.80
RN19	78.20	41.00	18.60	8.60	88.30	3.51
RN29	86.20	45.60	21.40	10.30	100.00	3.54

*All numbers shown are the average of 100 plants selected at random.

2. Leaves of the subject clone are larger and more rounded in shape and leaf margins are more sinuate than those of M9. Leaves of RN8 are round to oval in shape with broadly acute tips. Theis leaf characteristic is very pronounced in the older leaves (FIG. 3; Table 3).

TABLE 3

Leaf Size and Respetive Petiole Length of Respective Rootstock (Test Stooling Beds at Bordeaux, France)				
Rootstock Clone	Length, L (mm)	Width, W (mm)	L + W (mm)	Length of Petiole
M9 (virus-free)	101.7	63.8	165.5	32.5
RN8	98.8	73.6	172.4	34.0
RN19	91.4	60.0	151.4	30.8
RN29	85.5	57.1	142.6	28.5

3. The profuse blooming characteristic of RN8 is very pronounced and in this respect differs distinctly from its M9 parent. The number of blooms produced on RN8 two-year-old line-out stocks was about two-fold that of its M9 parent (Table 4).

TABLE 4

Bloom Characteristics (Research Station at Gorsum, Belgium - 1985)	
Rootstock Clone	% of Rootstocks With Bloom (1 Year From Stoolbed)
RN8	29
RN19	4
RN29	0
M9 (virus-free)	15

4. Rooting ability (number and quantity of roots produced per length of stoolbed shank) of the subject clone is significantly more than that demonstrated strated by its M9 parent. Also, the average number of rooted plants produced per stoolbed mother plant and/or per meter of stoolbed row is significantly more than the average produced by M9 mother stocks (Table 5 , 6 and 7). This difference in number of rooted daughter plants was approximately two-fold at the test site near Bordeaux, France after five years in the stoolbed (Table 7). These characteristics are stable and have been transmitted without change through succeeding generations.

TABLE 5

RN8 Stoolbed Production (Deveaux, Belgium) No. Mother Plants - 555 Length of Bed (m) - 185					
Year	82/83	83/84	84/85	85/86	86/87
Grade (mm)					
10/12	300	150	150	1,100	500
8/10	0	0	700	0	0
6/10	4,650	3,350	0	0	2,800
6/8	0	0	3,700	3,100	0
5/7	0	0	0	0	0
4/6	2,400	1,800	3,200	1,900	3,900
04	0	600	0	0	0
#2s	1,000	1,400	600	900	1,900
Totals	8,350	7,300	8,350	7,000	9,100
Per Mother Plant	15.05	13.15	15.05	12.61	16.40
Per Meter	45.14	39.46	45.14	37.84	49.19
Average					
Year	87/88	88/89	89/90	90/91	82/91
Grade (mm)					
10/12	675	200	0	0	
8/10	925	1,925	850	2,225	
6/10	0	0	0	0	
6/8	3,300	2,700	3,000	0	
5/7	0	0	0	3,450	
4/6	2,700	1,200	3,400	1,600	
04	0	0	0	0	
#2s	1,300	1,100	3,400	700	
Totals	8,900	7,125	10,650	7,975	
Per Mother Plant	16.04	12.84	19.19	14.37	14.96
Per Meter	48.11	38.51	57.57	43.11	44.89

TABLE 6

M9 (Virus-Free) Stoolbed Production (Deveaux, Belgium)					
No. Mother Plants - 561					
Length of Bed (m) - 187					
Year	82/83	83/84	84/85	85/86	86/87
Grade (mm)					
10/12	225	100	250	750	464
8/10	0	0	450	0	0
6/10	4,150	2,950	0	2,350	2,200
6/8	0	0	3,400	0	0
5/7	0	0	0	0	0
4/6	1,800	1,600	2,200	1,600	3,000
04	0	300	0	0	0
#2s	700	800	500	500	1,400
Totals	6,875	5,750	6,800	5,200	7,064
Per Mother Plant	12.25	10.25	12.12	9.27	12.59
Per Meter	36.76	30.75	36.36	27.81	37.78
Average					
Year	87/88	88/89	89/90	90/91	82/91
Grade (mm)					
10/12	75	—	—	—	
8/10	450	—	—	—	
6/10	0	—	—	—	
6/8	2,700	—	—	—	
5/7	0	—	—	—	
4/6	2,200	—	—	—	
04	0	—	—	—	
#2s	400	—	—	—	
Totals	5,825	—	—	—	
Per Mother Plant	10.38	—	—	—	11.14
Per Meter	31.15	—	—	—	33.43

TABLE 7

Average Number of Plants Per Stoolbed Mother Plant					
(Test Stooling Beds at Bordeaux, France)					
Rootstock Clone	Year Planted and Age				Average
	79/80 2-Yr	80/81 3-Yr	81/82 4-Yr	82/83 5-Yr	
M9 (virus-free)	1.2	2.6	.5	4.0	8.3
RN8	2.1	3.9	3.8	6.4	16.2
RN19	2.6	4.4	6.5	9.1	22.6
RN29	4.4	5.6	5.7	11.3	27.0

BRIEF DESCRIPTION OF THE DRAWINGS

Since the subject clone is intended to be used only as rootstock for apple cultivar, the drawings center on the vegetative parts rather than the flowers and fruits.

FIGS. 1 and 2 show the absence of lateral brances (feathers) on daughter stoolbed plants.

FIG. 3 shows the round- to oval-shaped leaves, broadly acute tips and sinuate leaf serration.

FIG. 4 shows the average height in centimeters of M9 rootstock daughter plants in a stoolbed row in Ephrata, Wash.

FIG. 5 shows the average height in centimeters of RN8 rootstock daughter plants in a stoolbed row in Ephrata Wash.

DESCRIPTION OF VEGATATIVE CHARACTERISTICS

The following is a detailed description of the new apple rootstocks growth characteristics based on the stoolbed plants grown at the six test sites described above. Colors of the leaves and shoots are based on their appearance at the sites where grown. In those instances where a precise color assessment can be made, reference is to the Munsell Limit Color Cascade Table. In other instances, general color terms are used in accordance with the ordinary dictionary significance.

General habit:
Strength of growth.—Vigorous, stiff.
Habit.—Upright.
Branching.—Very few, flexible.
Vegetative Shoots:
Bark color.—Greenish-brown (21-15).
Pubescence.—Very finely tomentose.
Lenticels.—Few, inconspicuous, widely spaced, small, white.

Leaves:
Size.—7.4 cm wide, 10.0 cm long.
Shape.—Oval to round, slightly asymmetric.
Base.—Obtuse, attenuated.
Apex.—Broadly acute.
Serrations.—Sinuate at sides, very obtuse to lacking at base.
Spacing.—Normal phyllotaxical arrangement for Malus.
Color.—Light green (22-14) with pinkish tips.

Leaf scars:
Shape.—Broad V, slightly raised.
Color.—Brown.

Petioles:
Shape.—Slender, slightly channeled.
Length.—Medium, 3.4 cm.
Color.—Reddish-brown (32-12).
Pose.—Acute angle near tip, slightly acute to horizontal along sides.
Glands.—None.

Stipules:
Size.—Small, 3.5-5 mm, inconspicuous, minutely serrated.
Color.—Light green.
Pose.—Mostly reposed along petiole.

Lateral buds:
Size.—Small.
Shape.—Flat, angular.
Color.—Dark brown.
Pubescence.—Finely tomentose.

Apical buds:
Size.—Larger than lateral buds.
Shape.—Obtuse.
Color.—Dark brown.
Pubescence.—Tomentose.

Dormant Plant

Shoots:
Size.—Stocky, 6–10 mm in caliper at base, stiff, brittle.
Bark Color.—Dark brown (25-15-1).
Pubescence.—Conspicuously pubescent.
Nodes.—Larger in diameter than internodes with slight shoulder at each side on leaf scar.
Internodes.—Smooth, regularly spaced.

Stooling and Root Characteristics

Rooting and stooling: Multiplies well in stoolbeds, forming strong roots along full length of shank. Roots arise from nodes.
Habit of growth in stoolbed: Shoots arise from nodes, grow mostly outward at a slight angle.

Flower Characteristics

Flowers:
 Size.—3.5 cm in diameter.
 Color.—White with pink streaks at base.
Fruit: No commercial value, but useful for identification. No
 Shape.—Round to slightly oblong.
 Color.—Red Stripes.
 Size.—About 4.5 cm in diameter and about 5.5 cm in length.
 Flavor.—Bland, tasteless.

General Characteristics

Rootsuckering: Few rootsuckers.
Size control potential: Size of trees budded on the subject rootstocks will vary according to the vigor of the cultivar and/or type of soil and orchard management. “Standard” growing cultivars such as Red and Golden Delicious are

reduced in size about 70% when compared to apple seedling rootstocks. Less vigorous varieties are more reduced in size and more vigorous varieties are less reduced in size.
Dwarfing: Fully dwarfing.
Precocity: Varies according to variety, most cultivars often flower and set fruit the first year in the orchard and thereafter bear fruit each year.
Compatibility: Graft compatible with all major commerical fruiting varieties.
Root Anchorage: Needs support.
Hardiness: Hardy in most commercial apple growing areas.
Disease and pest resistance: Average resistance to common diseases and pests of apple. Tested and found free of all known virus diseases to apple.
What is claimed is:
1. A new and distinct apple tree clone, a sport of the Malling 9, referred to by the cultivar designation ‘M9-RN8’, substantially as herein shown and described, characterized particularly by its ability to serve as a rootstock for grafting of apple tree cultivars to produce dwarf apple trees and by its ability to rot very readily in the stoolbed with very little lateral branching and produce high quality stoolbed rootstock plants for nursery use.

* * * * *



FIG. 1

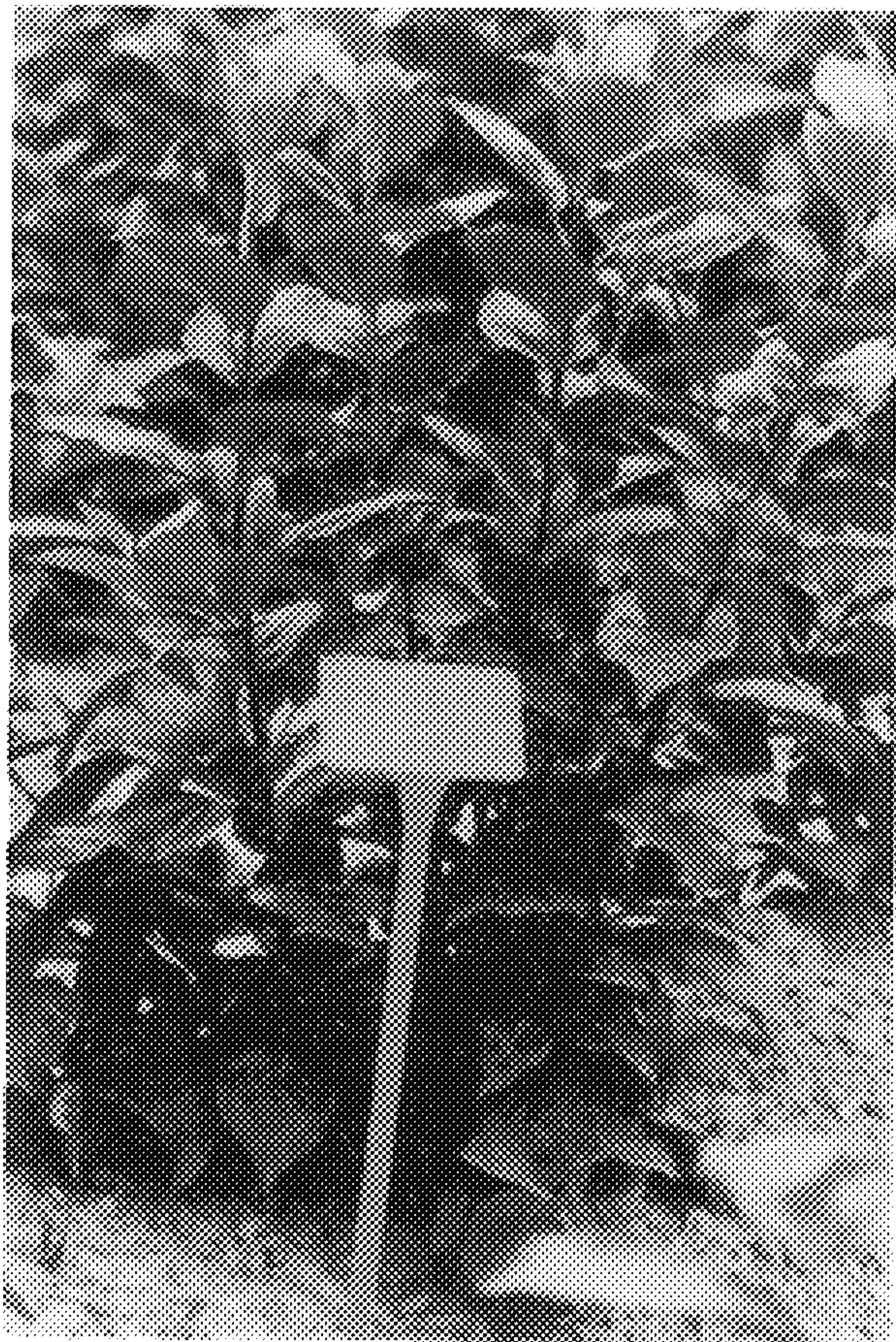
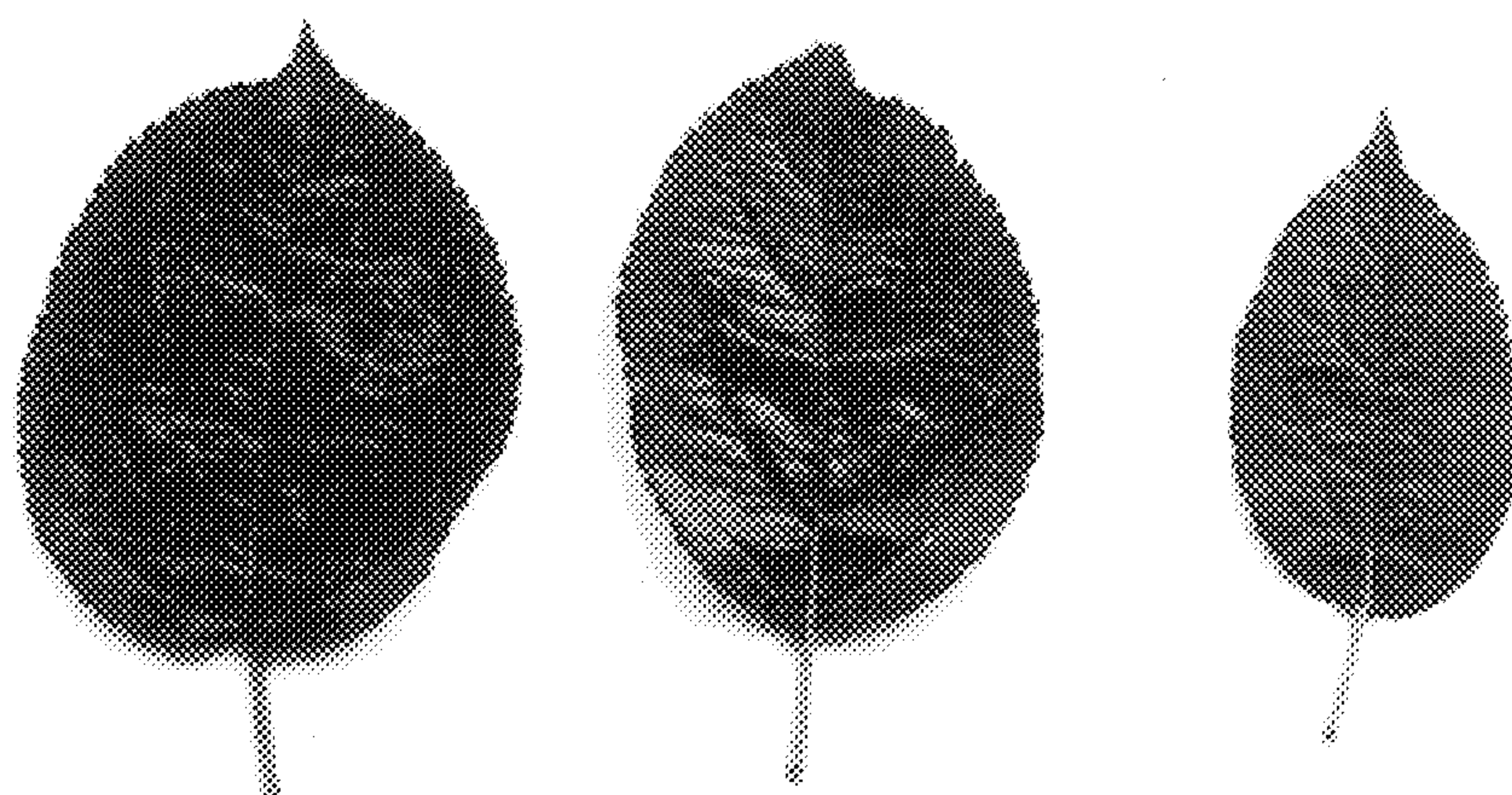


FIG. 2



RN - 8

FIG. 3



FIG. 4

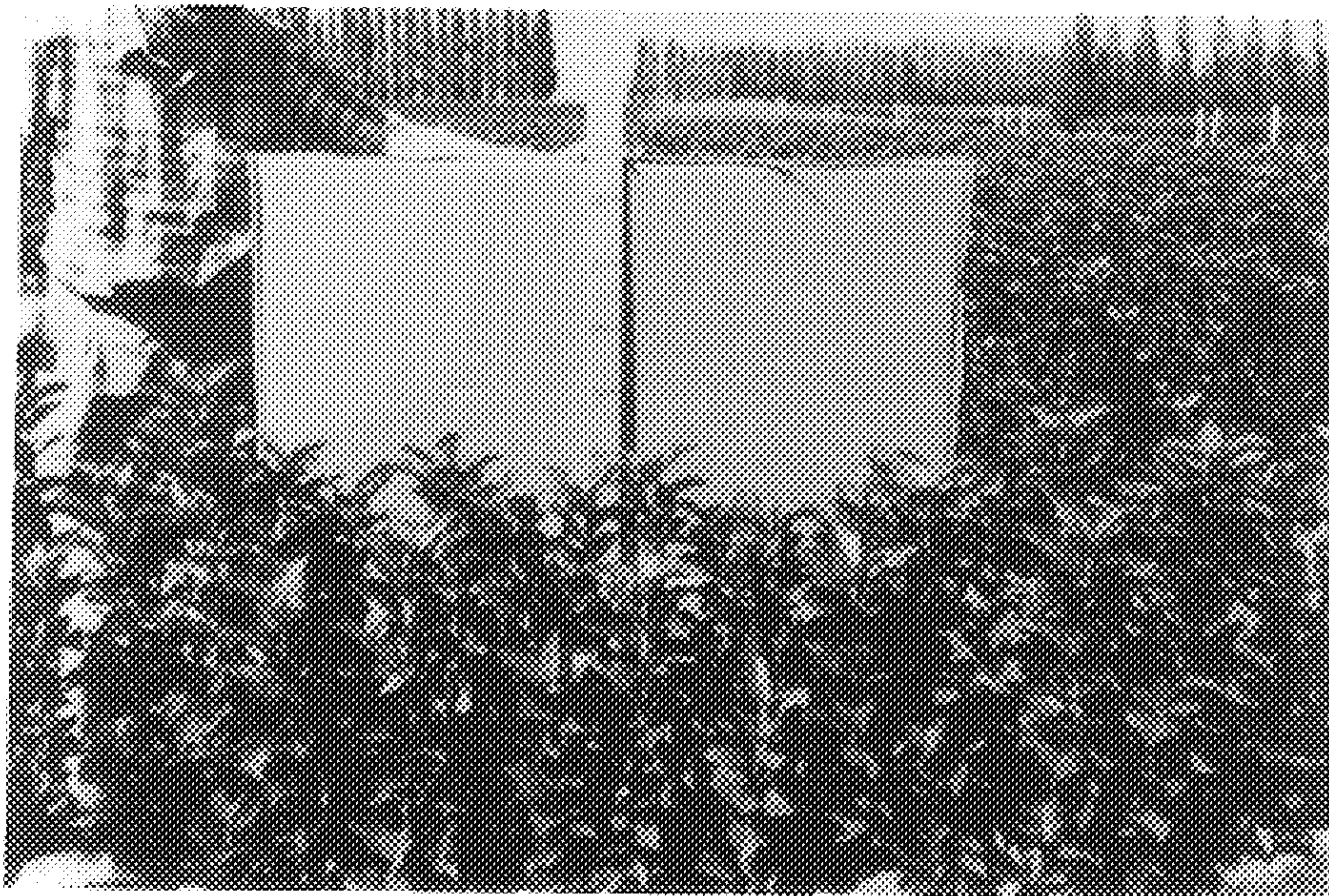


FIG. 5