

INTERNATIONAL  
STANDARD

ISO  
4628-4

Second edition  
2003-09-01

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**Paints and varnishes — Evaluation of  
degradation of coatings — Designation of  
quantity and size of defects, and of  
intensity of uniform changes in  
appearance —**

**Part 4:  
Assessment of degree of cracking**

*Peintures et vernis — Évaluation de la dégradation des revêtements —  
Désignation de la quantité et de la dimension des défauts, et de  
l'intensité des changements uniformes d'aspect —*

*Partie 4: Évaluation du degré de craquelage*



Reference number  
ISO 4628-4:2003(E)

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Published in Switzerland

## Contents

Page

Foreword .....	iv
1 Scope.....	1
2 Normative references .....	1
3 Terms and definitions.....	1
4 Assessment .....	1
5 Expression of results.....	2
6 Test report.....	3
Annex A (informative) Examples of types of cracking .....	6

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4628-4 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 4628-4:1982), of which it constitutes a mainly editorial revision. Examples of different types of cracking have been added as an informative annex.

ISO 4628 consists of the following parts, under the general title *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance*:

- *Part 1: General introduction and designation system*
- *Part 2: Assessment of degree of blistering*
- *Part 3: Assessment of degree of rusting*
- *Part 4: Assessment of degree of cracking*
- *Part 5: Assessment of degree of flaking*
- *Part 6: Assessment of degree of chalking by tape method*
- *Part 7: Assessment of degree of chalking by velvet method*
- *Part 8: Assessment of degree of delamination and corrosion around a scribe*
- *Part 10: Assessment of degree of filiform corrosion*

# Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance —

## Part 4: Assessment of degree of cracking

### 1 Scope

This part of ISO 4628 describes a method for assessing the degree of cracking of coatings by comparison with pictorial standards, using the designation system defined in ISO 4628-1.

ISO 4628-1 defines the system used for designating the quantity and size of defects and the intensity of changes in appearance of coatings and outlines the general principles of the system. This system is intended to be used, in particular, for defects caused by ageing and weathering, and for uniform changes such as colour changes, for example yellowing.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4628-1, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### degree of cracking

rating characterizing cracks in a coating in terms of quantity, size and depth

### 4 Assessment

Assess the quantity of cracking by reference to Table 1 and using as an example Figure 1 or 2, depending on the type of cracking.

NOTE Figure 1 shows cracking without preferential direction and Figure 2 shows cracking in one preferential direction, which occurs with substrates such as wood ("anisotropic" substrates). Other forms of cracking occur, but the principles of assessing the quantity remain the same.

Table 1 — Rating scheme for designating the quantity of cracks

Rating	Quantity of cracks
0	none, i.e. no detectable cracks
1	very few, i.e. small, barely significant number of cracks
2	few, i.e. small but significant number of cracks
3	moderate number of cracks
4	considerable number of cracks
5	dense pattern of cracks

If specified, assess the average size of the cracks in accordance with Table 2.

Table 2 — Rating scheme for designating the size of cracks

Rating	Size of cracks
0	not visible under x 10 magnification
1	only visible under magnification up to x 10
2	just visible with normal corrected vision
3	clearly visible with normal corrected vision
4	large cracks generally up to 1 mm wide
5	very large cracks generally more than 1 mm wide

Where the test area exhibits cracks of various sizes, quote as the size rating that of the largest cracks which are numerous enough to be typical of the test area.

If possible, indicate the depth of cracking by reference to the level in the coating system to which the cracks penetrate. A distinction is made between three main types of failure by cracking:

- a) surface cracks which do not fully penetrate the top coat (i.e. checking);
- b) cracks which penetrate the top coat, the underlying coat(s) being substantially unaffected;
- c) cracks which penetrate the whole coating system.

Carry out the assessment under good illumination.

## 5 Expression of results

The numerical ratings for the quantity and, if specified, size of the cracks, together with the depth of cracking (a, b or c), shall be indicated as given in the following example:

cracking; degree of cracking 2(S3)b<sup>1)</sup>,

together with the approximate dimensions of the area concerned, or its proportion of the total area, expressed as a percentage.

If necessary, the assessment may be amplified in words, for example "cracking in one preferential direction" and by using the descriptions given in Annex A.

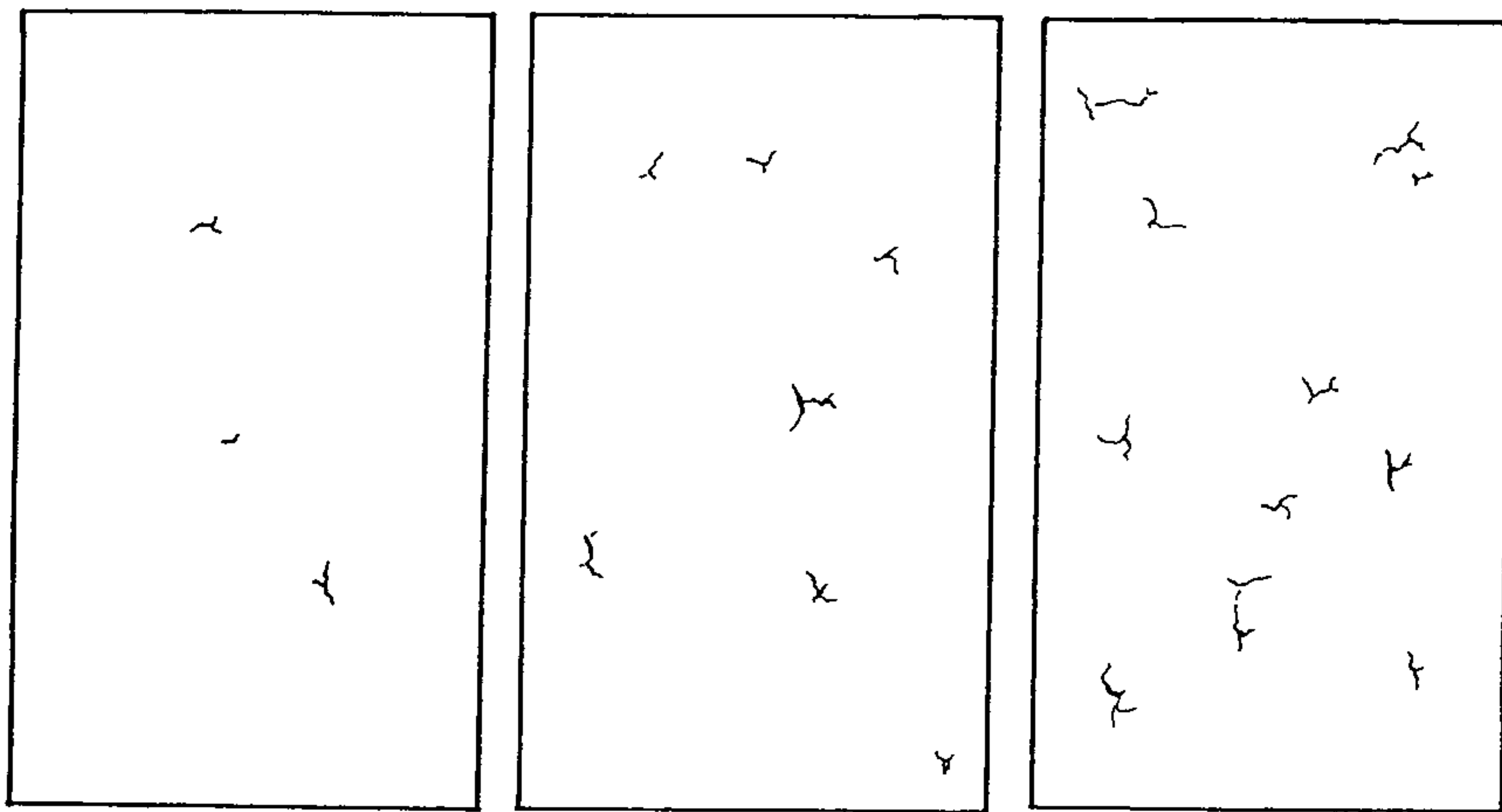
1) i.e. quantity 2, size 3; the cracks penetrate the top coat; the underlying coat(s) are substantially unaffected.

## 6 Test report

The test report shall contain at least the following information:

- a) all details necessary to identify the coating examined;
- b) a reference to this part of ISO 4628 (ISO 4628-4:2003);
- c) the type of surface examined, its size and, if appropriate, its location;
- d) the result of the assessment in accordance with Clause 5;
- e) an indication of the illumination under which the assessment was carried out;
- f) any unusual features (anomalies) observed during the assessment;
- g) the date of the examination.

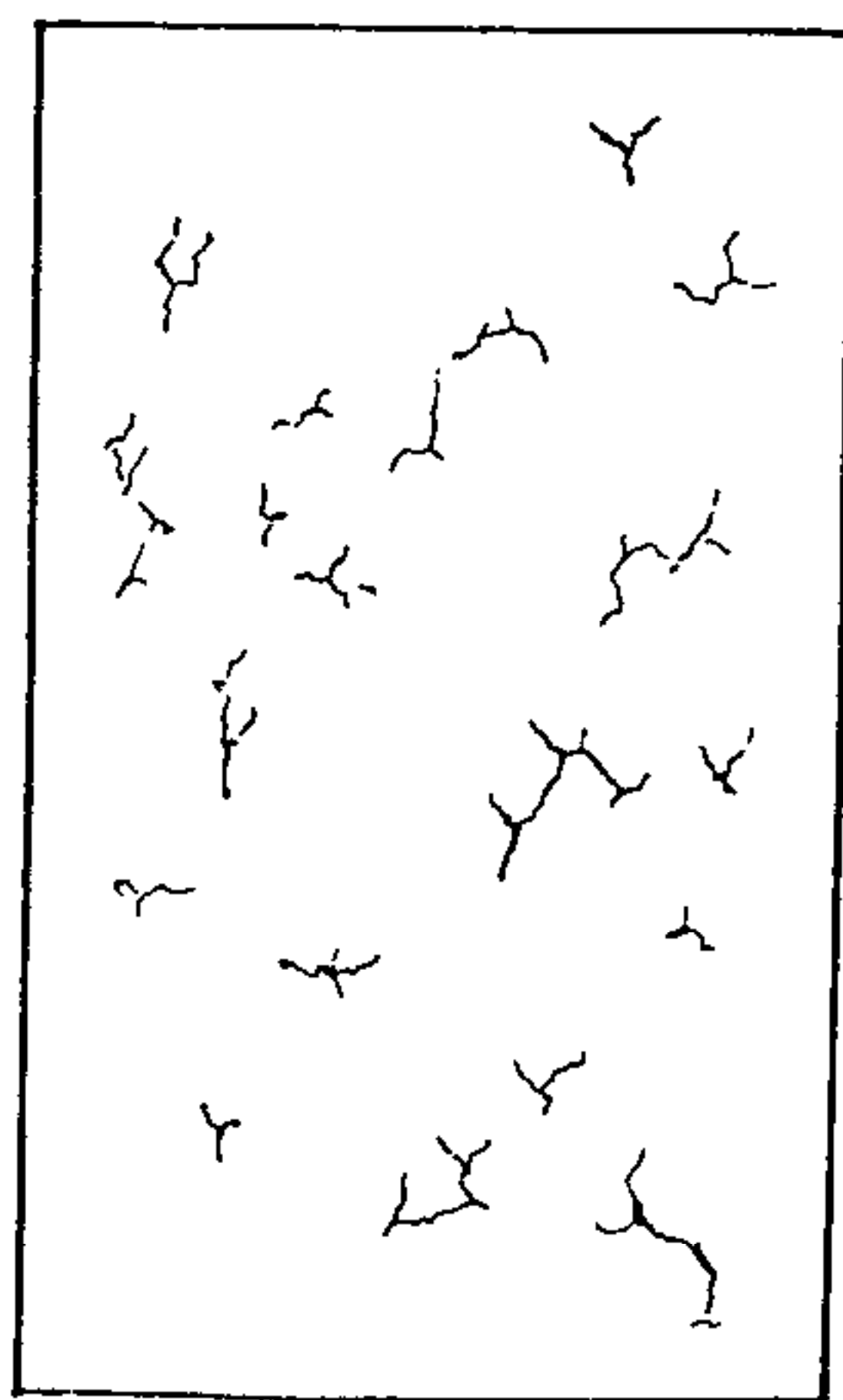




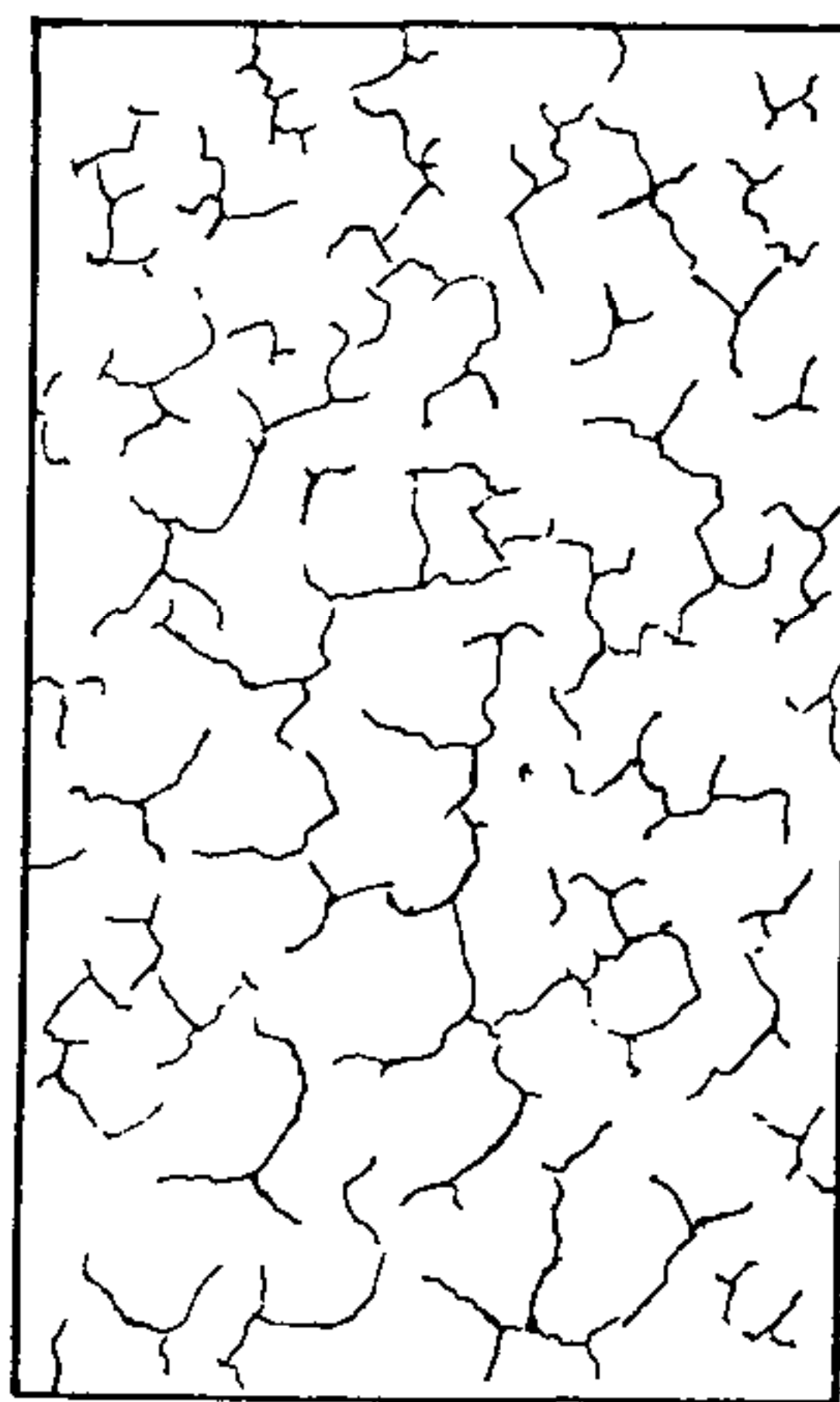
Quantity (density) 1

Quantity (density) 2

Quantity (density) 3



Quantity (density) 4



Quantity (density) 5

Figure 1 — Cracking without preferential direction  
(panels of area 1 dm<sup>2</sup> to 2 dm<sup>2</sup>)



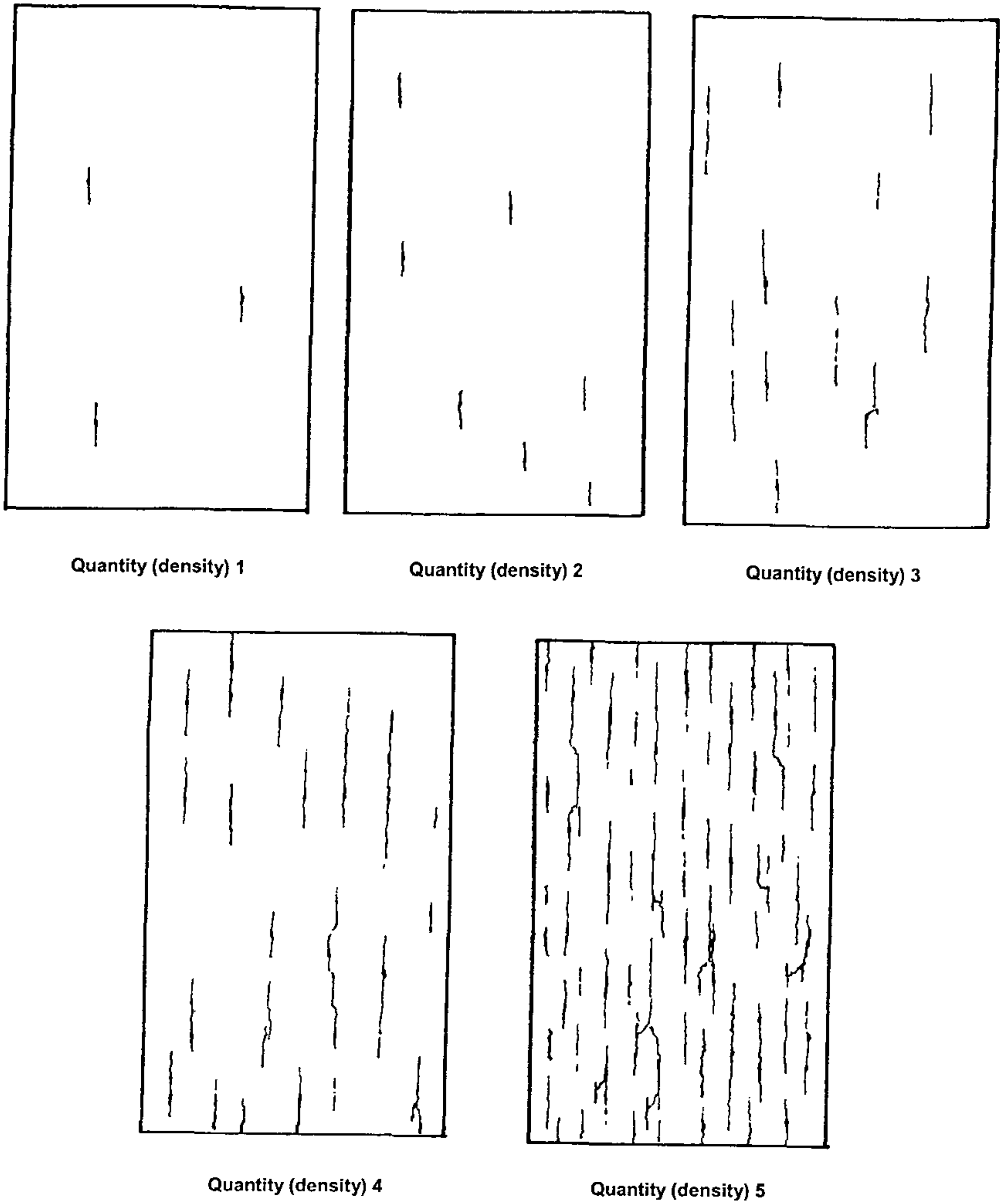
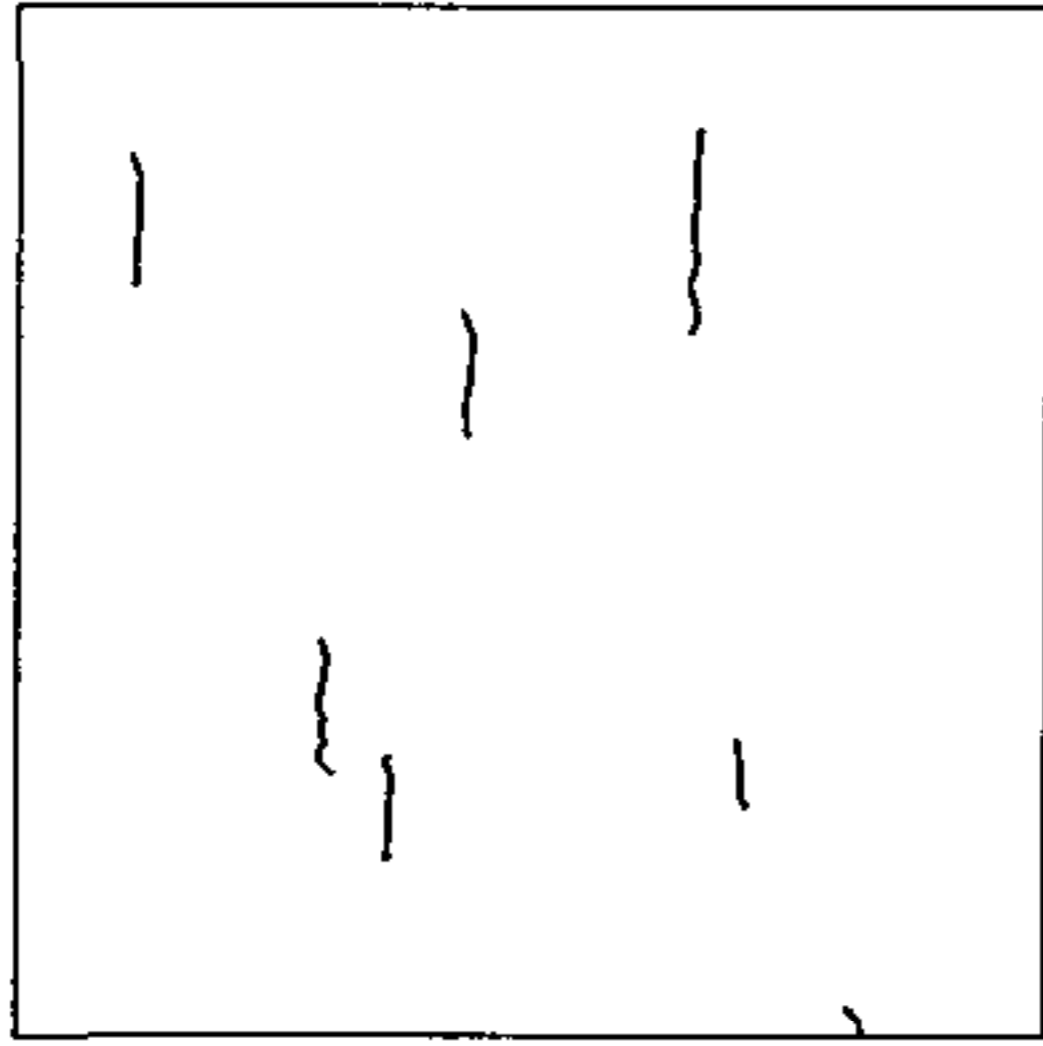


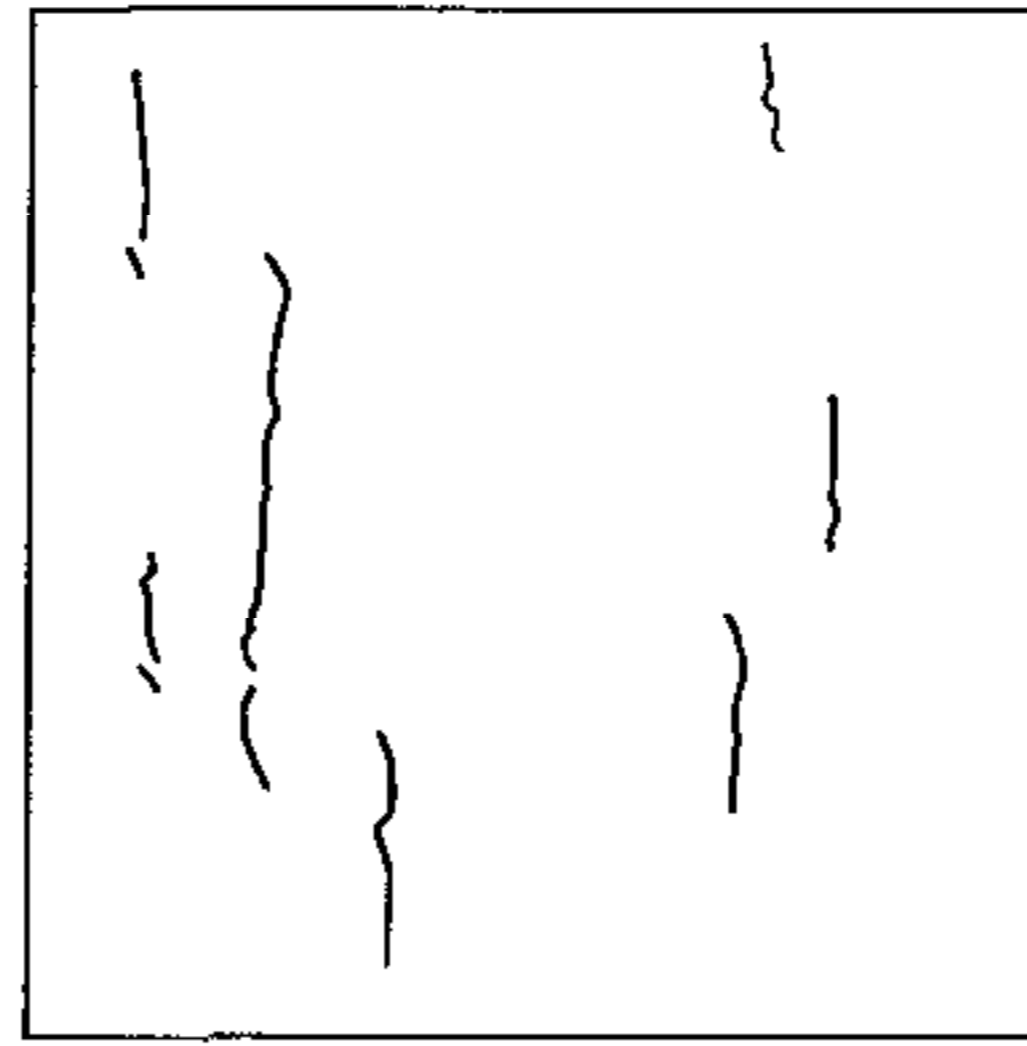
Figure 2 — Cracking in one preferential direction  
(for example due to brush marks or wood grain)  
(panels of area 1 dm<sup>2</sup> to 2 dm<sup>2</sup>)

**Annex A**  
(informative)

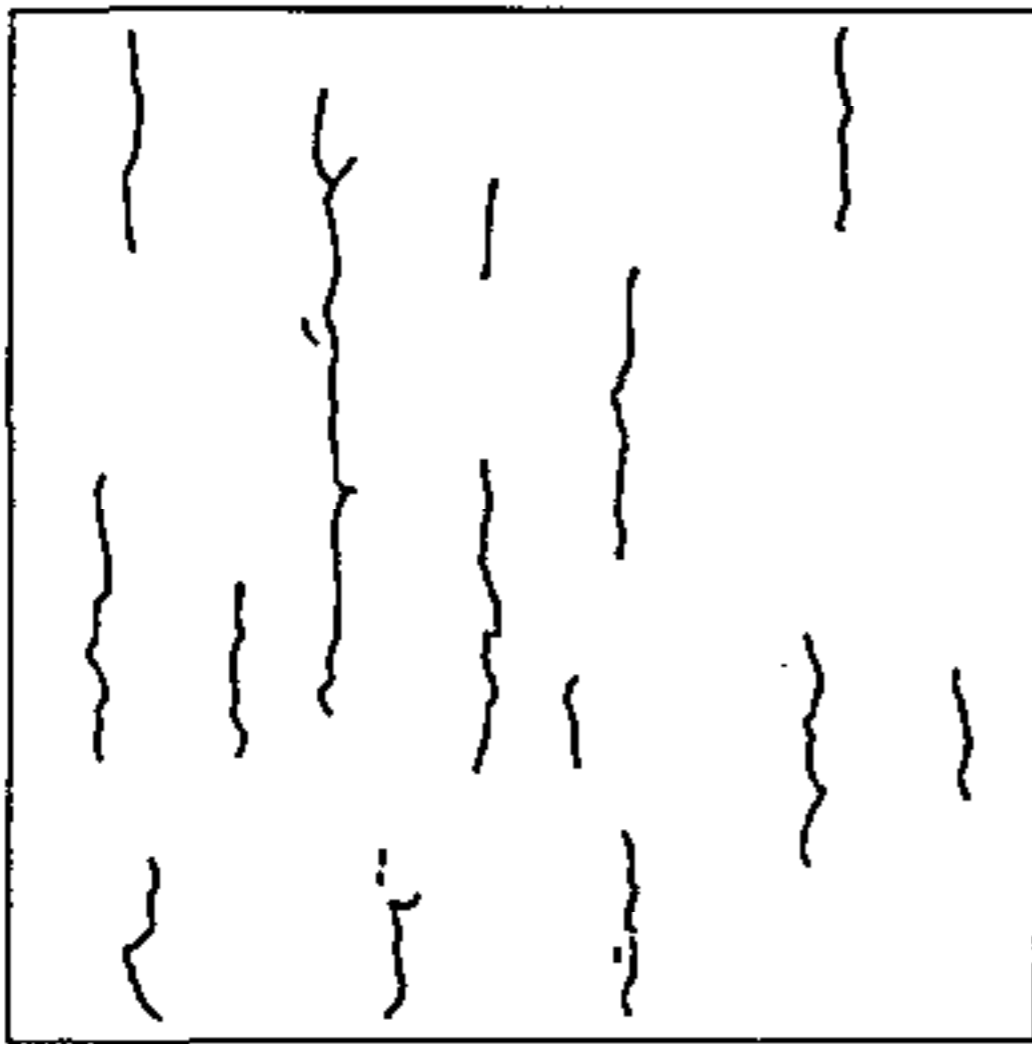
**Examples of types of cracking**



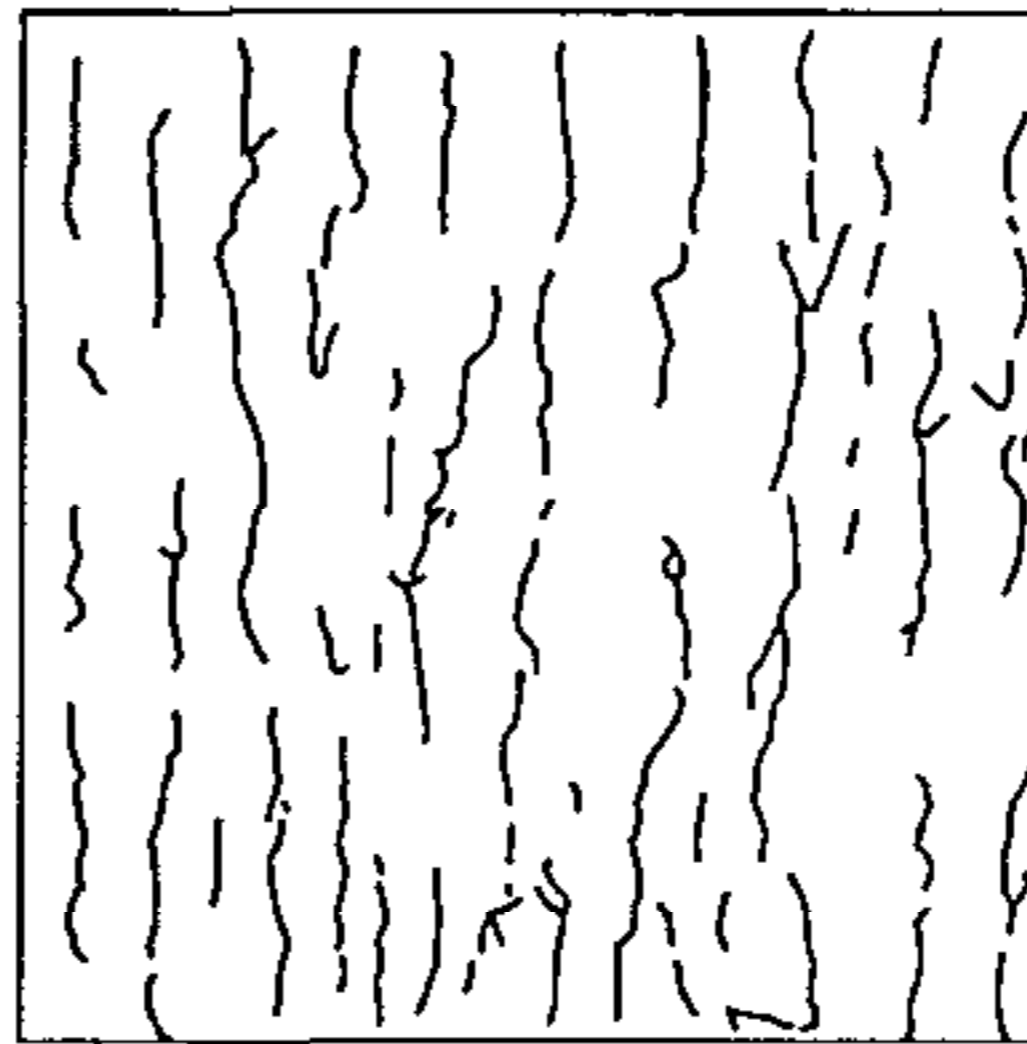
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**Figure A.1 — Irregular**

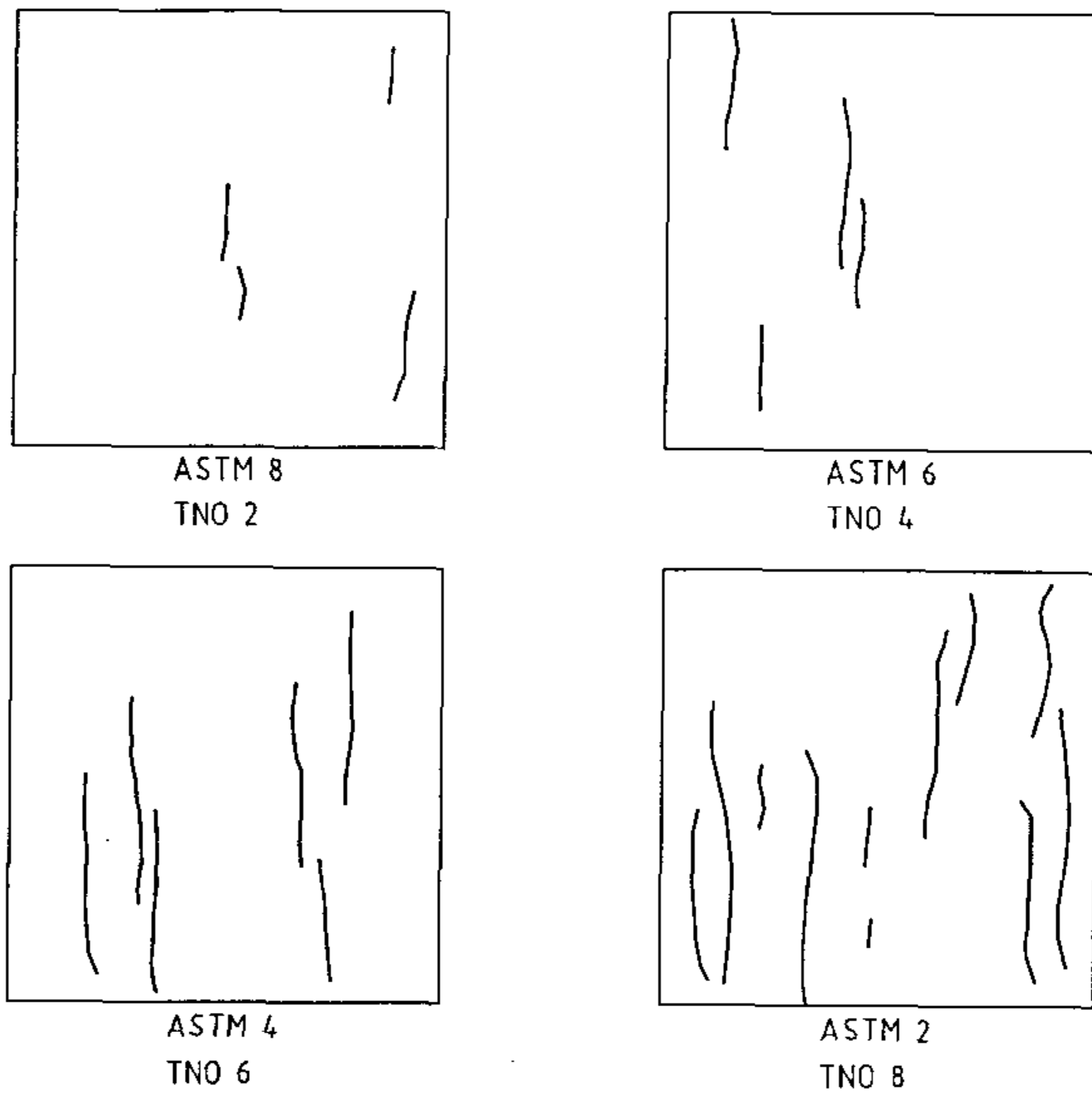


Figure A.2 — Long line

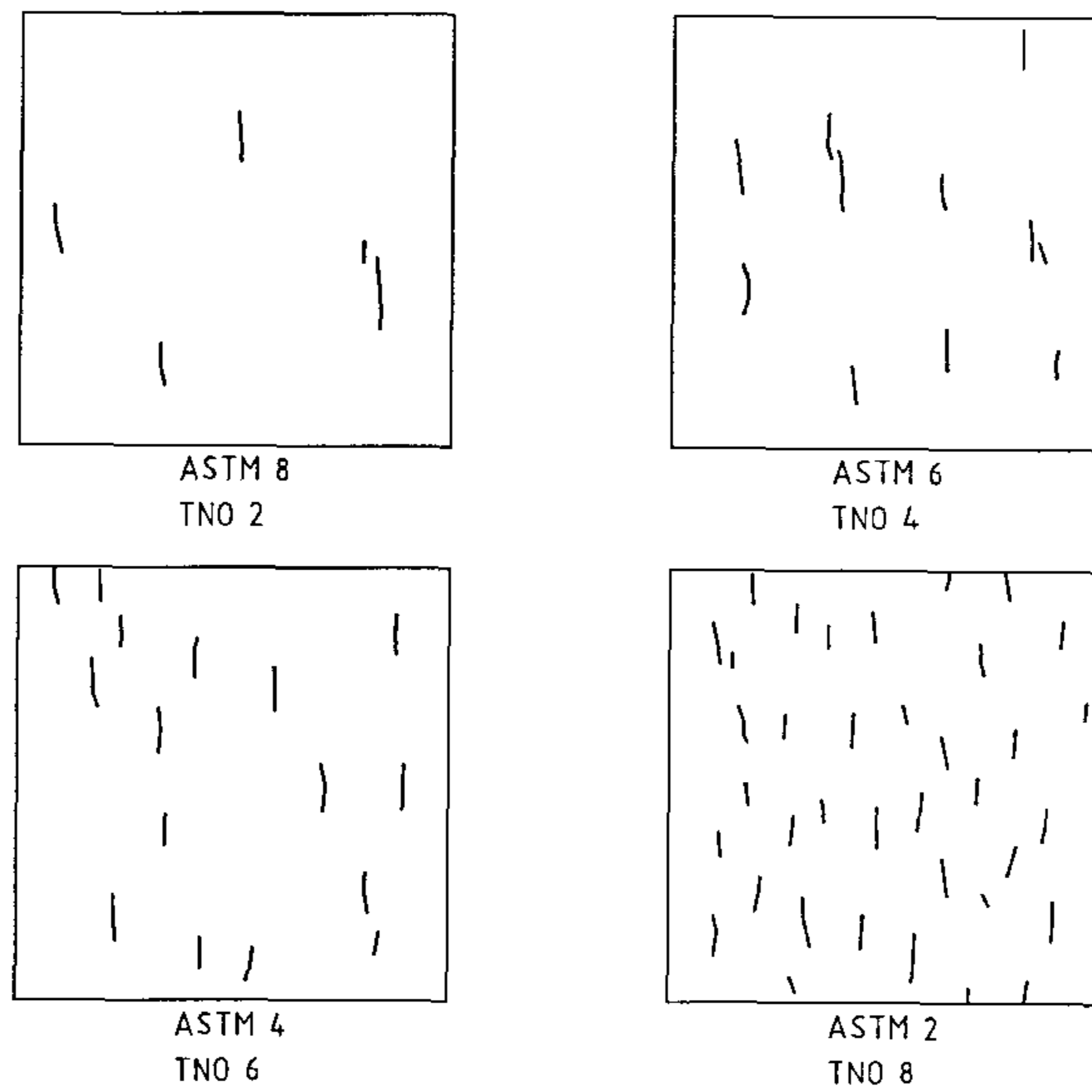
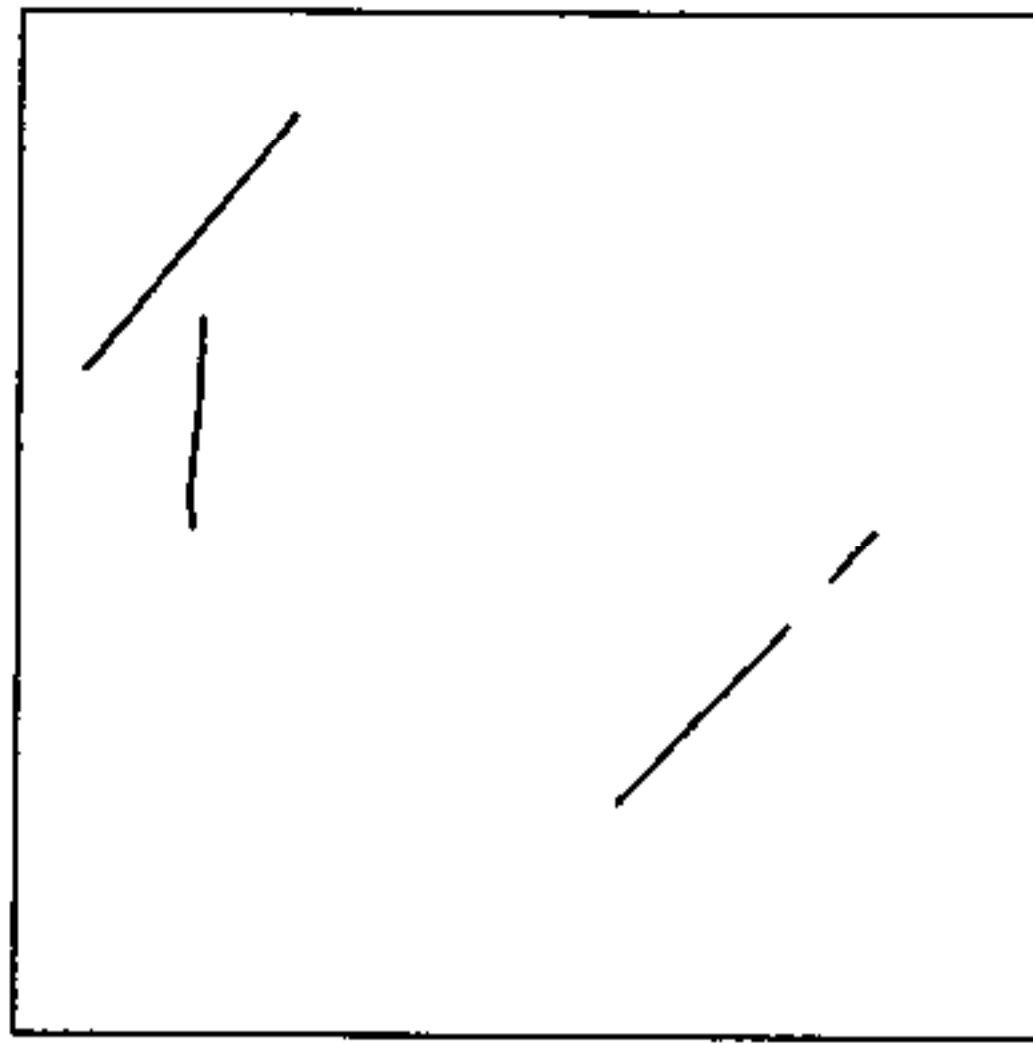
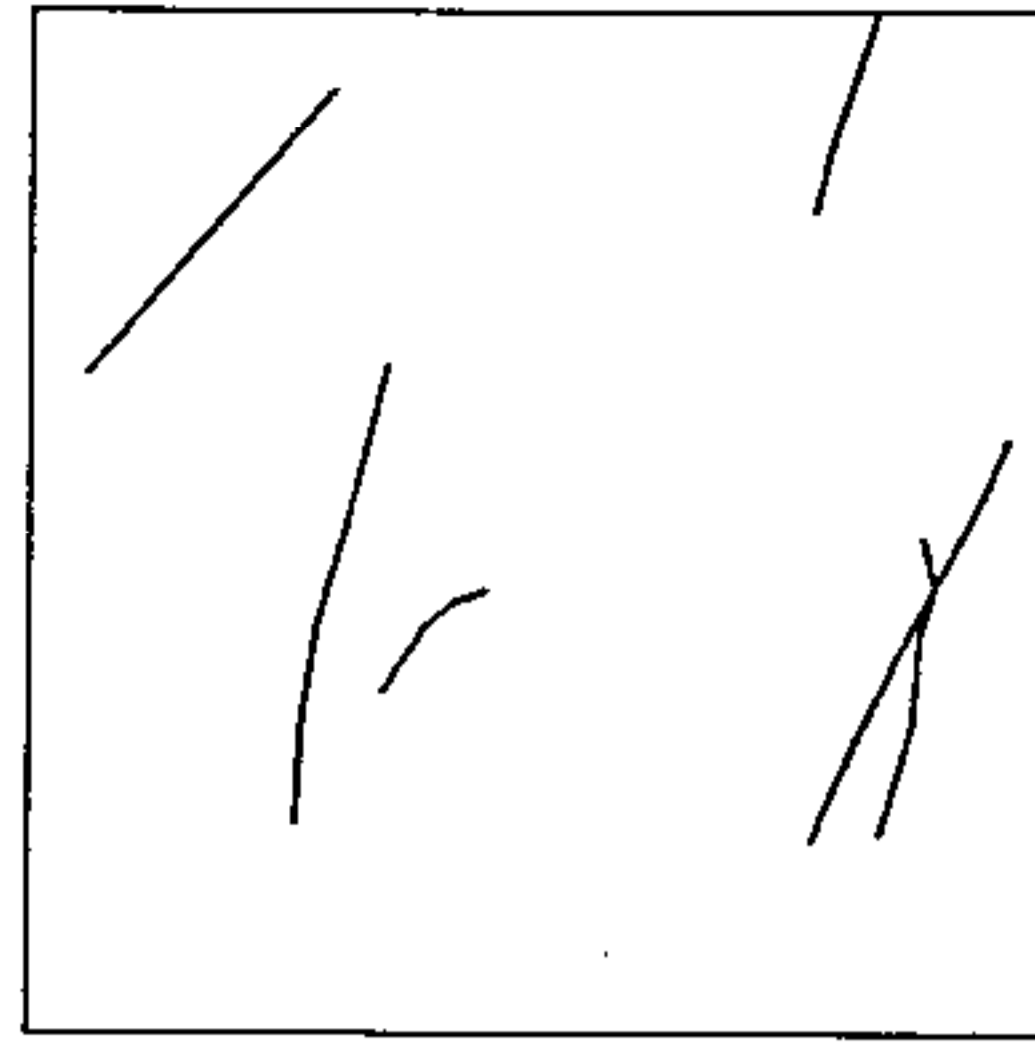


Figure A.3 — Short parallel



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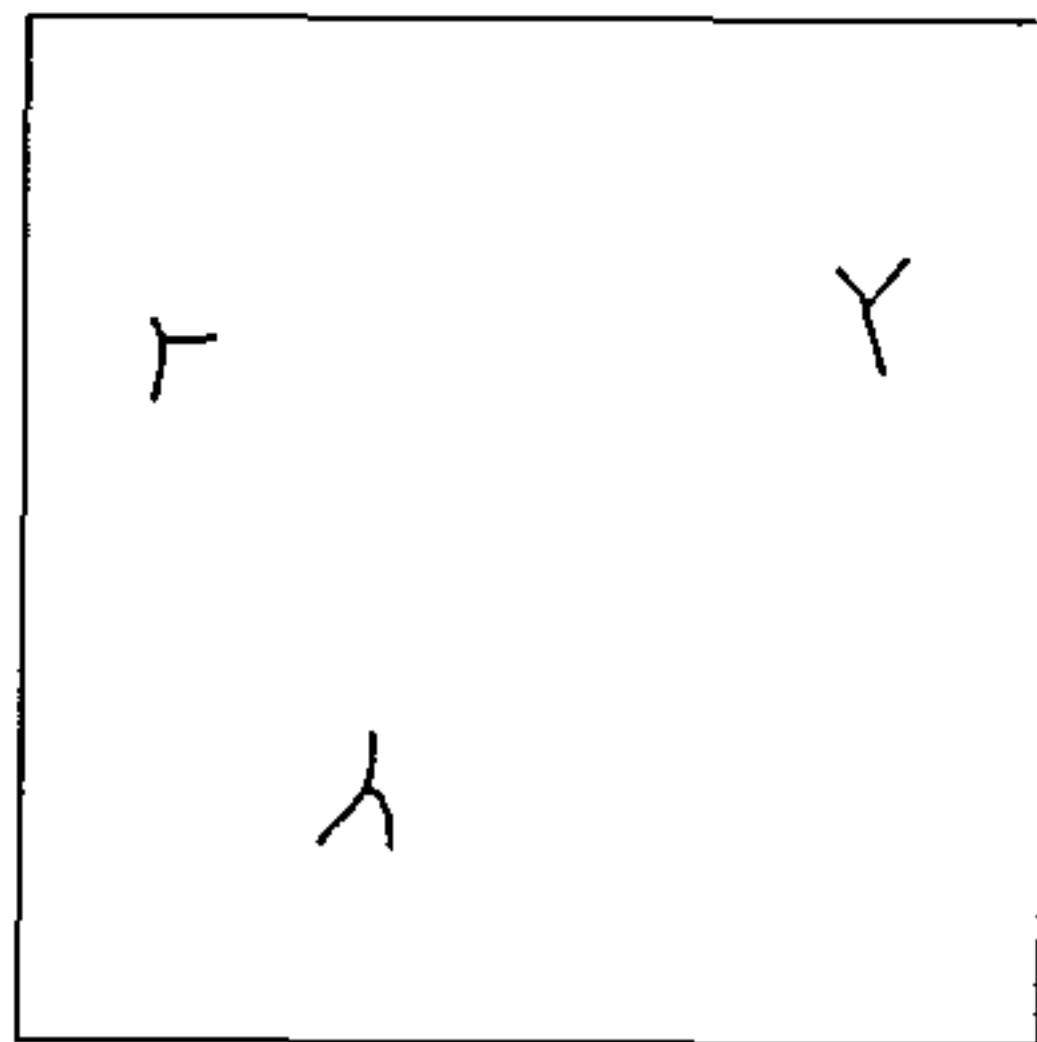


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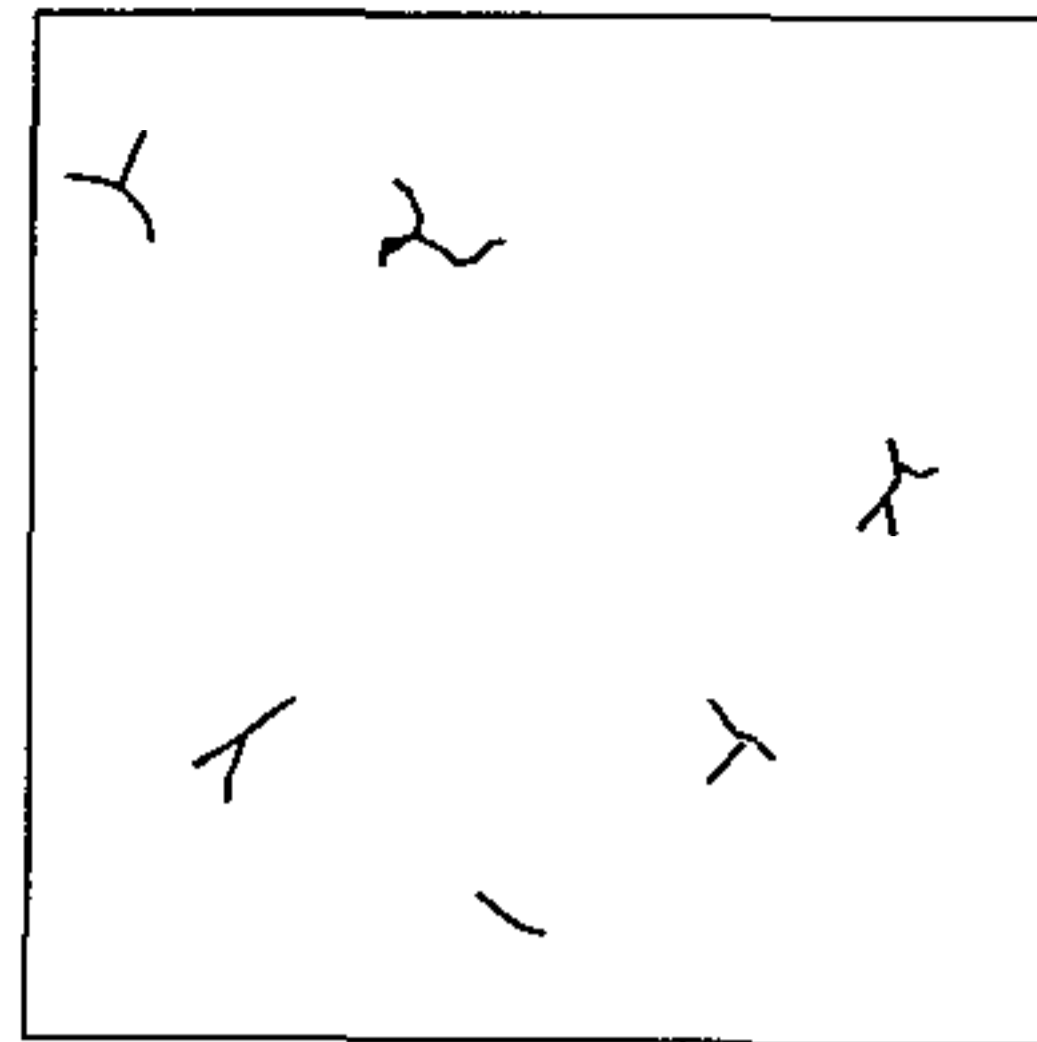


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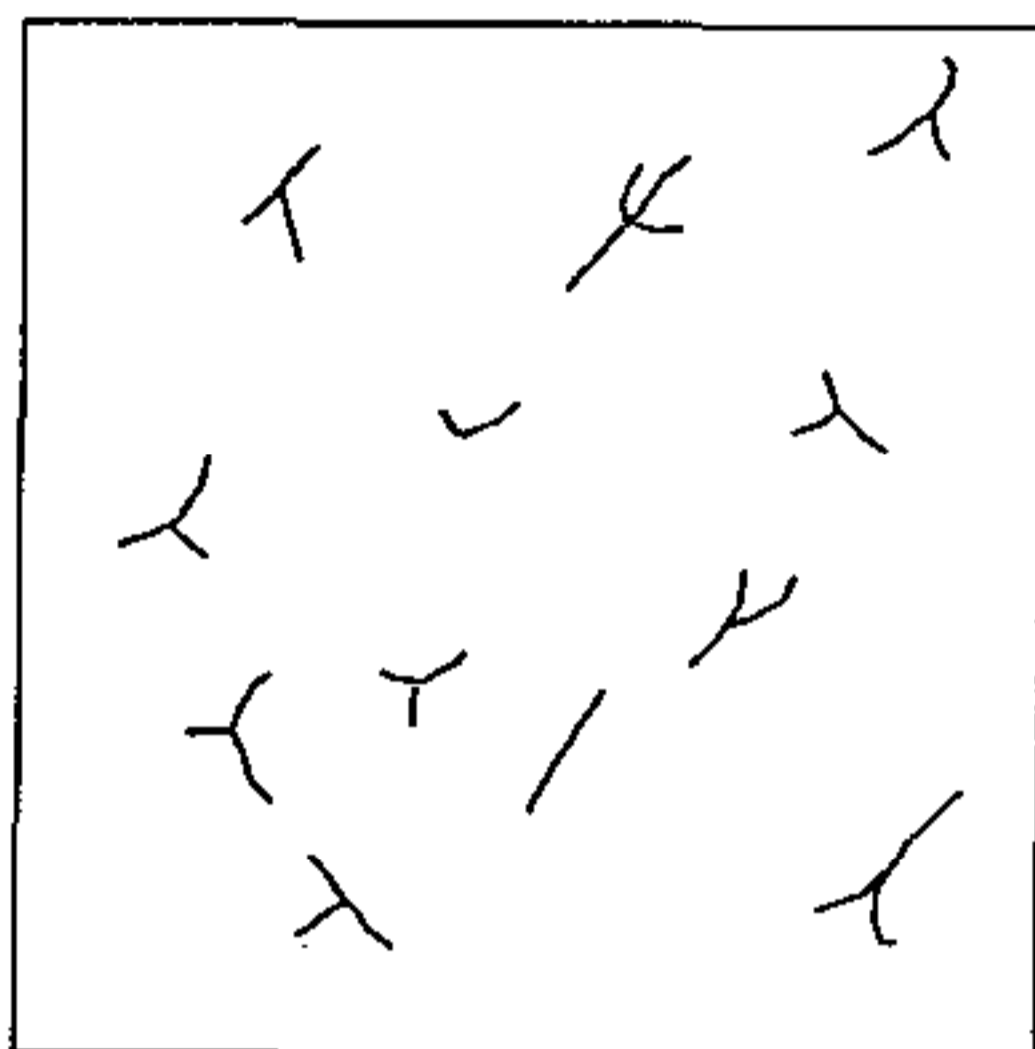
Figure A.4 — Switch



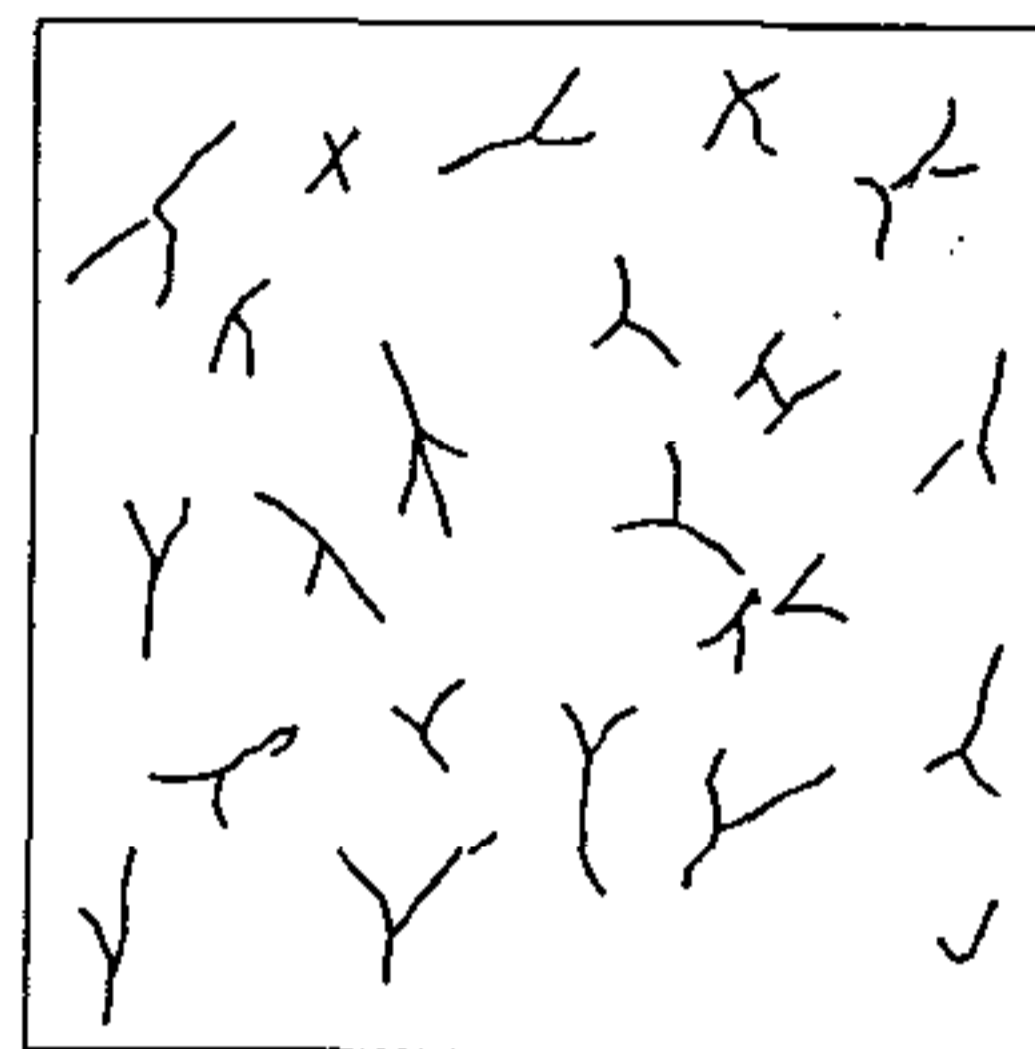
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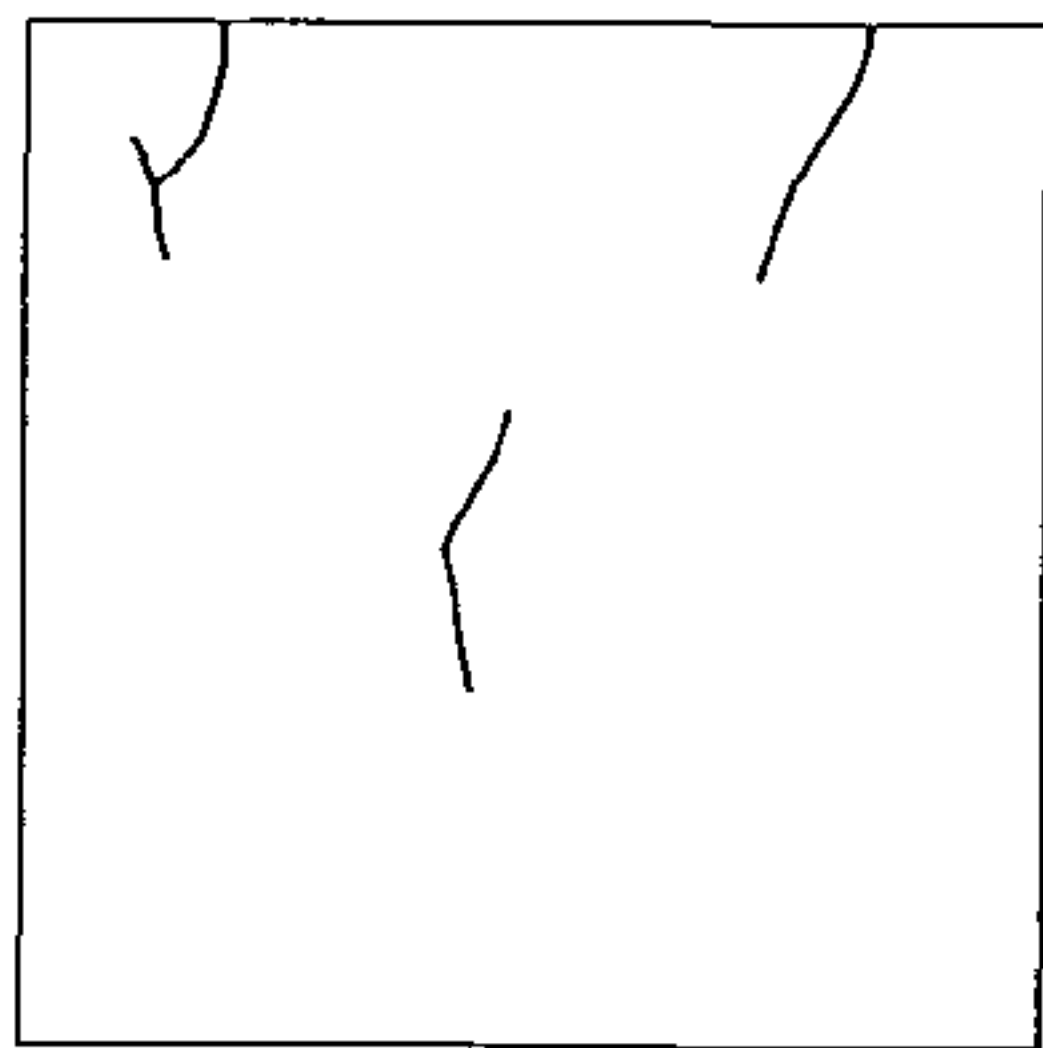


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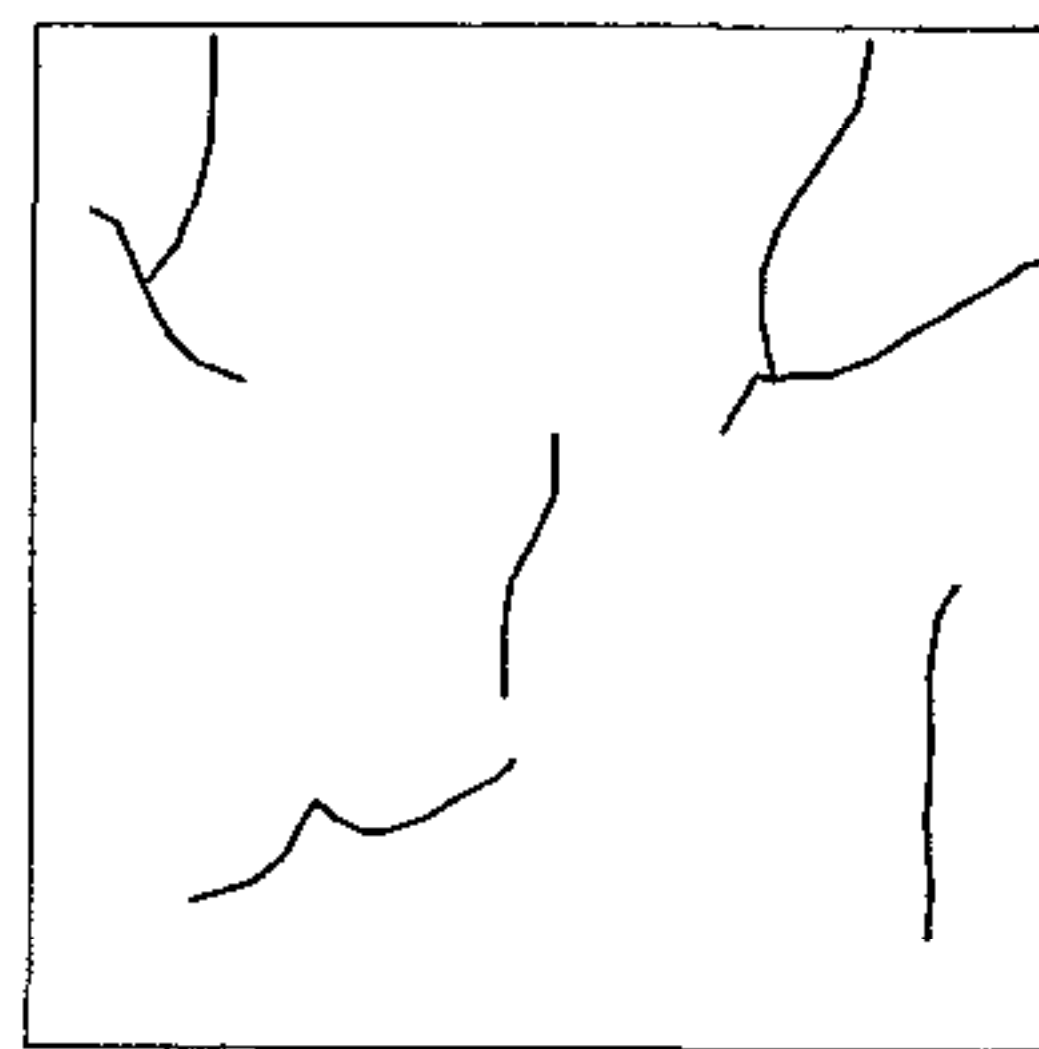


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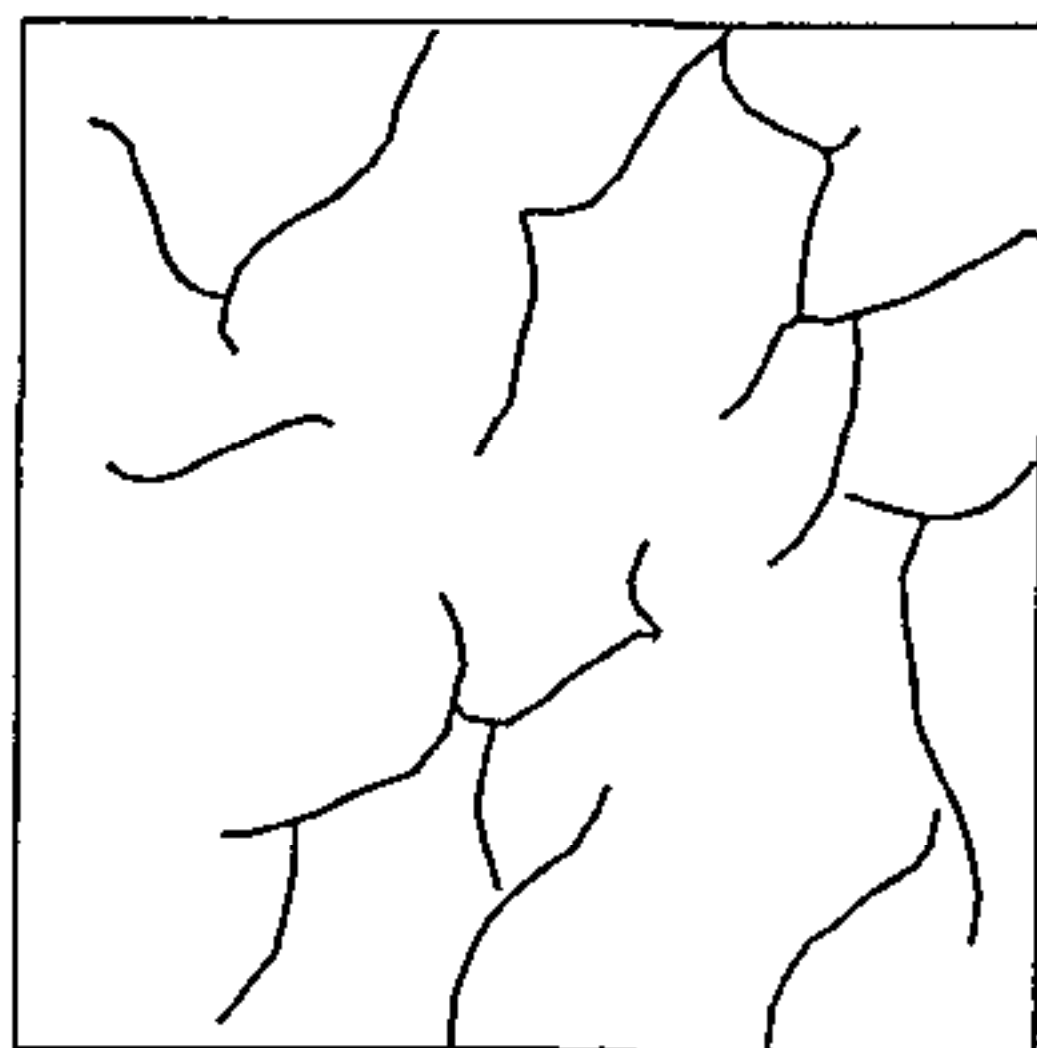
Figure A.5 — Crow's-foot



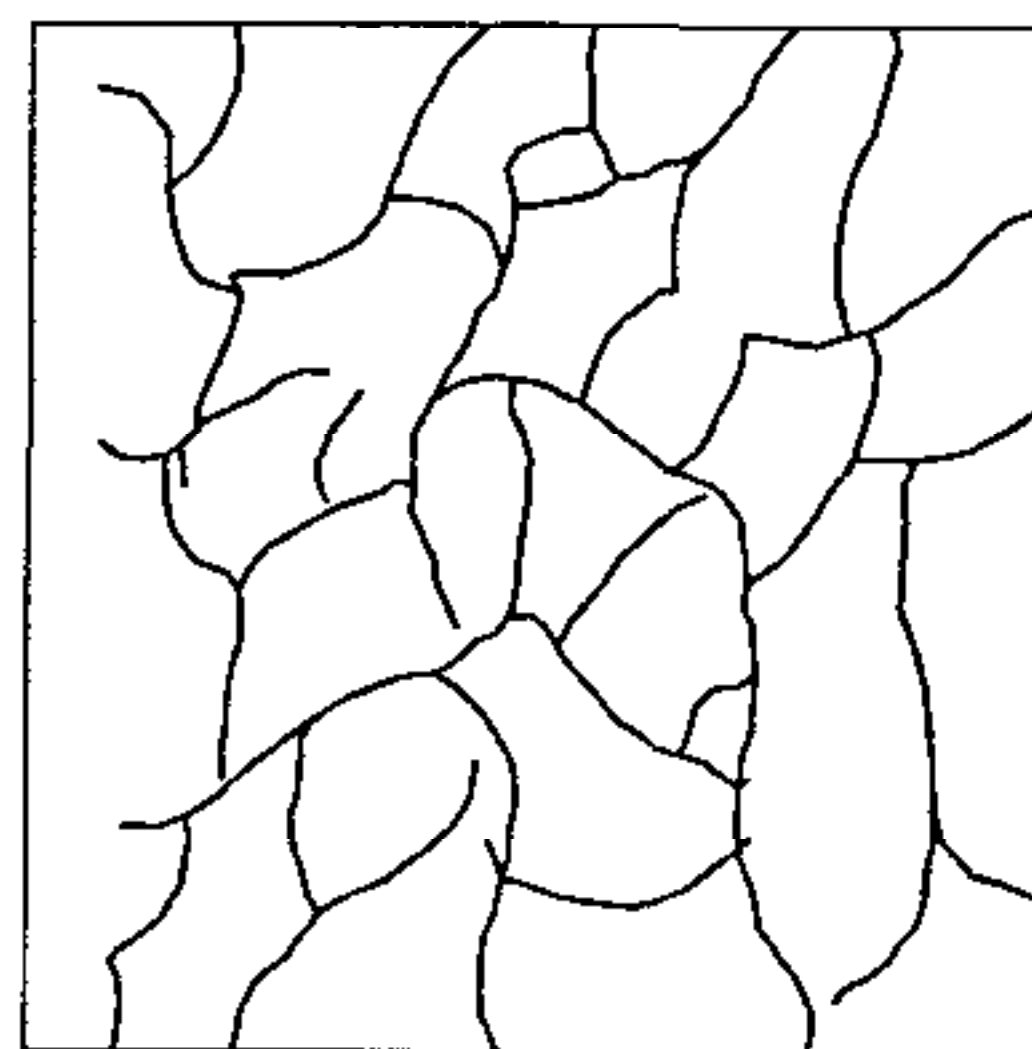
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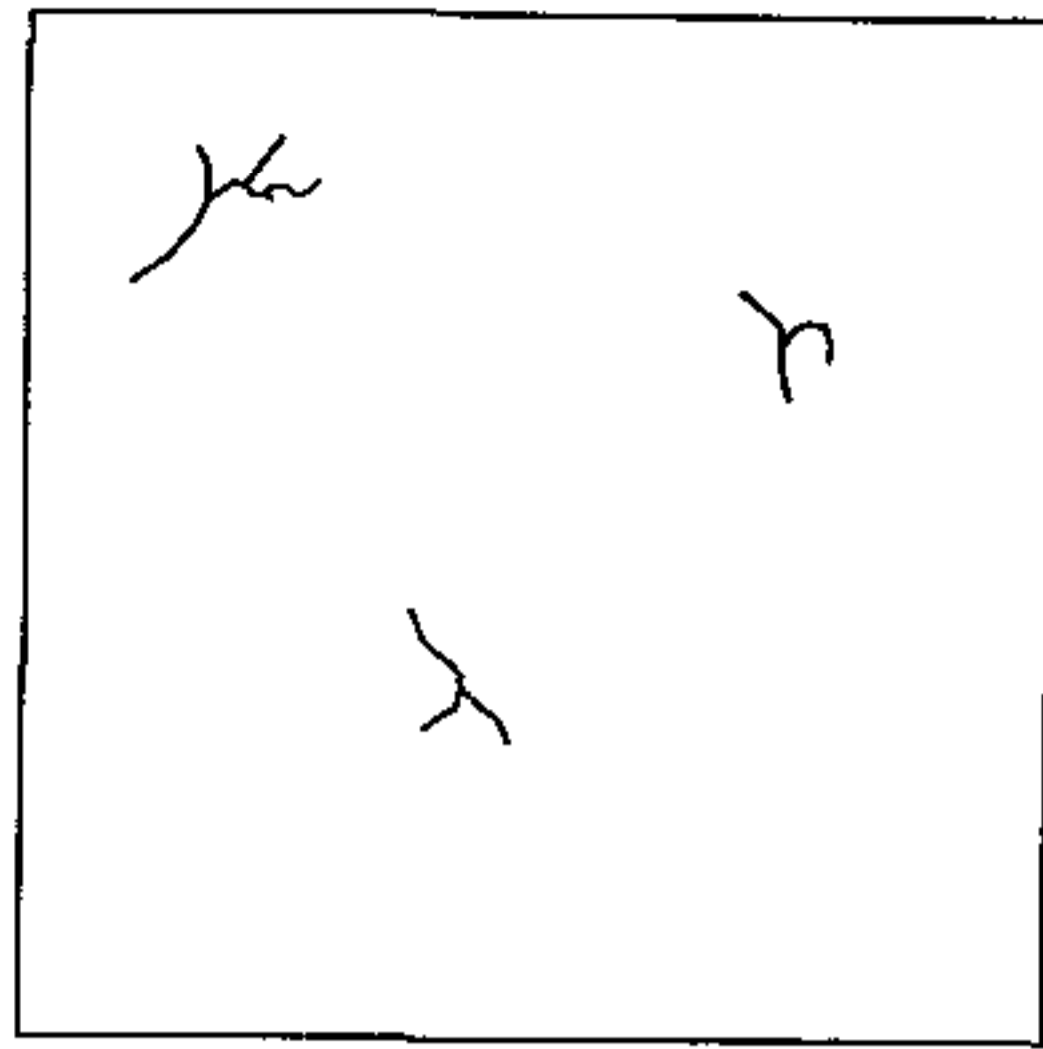


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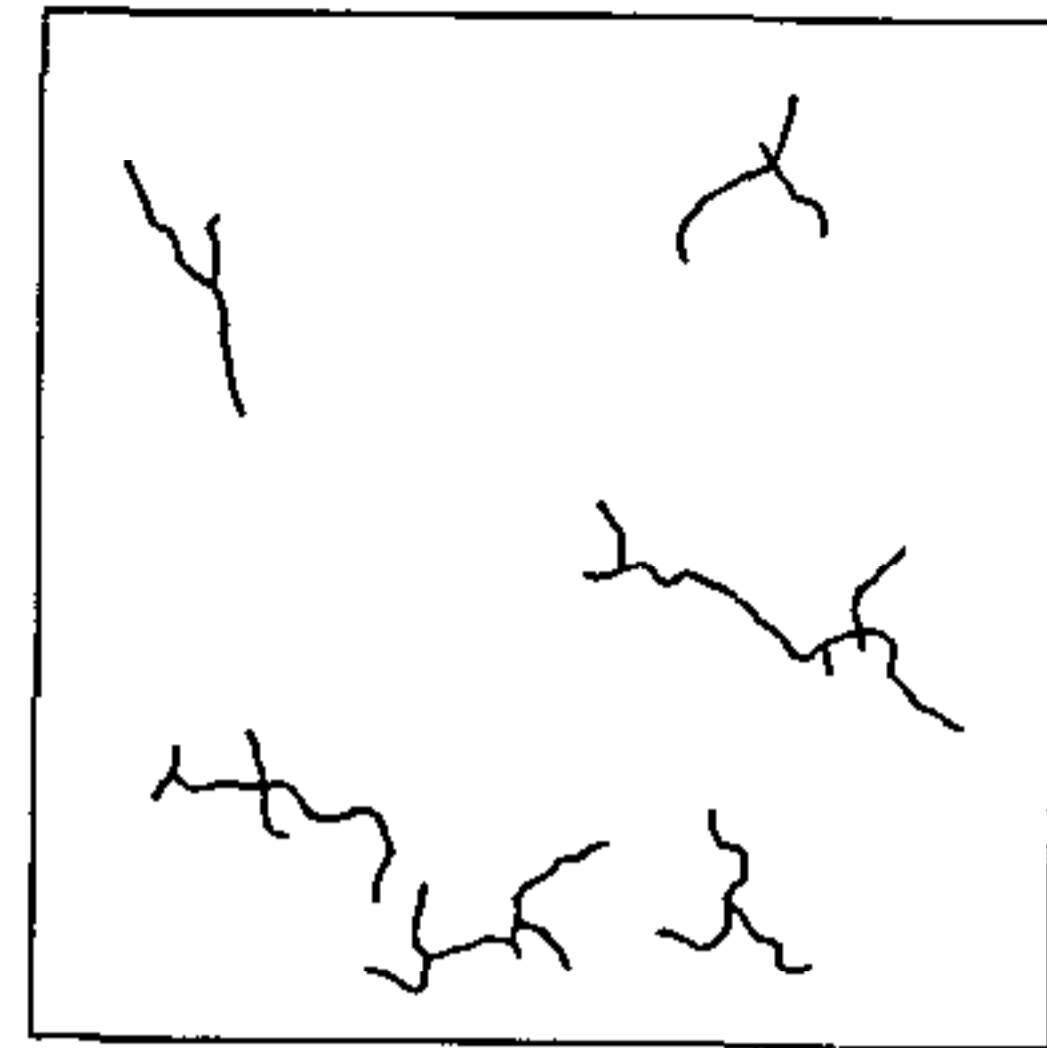


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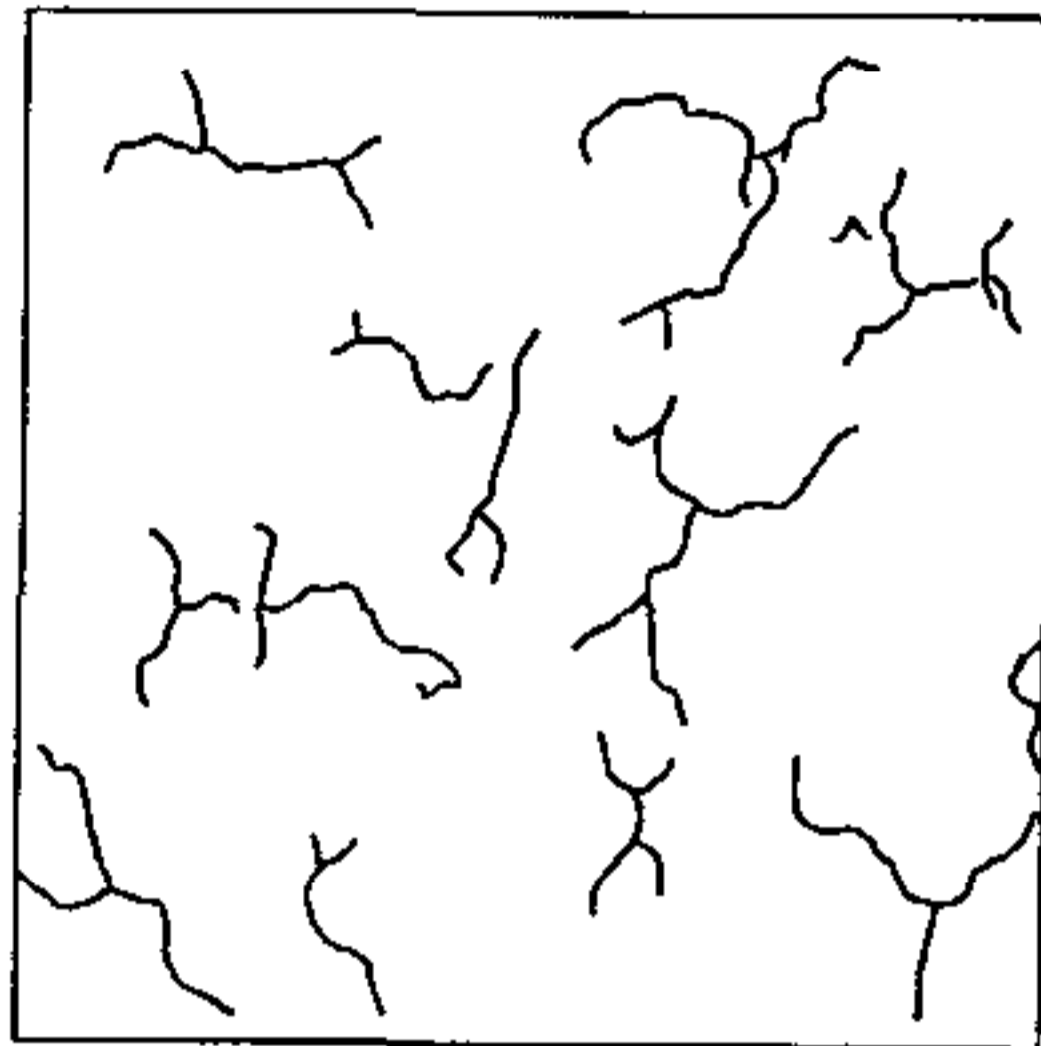
Figure A.6 — Mosaic



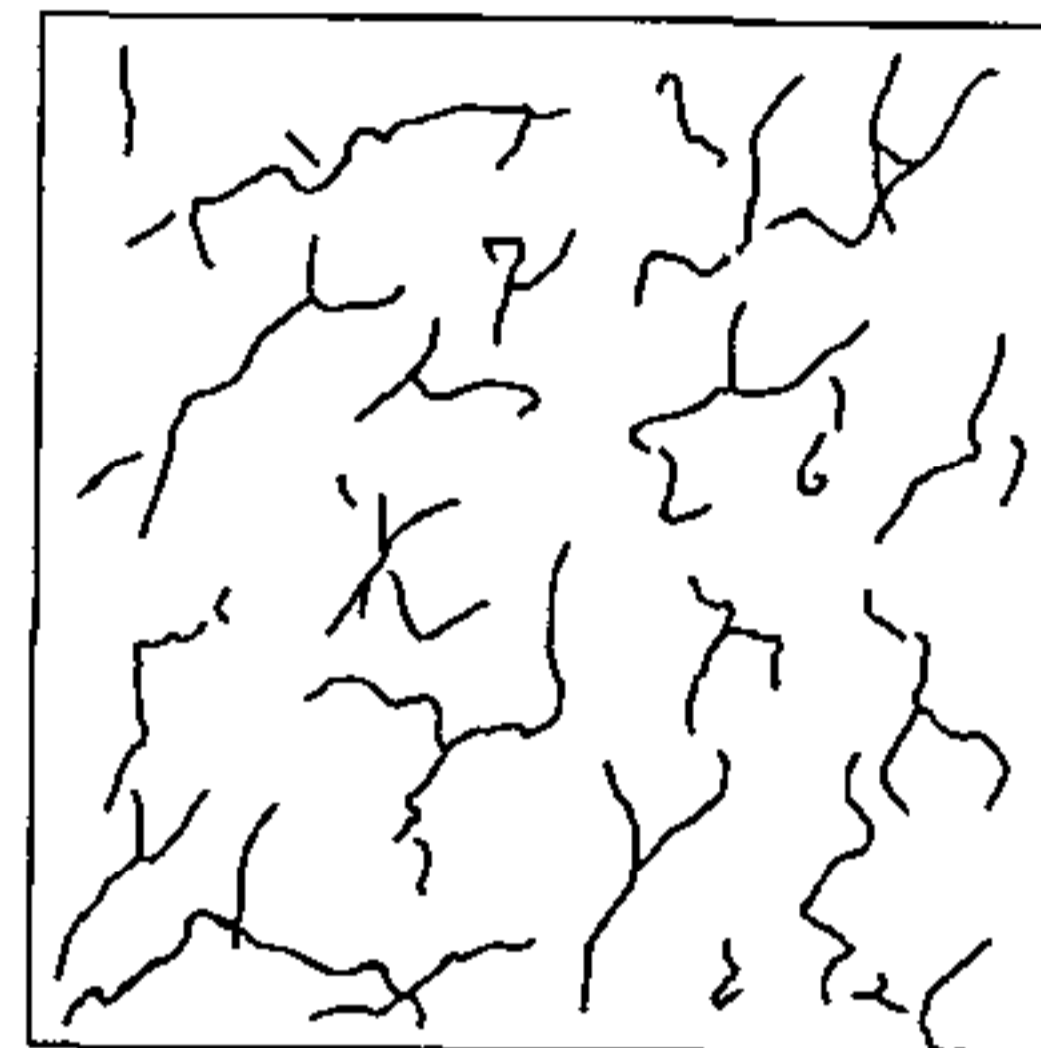
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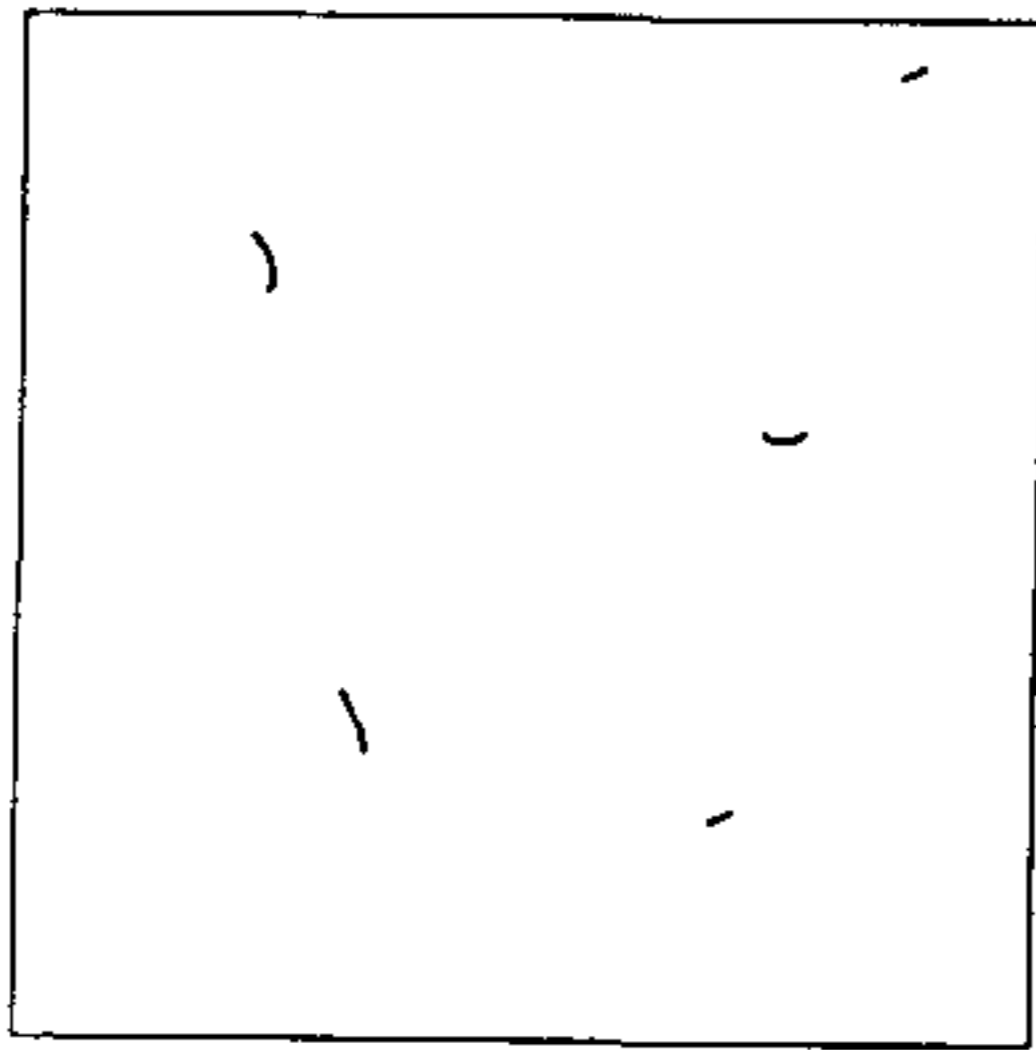
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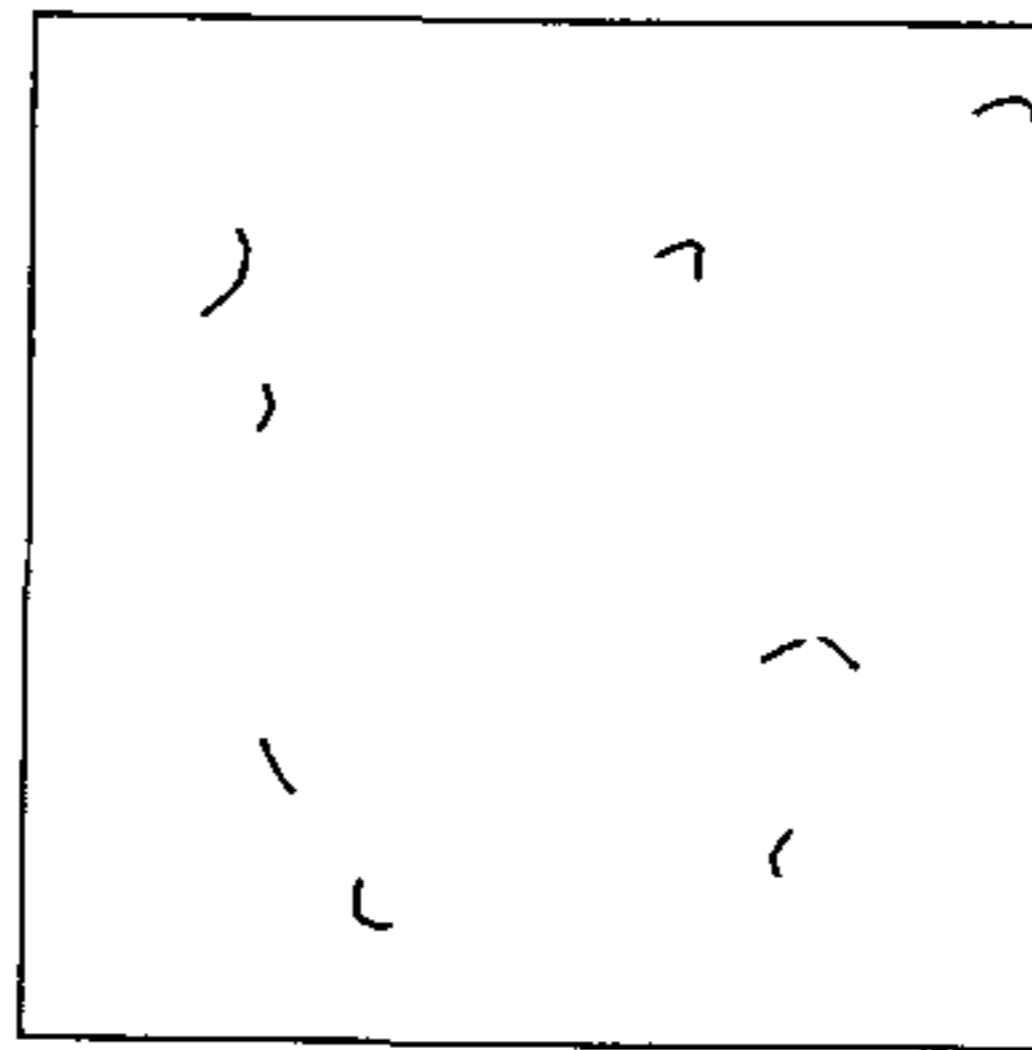
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Figure A.7 — Shrinkage

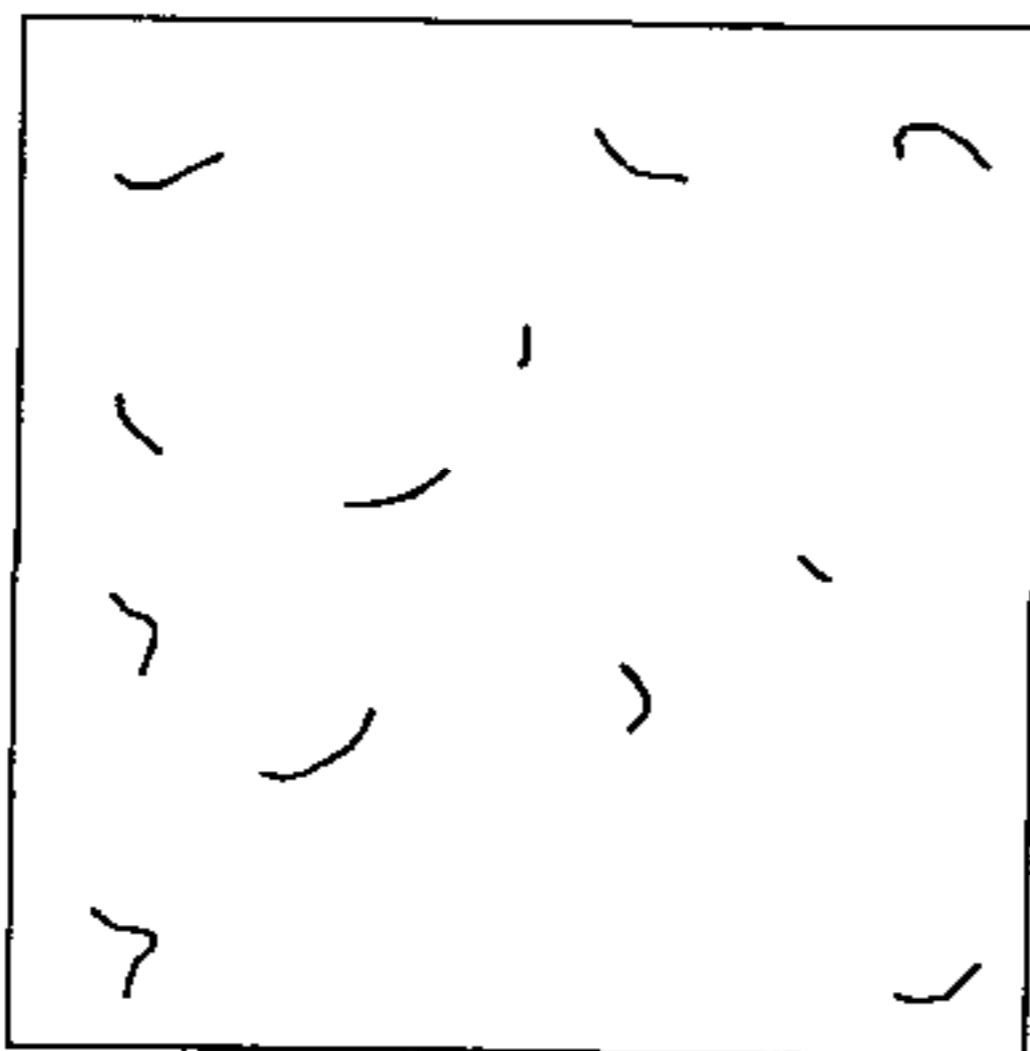




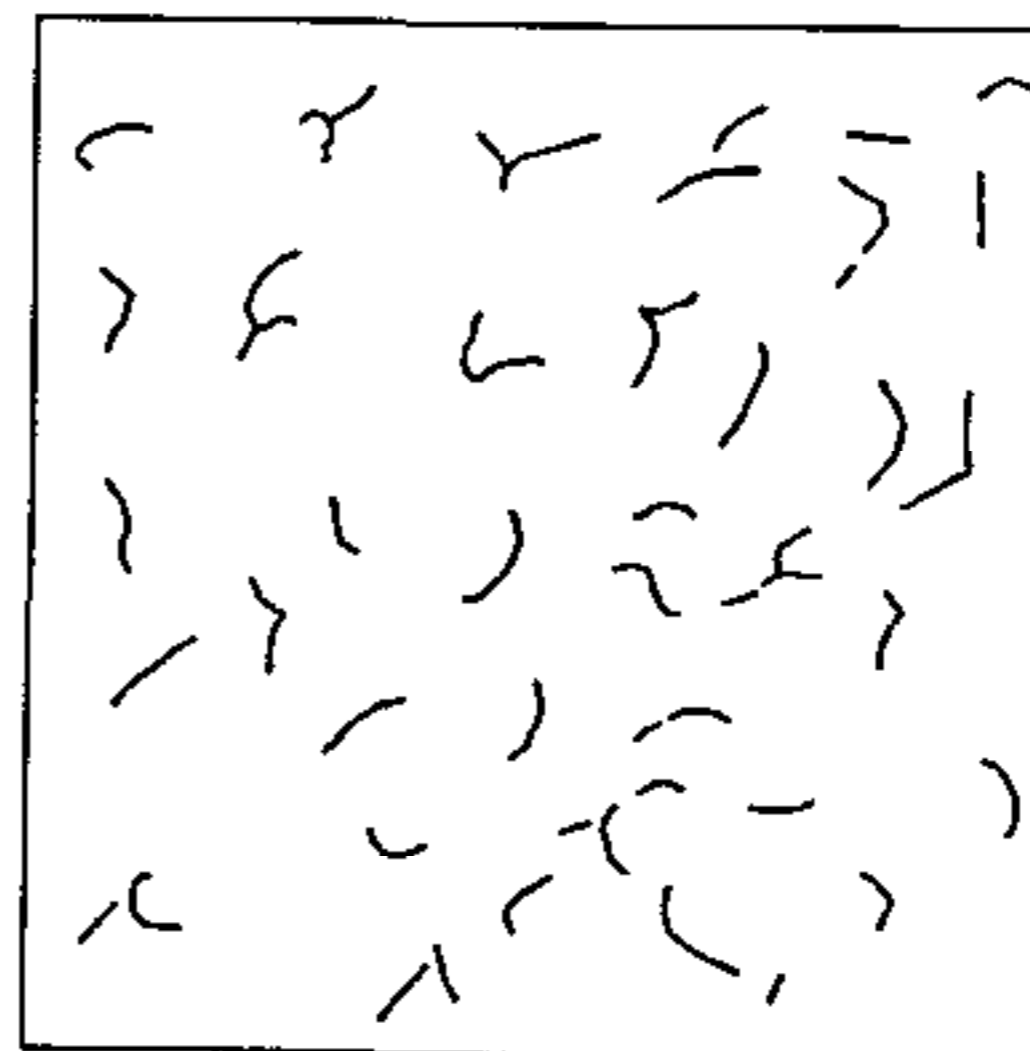
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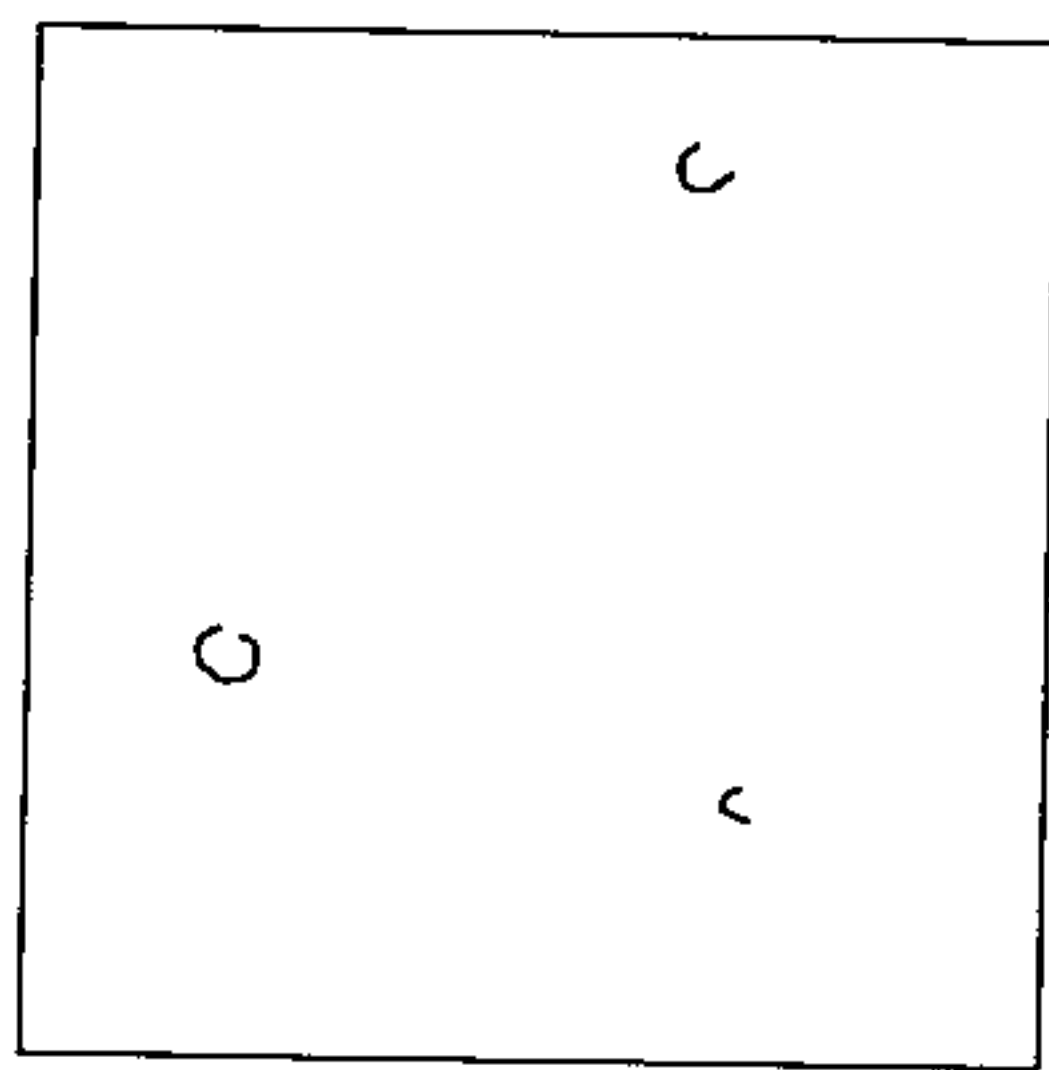


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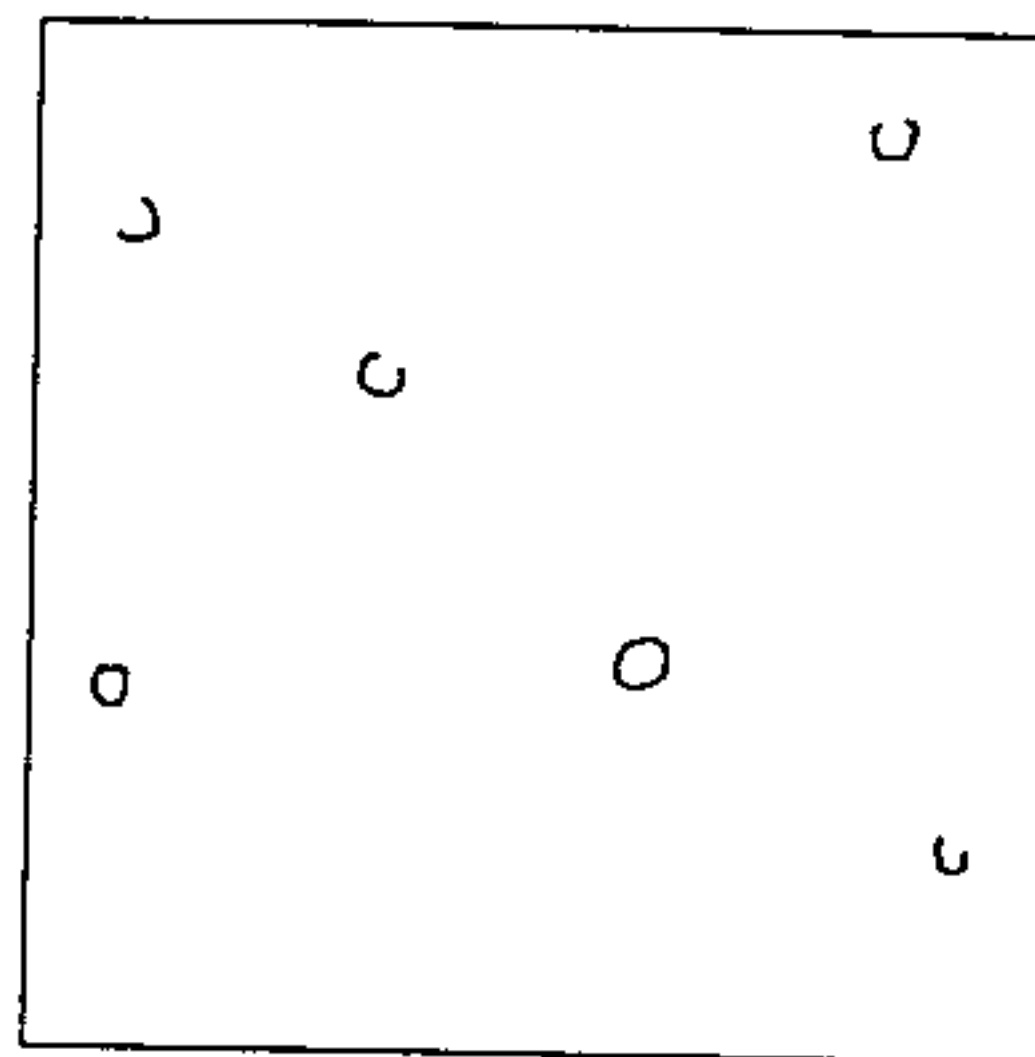


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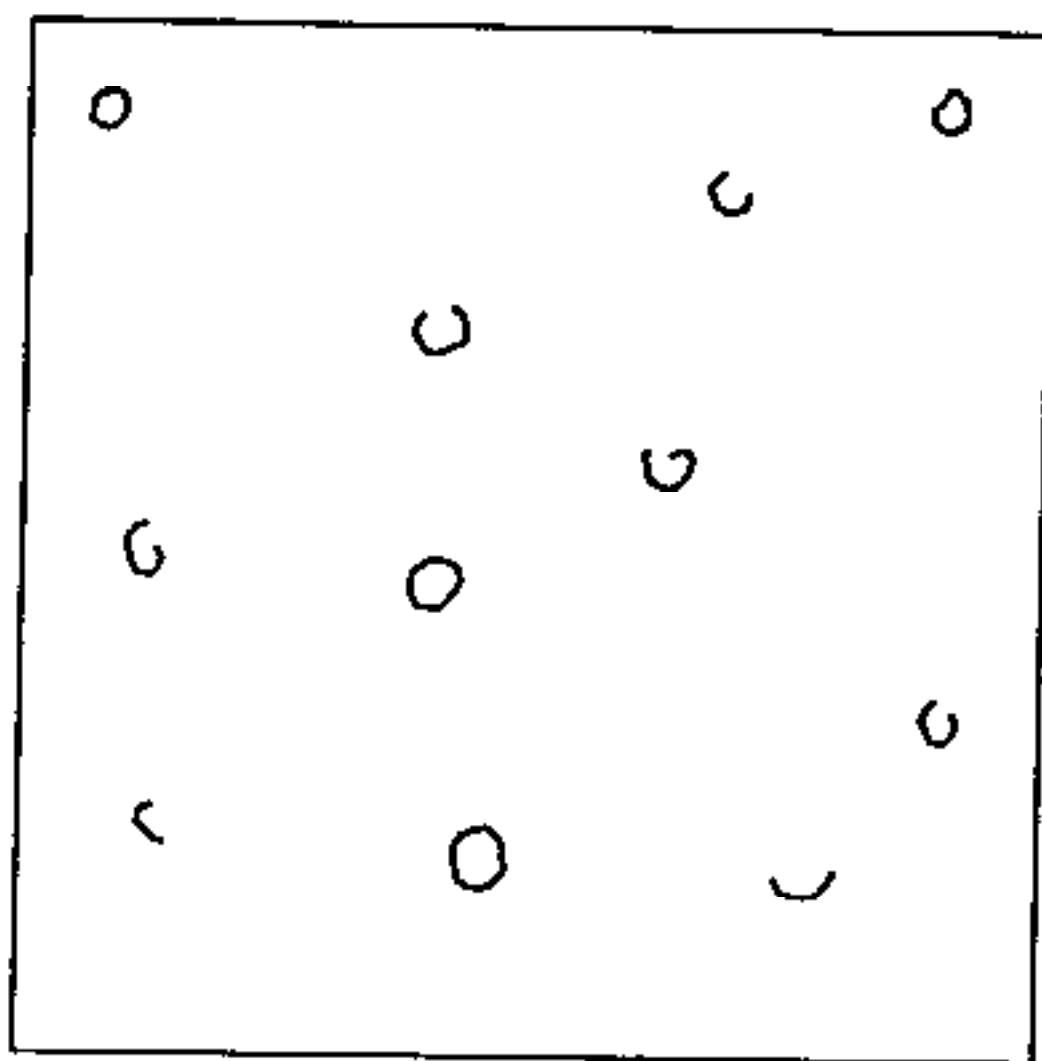
Figure A.8 — Short, random



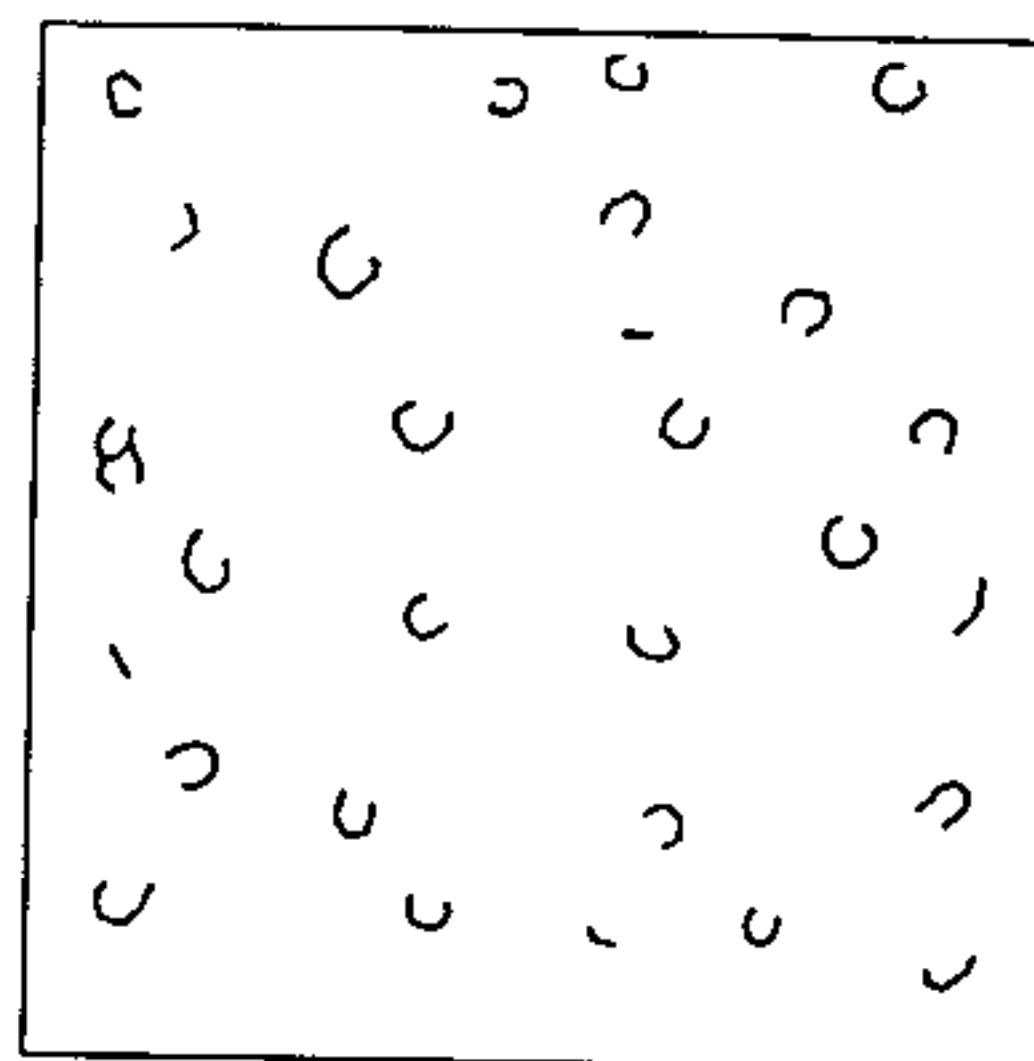
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Figure A.9 — Sigmoid

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