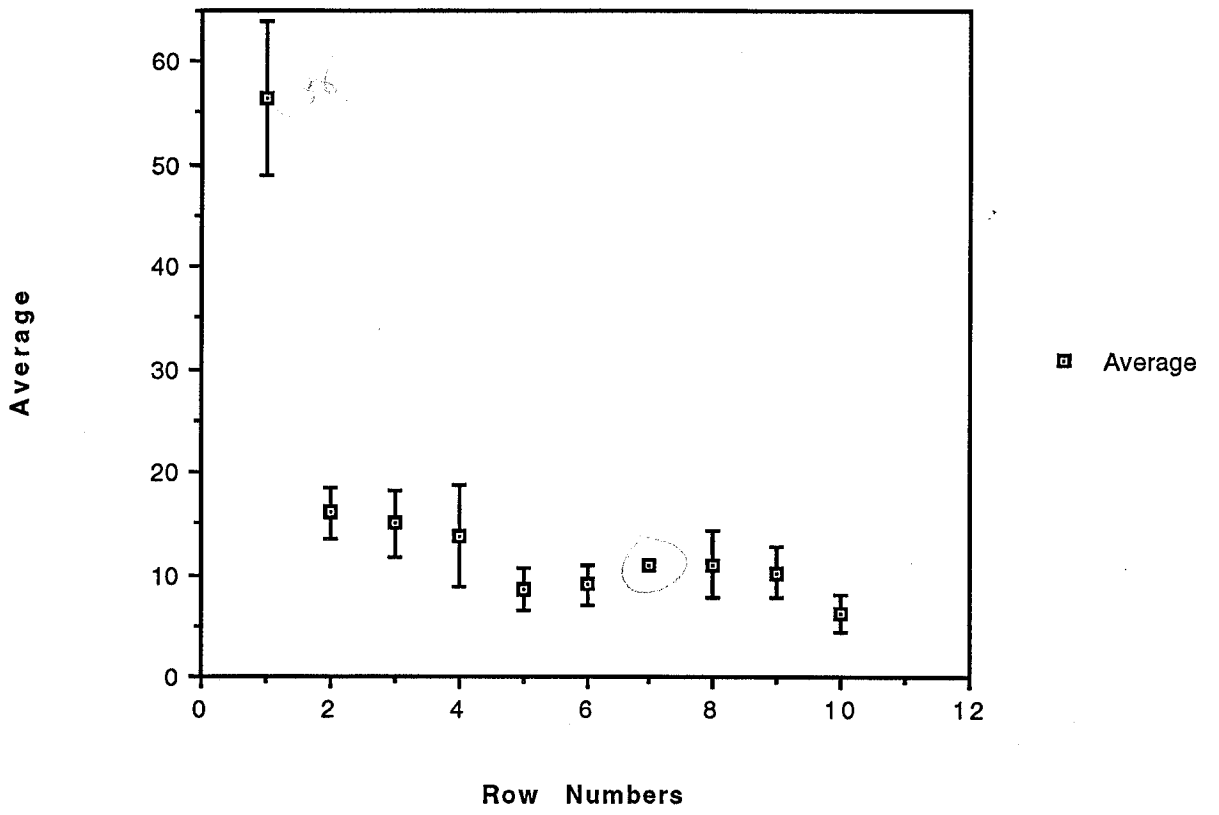
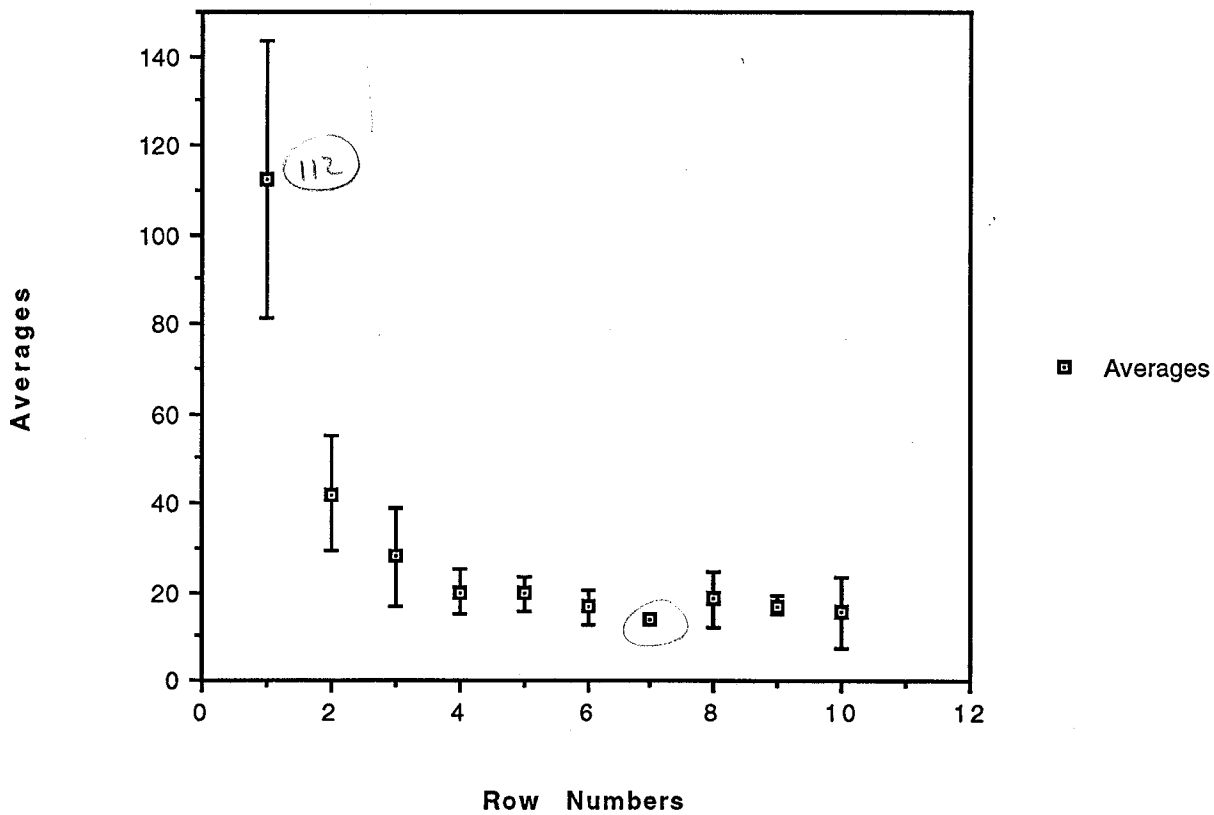
AUTORADIOGRAPHIC ANALYSIS PICTURES AND STATISTICS

Data from "AutoRad 22.5/10.4-TS1"



Just for comparison, we have 2x as many data counts, on Average, Here as on 22.5/10.4-TS1

Data from "AutoRad 22.35/15.3-TS1"



Grain-size Scales

By Roy L. Ingram, University of North Carolina

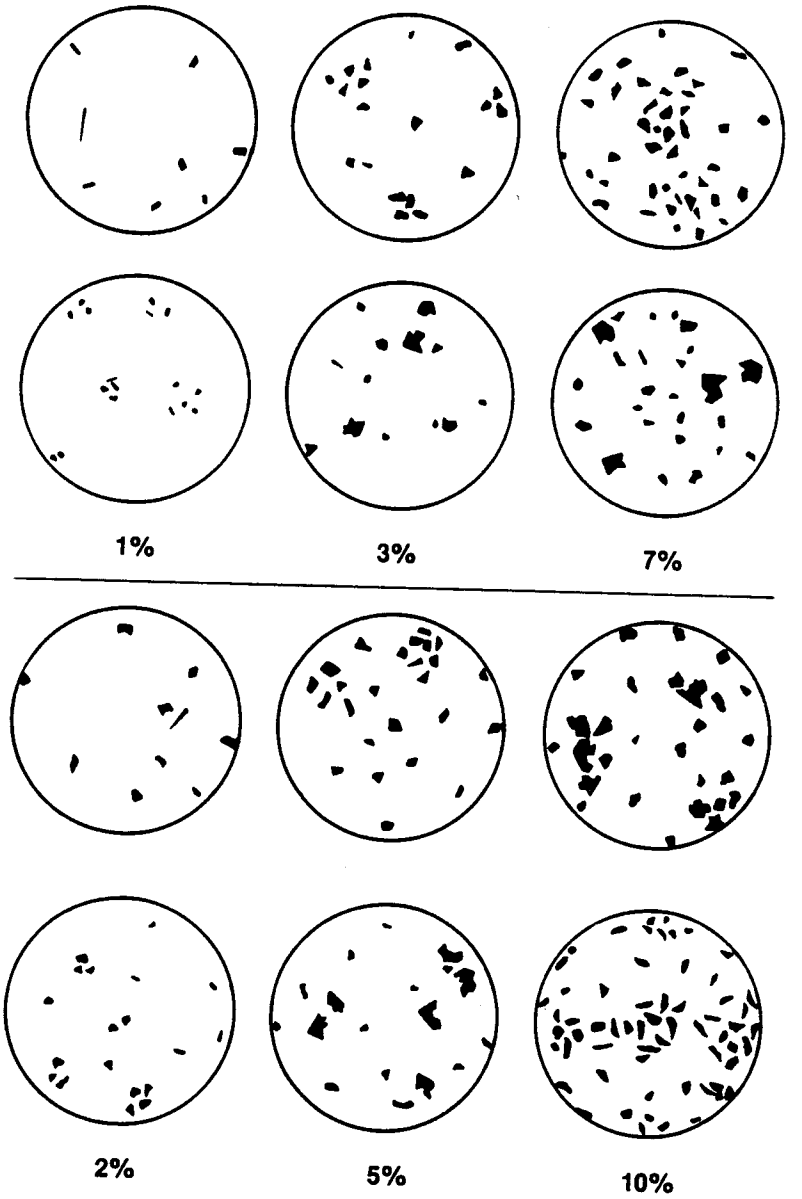
GRAIN-SIZE SCALE USED BY AMERICAN GEOLOGISTS

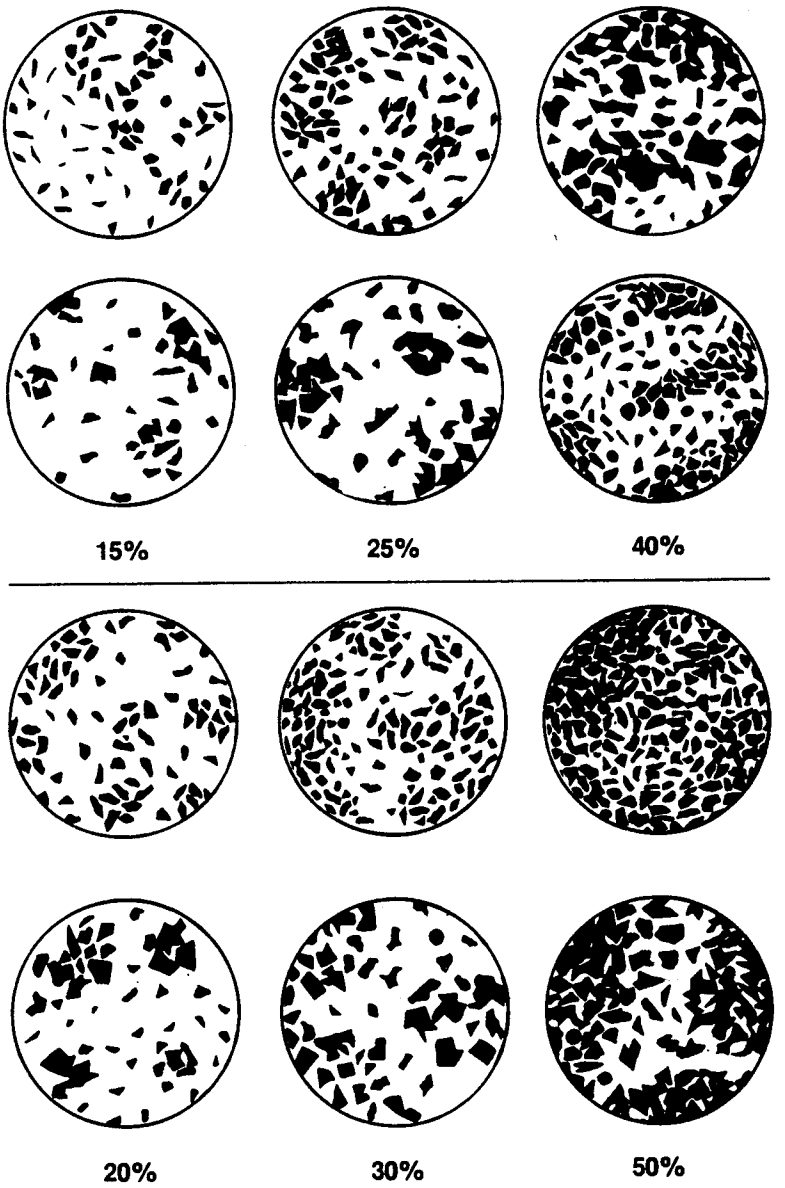
Modified Wentworth Scale — after Lane, et al., 1947, Trans. American Geophysical Union, v. 28, p. 936-938

GRADE LIMITS phi	mm	mm	inches	U.S. Standard Sieve Series	GRADE NAME		
−12	4096		161.3				
					very large		
−11	2048		80.6				
					large		
−10	1024		40.3			Boulders	
					medium		
−9	512		20.2				
					small		
−8	256		10.1				
					large		
−7	128		5.0			Cobbles	
					small		GRAVEL
−6	64		2.52	63 mm			
					very coarse		
−5	32		1.26	31.5 mm			
					coarse		
−4	16		0.63	16 mm			
					medium	Pebbles	
−3	8		0.32	8 mm			
					fine		
−2	4		0.16	No. 5			
					very fine		
−1	2		0.08	No. 10			
					very coarse		
0	1		0.04	No. 18			
					coarse		
+1	1/2	0.500		No. 35			
					medium	Sand	SAND
+2	1/4	0.250		No. 60			
					fine		
+3	1/8	0.125		No. 120			
					very fine		
+4	1/16	0.062		No. 230			
					coarse		
+5	1/32	0.031					
					medium		
+6	1/64	0.016				Silt	
					fine		
+7	1/128	0.008					
					very fine		
+8	1/256	0.004					MUD
					coarse		
+9	1/512	0.002					
					medium		
+10	1/1024	0.001				Clay size	
					fine		
+11	1/2048	0.0005					
					very fine		
+12	1/4096	0.00025					

Comparison Chart for Estimating Percentage Composition

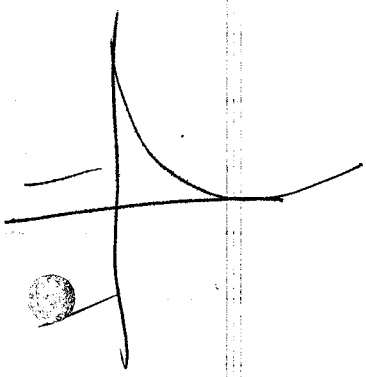
Prepared by Richard D. Terry and George V. Chilingar, Allen Hancock Foundation, Los Angeles. Reprinted from *Journal of Sedimentary Petrography*, v. 25, n. 3, p. 229–234, Sept. 1955.

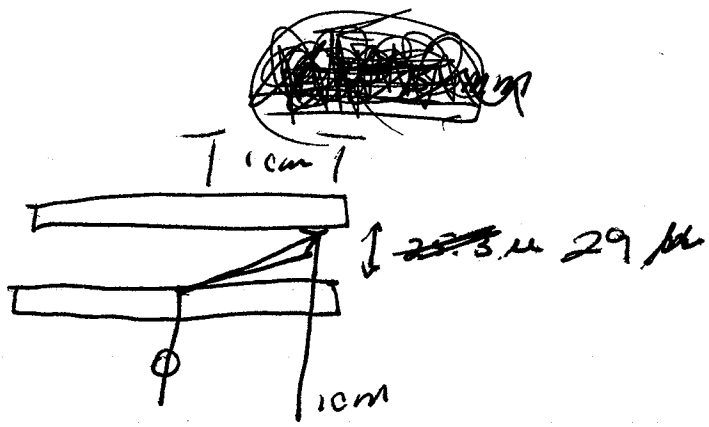



15%
25%
40%
20%
30%
50%

GIVEN THE INTENSITY OF A FRACTURE I_0
what is the I @ a distance (x) from the fracture
AN ALPHA PARTICLE CAN TRAVEL 1 cm thru air, so
that is the maximum of x. The alpha particle
can travel straight up, so the min = ϕ
The GAP between the slide & the CR-39
= 0.0253 mm = 25.3 μ

29 μm





$$I_x = \sqrt{(\text{Gap})^2 + (x^2)}$$

constant

The following are notes, photographs and statistical data on the autoradiographic experiment started on 12/31/92 (Analog Notebook 024/223). Conclusions and reference to this manual are found on page 024/236.

2/11/93

Peggy,

On the petrographic descriptions:

- Do the terms "fine" & "very fine" and etc translate to dimensions (e.g., AGI table attached)?

- We need to quantify the MODAL grain size of the matrix as best we can.

- Think about ways to measure apparent intergranular porosity
  - perhaps by staining the cement some bizarre color or...?

- on 22.5/10.4 - TS1, it appears from the description that no glass remains, all is altered or crystallized to qtz, FSP, & KAO. Within the matrix, what are the percentages of each? Is there really no glass? Point counting the matrix may be a way to put No.'s on these.

- Where is the Description of 22.35/15.3 - TS1?
- We need to note the name/initials of the petrographer on the sheets for QA.

Grain-size Scales

By Roy L. Ingram, University of North Carolina

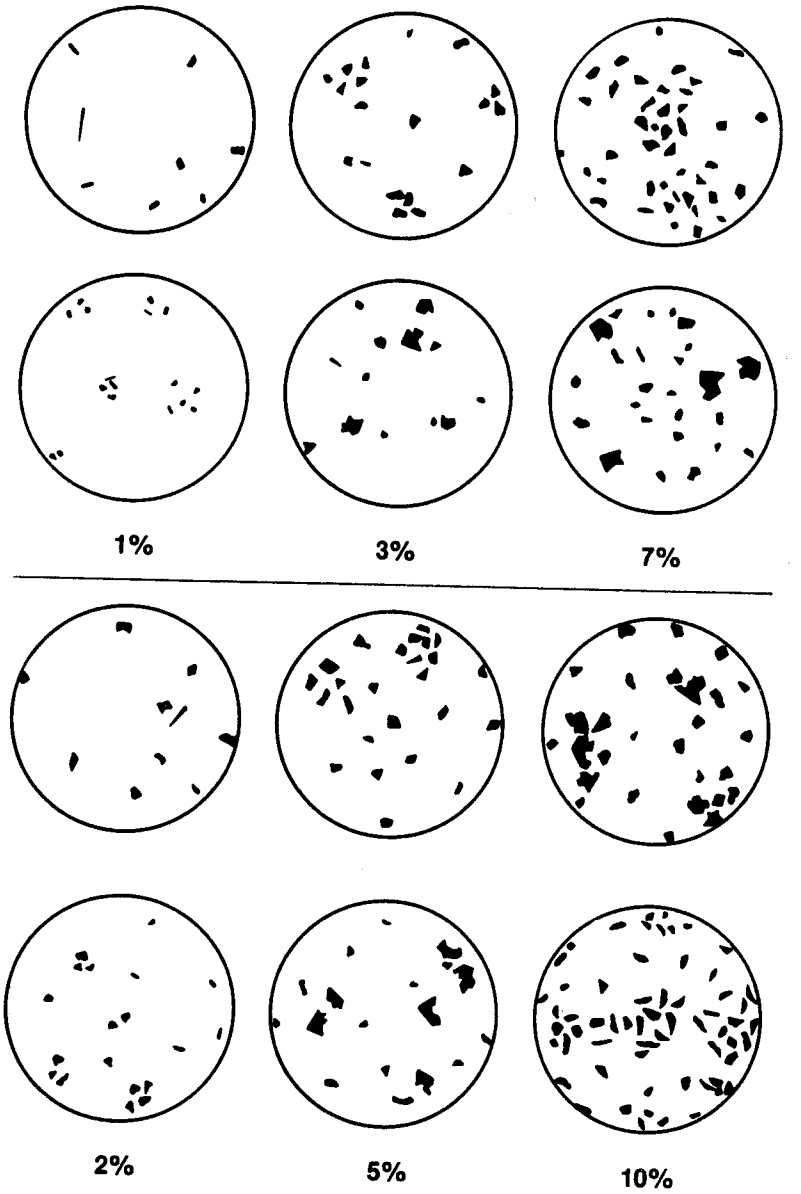
GRAIN-SIZE SCALE USED BY AMERICAN GEOLOGISTS

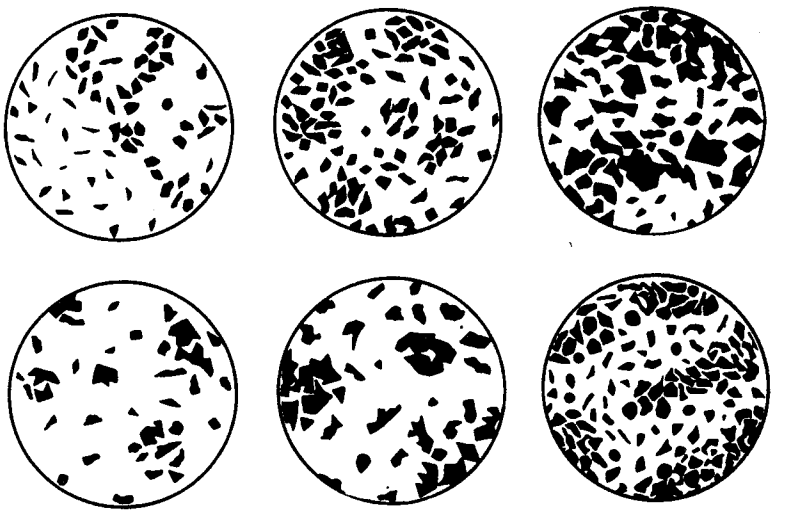
Modified Wentworth Scale — after Lane, et al., 1947, Trans. American Geophysical Union, v. 28, p. 936-938

GRADE LIMITS phi	mm	mm	inches	U.S. Standard Sieve Series	GRADE NAME		
−12	4096		161.3				
					very large		
−11	2048		80.6				
					large		
−10	1024		40.3			Boulders	
					medium		
−9	512		20.2				
					small		
−8	256		10.1				
					large		
−7	128		5.0			Cobbles	GRAVEL
					small		
−6	64		2.52	63 mm			
					very coarse		
−5	32		1.26	31.5 mm			
					coarse		
−4	16		0.63	16 mm			
					medium	Pebbles	
−3	8		0.32	8 mm			
					fine		
−2	4		0.16	No. 5			
					very fine		
−1	2		0.08	No. 10			
					very coarse		
0	1		0.04	No. 18			
					coarse		
+1	1/2	0.500		No. 35			
					medium	Sand	SAND
+2	1/4	0.250		No. 60			
					fine		
+3	1/8	0.125		No. 120			
					very fine		
+4	1/16	0.062		No. 230			
					coarse		
+5	1/32	0.031					
					medium		
+6	1/64	0.016				Silt	
					fine		
+7	1/128	0.008					
					very fine		
+8	1/256	0.004					MUD
					coarse		
+9	1/512	0.002					
					medium		
+10	1/1024	0.001				Clay size	
					fine		
+11	1/2048	0.0005					
					very fine		
+12	1/4096	0.00025					

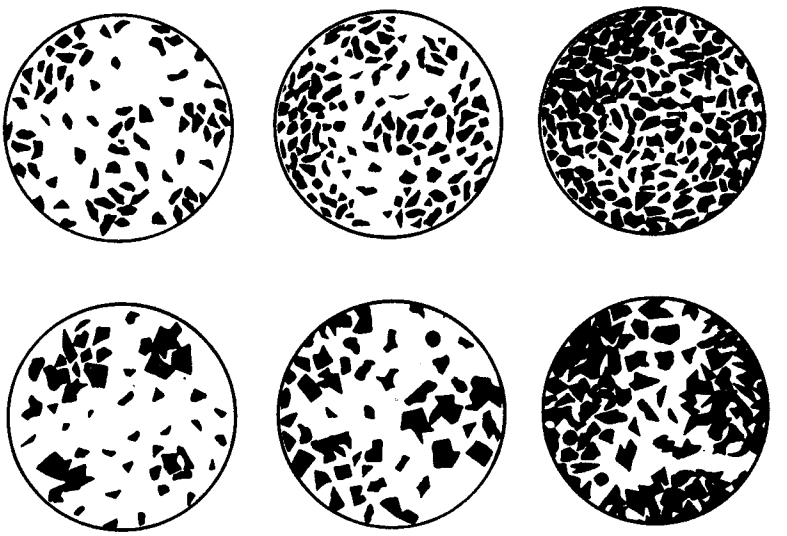
Comparison Chart for Estimating Percentage Composition

Prepared by Richard D. Terry and George V. Chilingar, Allen Hancock Foundation, Los Angeles. Reprinted from *Journal of Sedimentary Petrography*, v. 25, n. 3, p. 229–234, Sept. 1955.





15% 25% 40%



20% 30% 50%

Center for Nuclear Waste Regulatory Analyses
(512) 522-5540

From: **English C. Pearcy** Date: 2/15/93

To: Reggy

→ try to account for the highs + lows in sec's 1 + 2 of 22.5/10.4 -TS1

By looking at the counted areas.

→ try recounting in other areas to confirm/reject results.

0

Autoradiography Statistical Analysis
Sample No. 22.5/10.4-TS1
Autoradiography No. 5A

Section 1

	1	2	3	4	5	6	7	8	9	10	
A	1	1	1	1	1	1	4	2	1	3	Fracture
B	0	0	1	0	0	1	2	1	2	5	Fracture
C	0	3	0	1	1	1	1	3	1	3	Fracture
D	1	1	1	3	1	0	0	1	0	4	Fracture
E	0	2	5	2	1	0	0	0	4	5	Fracture
F	1	1	2	0	0	1	2	2	3	3	Fracture
G	1	0	2	0	0	1	0	2	3	7	Fracture
H	1	0	1	1	4	0	0	2	1	6	Fracture
I	1	2	1	2	0	0	2	1	3	6	Fracture
J	2	2	0	1	0	0	1	0	2	6	Fracture
	8	12	14	11	8	5	12	14	20	48	Fracture

Section 3

	1	2	3	4	5	6	7	8	9	10
A	7	0	0	1	1	0	0	1	1	2
B	9	3	1	0	1	0	2	2	4	0
C	3	1	2	0	0	1	2	1	1	1
D	4	1	4	1	0	2	2	0	0	1
E	4	2	0	2	0	1	1	0	0	0
F	2	0	1	1	0	2	1	1	1	0
G	7	1	0	0	3	0	2	0	3	0
H	7	2	0	1	1	1	0	0	1	0
I	10	3	1	3	0	2	1	1	0	0
J	5	0	2	0	3	0	0	4	2	1
	58	13	11	9	9	9	11	10	13	5

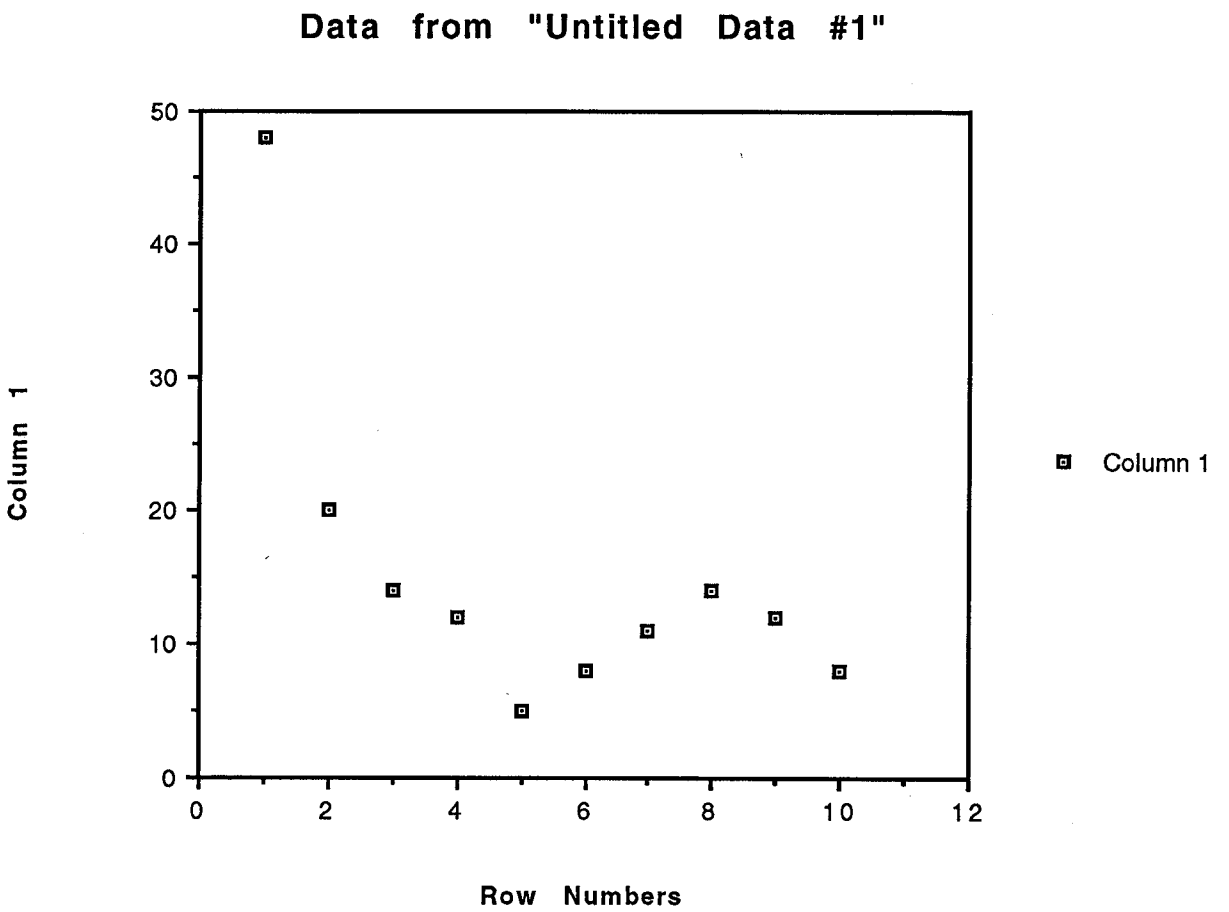
Section 2

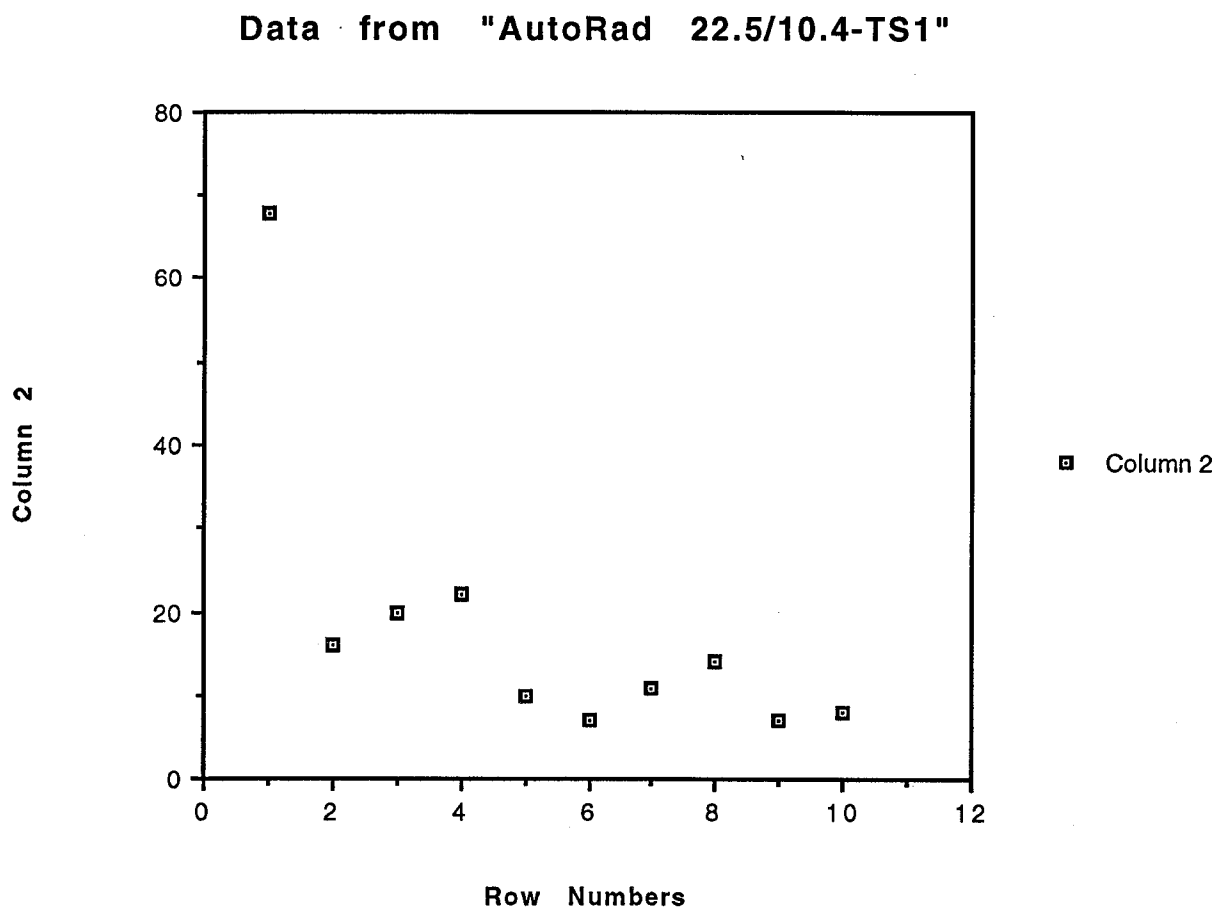
	1	2	3	4	5	6	7	8	9	10	
A	0	1	0	1	2	0	1	2	1	4	Fracture
B	0	1	2	1	0	1	2	2	3	5	Fracture
C	2	3	0	2	0	2	1	1	5	5	Fracture
D	1	0	0	0	0	1	5	3	0	4	Fracture
E	1	0	1	1	0	0	3	3	0	9	Fracture
F	2	0	2	0	1	2	1	1	1	8	Fracture
G	1	2	3	3	0	2	2	0	1	11	Fracture
H	0	0	3	0	0	0	2	2	2	8	Fracture
I	0	0	2	2	2	1	1	3	2	9	Fracture
J	1	0	1	1	2	1	4	3	1	5	Fracture
	8	7	14	11	7	10	22	20	16	68	

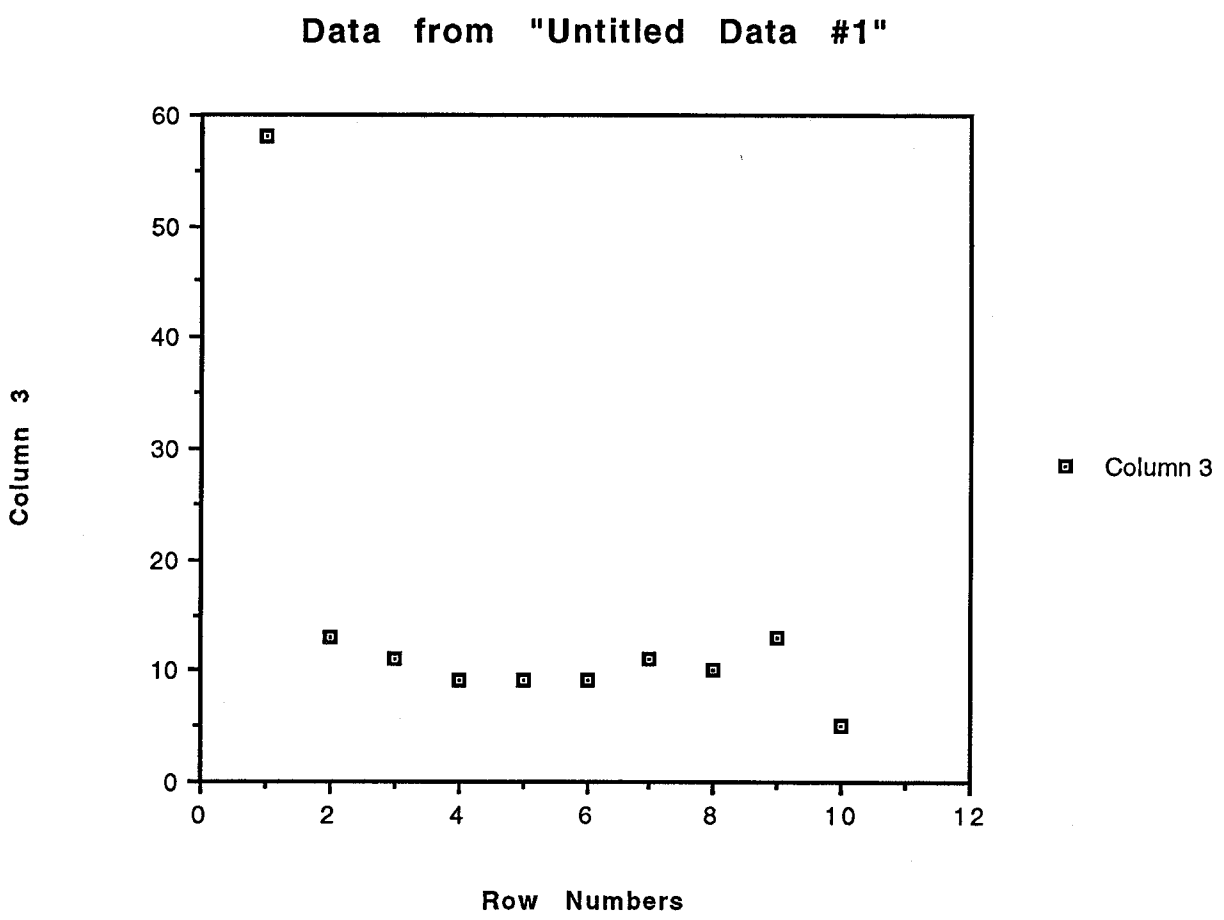
Section 4

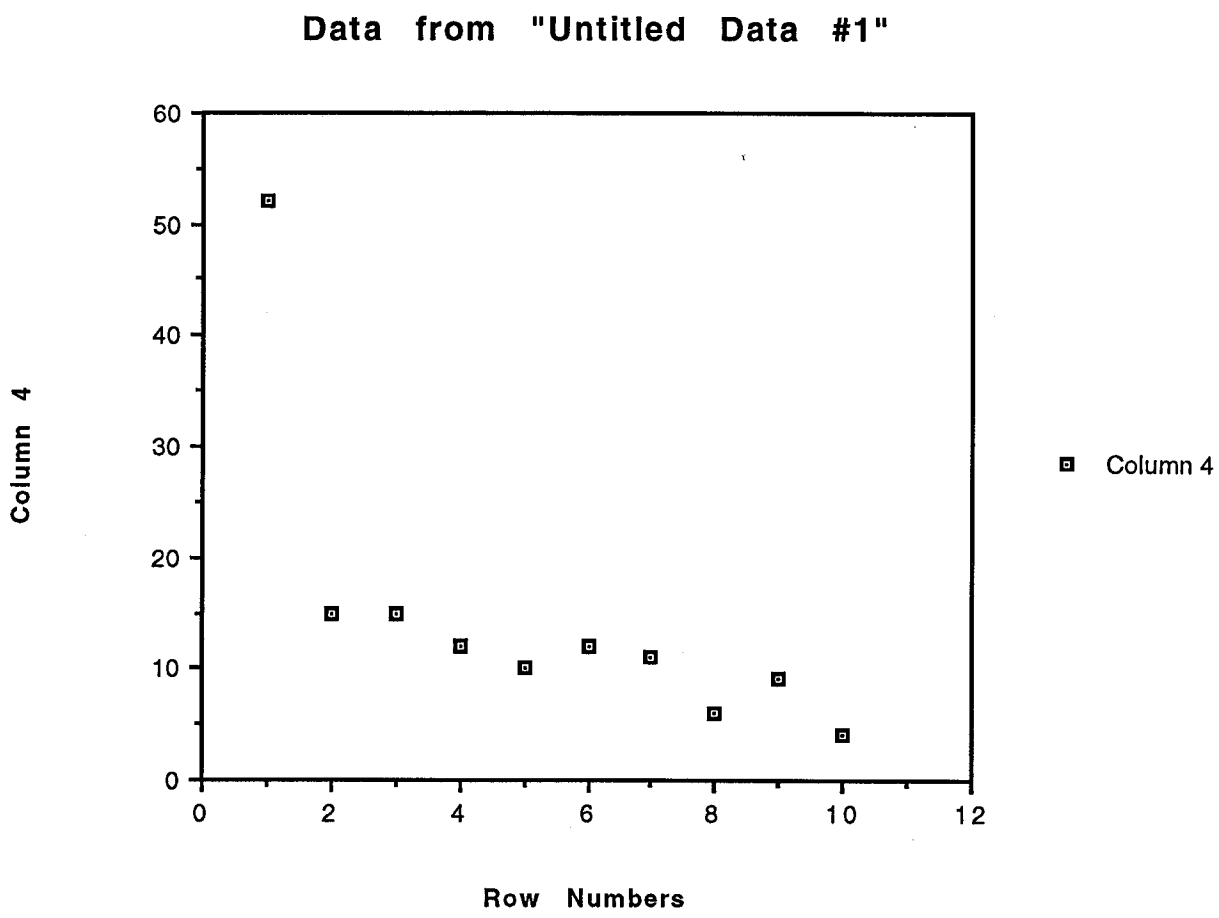
	1	2	3	4	5	6	7	8	9	10
A	5	1	3	3	0	0	2	0	0	0
B	7	5	2	2	1	2	2	1	1	1
C	3	3	1	2	1	1	0	0	0	1
D	5	0	2	0	0	0	2	2	1	1
E	4	0	1	0	0	1	0	0	2	0
F	6	1	1	2	1	2	2	1	1	1
G	2	1	0	1	3	1	1	0	1	0
H	6	2	1	1	2	0	0	0	1	0
I	8	0	3	1	2	5	2	1	1	0
J	6	2	1	0	0	0	0	1	1	0
	52	15	15	12	10	12	11	6	9	4

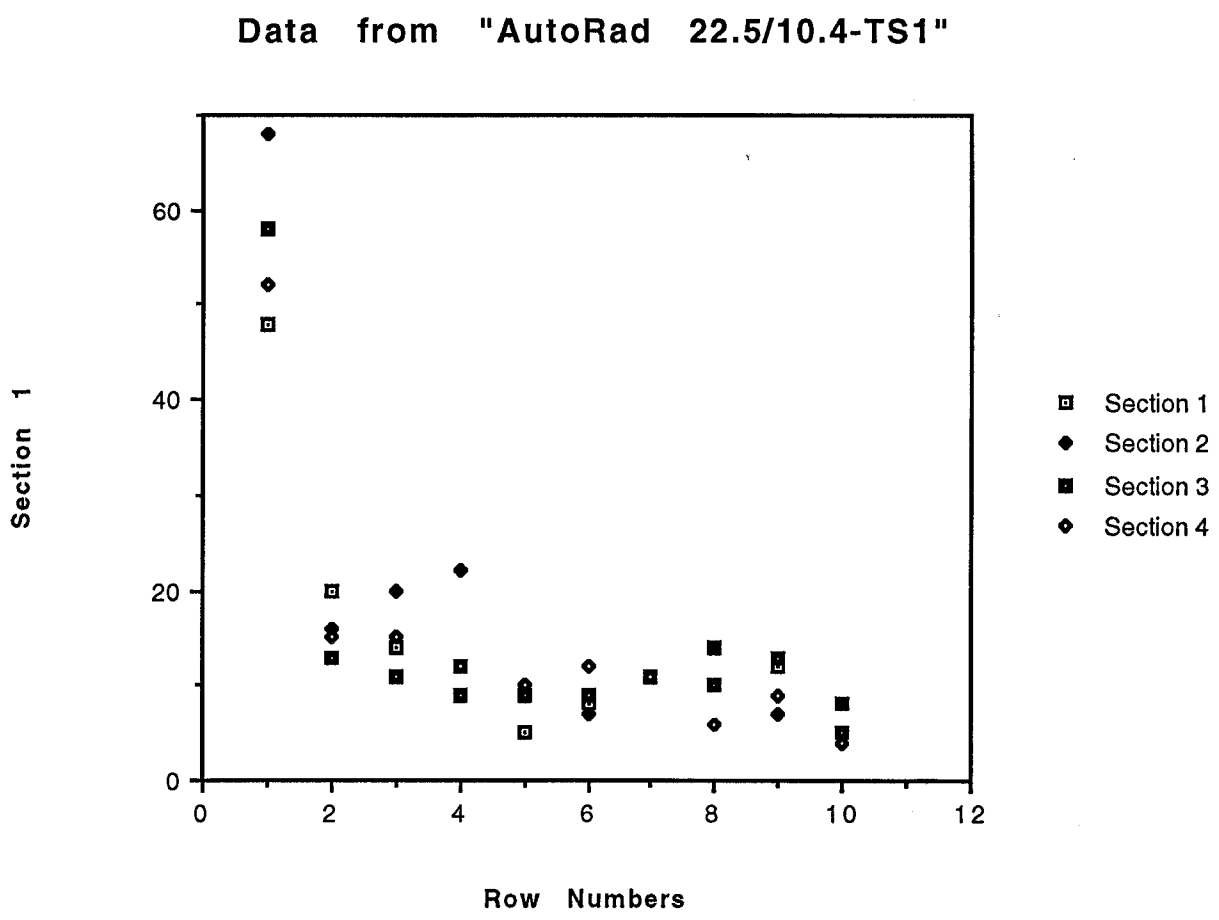
0

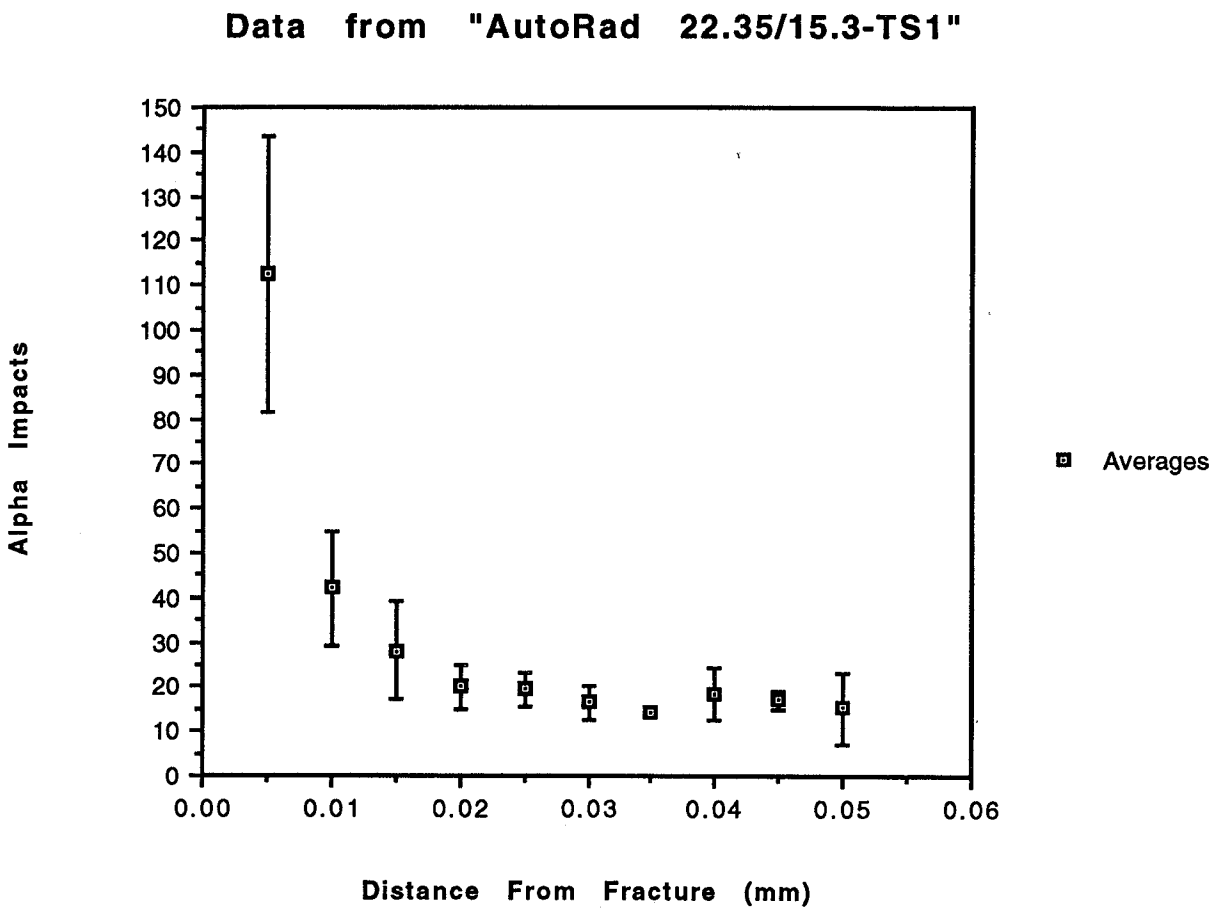

Data from "Untitled Data #1"
50
40
30
20
10
0
Column 1
0
2
4
6
8
10
12
Row Numbers
Column 1


Data from "AutoRad 22.5/10.4-TS1"
80
60
40
20
0
Column 2
0
2
4
6
8
10
12
Row Numbers
Column 2


Data from "Untitled Data #1"
60
50
40
30
20
10
0
Column 3
0
2
4
6
8
10
12
Row Numbers
Column 3


Data from "Untitled Data #1"
60
50
40
30
20
10
0
Column 4
0
2
4
6
8
10
12
Row Numbers
Column 4


Data from "AutoRad 22.5/10.4-TS1"
Section 1
60
40
20
0
0
2
4
6
8
10
12
Row Numbers
Section 1
Section 2
Section 3
Section 4


Data from "AutoRad 22.35/15.3-TS1"
Alpha Impacts
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
Distance From Fracture (mm)
Averages

Autoradiography Statistical Analysis
Sample No. 22.35/15.3-TS1
Autoradiography No. 3A

Section 1

	1	2	3	4	5	6	7	8	9	10	
											Fracture
											Fracture
											Fracture
A	2	1	1	2	3	1	3	1	4	19	Fracture
B	5	1	0	2	1	0	2	3	2	8	Fracture
C	2	2	3	0	0	4	0	4	6	12	Fracture
D	0	1	1	0	3	3	3	3	7	11	Fracture
E	2	2	2	1	0	1	5	3	5	15	Fracture
F	1	3	1	2	2	3	2	4	8	15	Fracture
G	4	2	2	0	1	1	2	9	13	25	Fracture
H	1	4	2	3	2	0	2	8	7	19	Fracture
I	3	0	2	2	3	4	2	5	8	14	Fracture
J	3	0	2	1	0	1	1	3	4	14	Fracture
											Fracture
	23	16	16	13	15	18	22	43	64	152	Fracture
											Fracture

Section 2

	1	2	3	4	5	6	7	8	9	10	
											Fracture
											Fracture
											Fracture
A	4	0	5	0	1	1	2	2	7	13	Fracture
B	1	2	1	1	2	1	1	5	2	20	Fracture
C	1	3	2	1	1	2	0	4	7	20	Fracture
D	1	0	1	3	1	1	4	5	5	14	Fracture
E	3	1	2	4	2	0	2	3	6	11	Fracture
F	2	0	6	3	2	1	2	2	3	12	Fracture
G	5	5	1	1	1	0	3	2	1	10	Fracture
H	1	4	5	1	6	2	1	1	4	8	Fracture
I	3	2	4	1	2	3	2	0	2	7	Fracture
J	2	1	1	0	3	3	2	4	3	7	Fracture
	23	18	28	15	21	14	19	28	40	122	

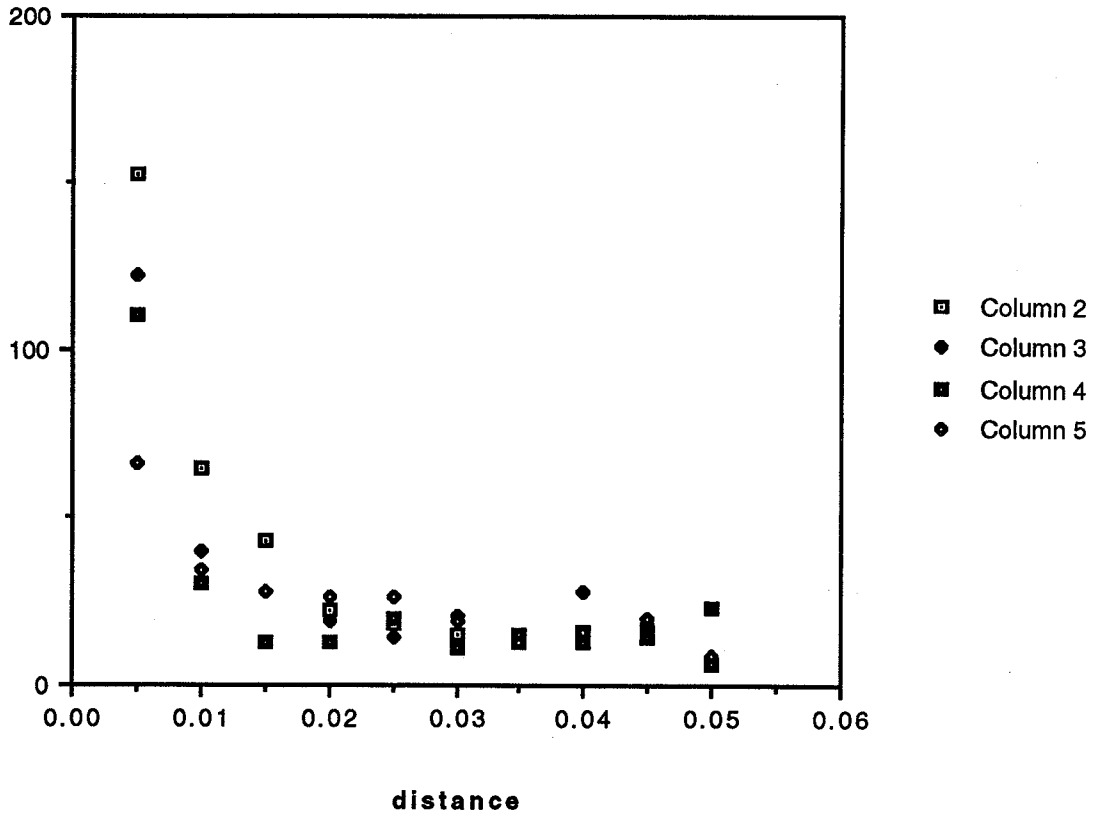
Section 3

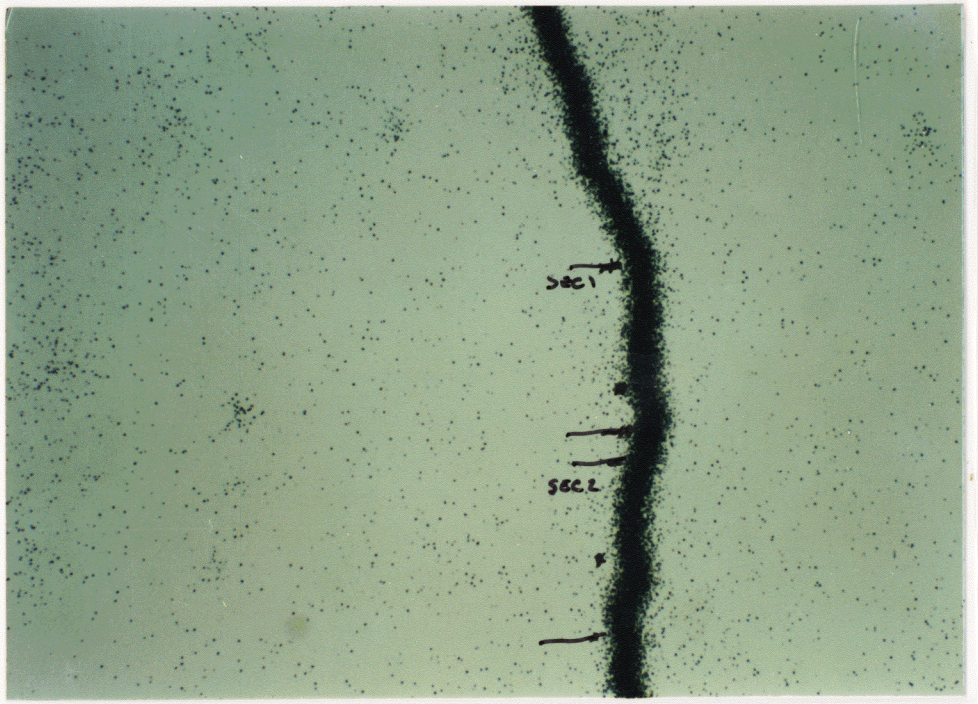
	1	2	3	4	5	6	7	8	9	10
A	15	1	1	4	1	1	1	2	4	0
B	14	4	1	2	3	1	1	1	2	0
C	17	1	2	2	3	1	0	0	0	0
D	10	4	1	2	3	2	1	1	1	0
E	6	3	2	2	1	1	5	1	1	0
F	9	2	0	0	3	0	2	1	1	1
G	5	4	3	0	3	1	2	0	0	2
H	5	4	1	0	2	1	0	3	3	2
I	17	3	1	0	1	1	1	1	0	0
J	12	4	1	1	0	2	2	3	2	1
	110	30	13	13	20	11	15	13	14	6

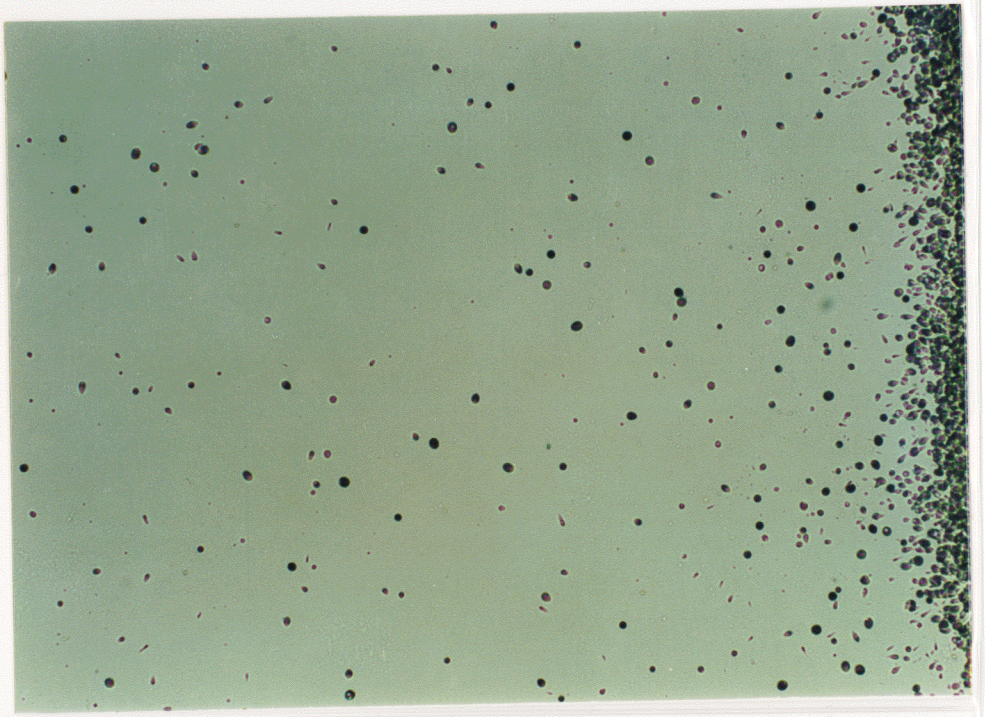
Section 4

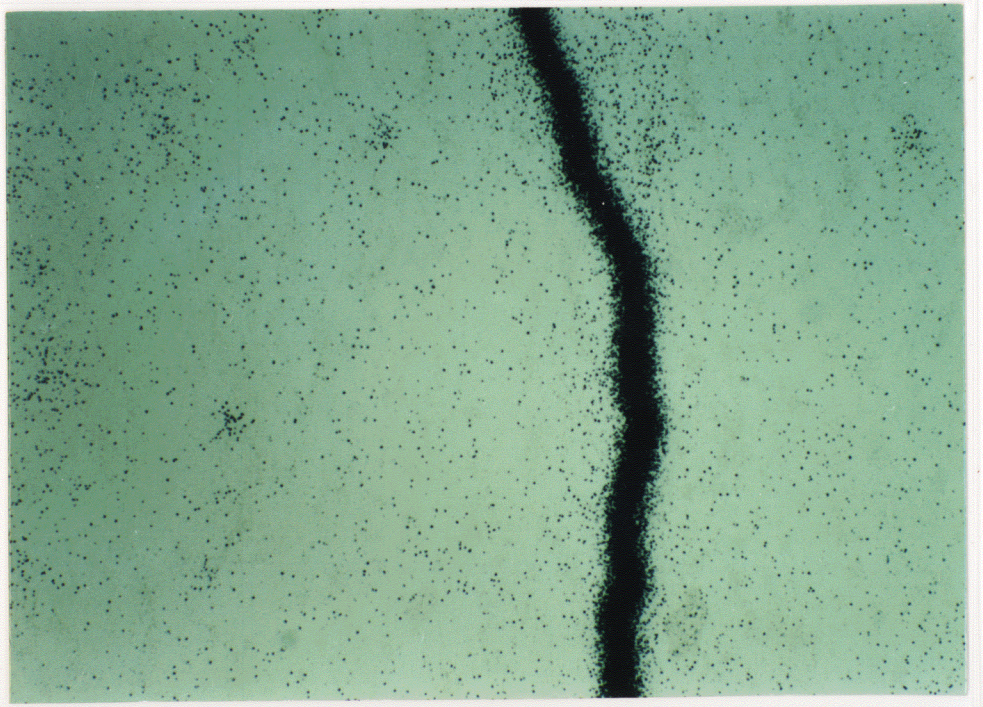
	1	2	3	4	5	6	7	8	9	10
A	8	2	1	3	2	1	2	0	2	2
B	10	5	1	0	2	5	1	1	1	2
C	10	4	2	4	0	2	1	3	0	0
D	3	3	4	2	6	0	2	0	1	1
E	5	3	2	2	1	3	2	2	3	1
F	9	2	4	3	3	1	1	4	5	3
G	7	3	5	0	1	1	0	1	3	0
H	8	3	3	4	4	3	1	3	1	0
I	2	2	3	4	1	1	2	1	3	0
J	4	7	3	4	6	2	1	1	1	0
	66	34	28	26	26	19	13	16	20	9

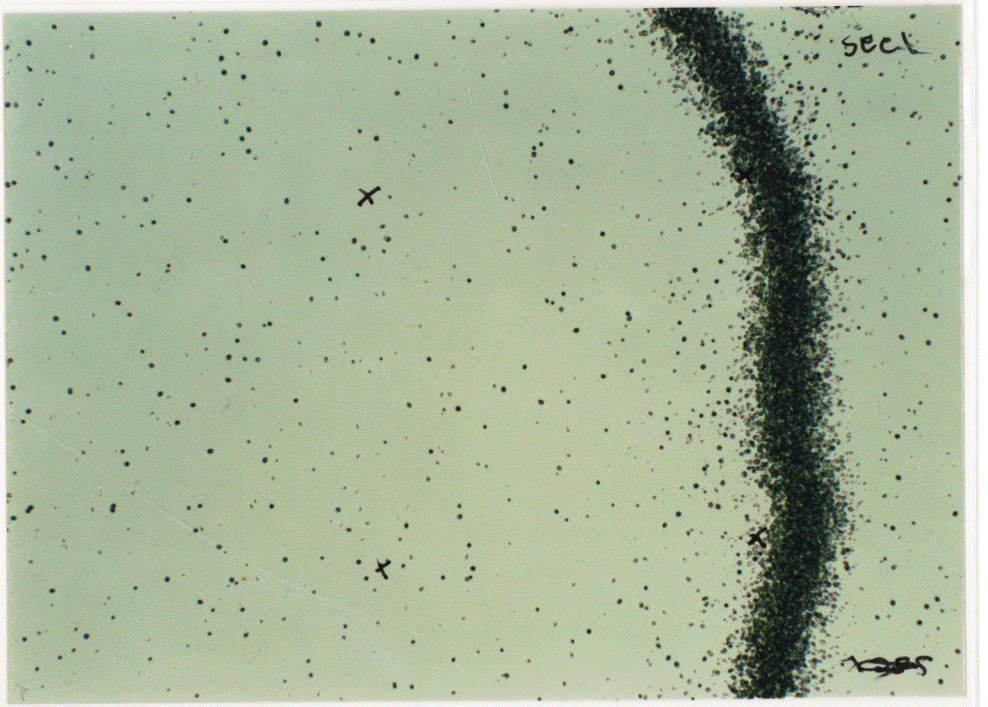
0

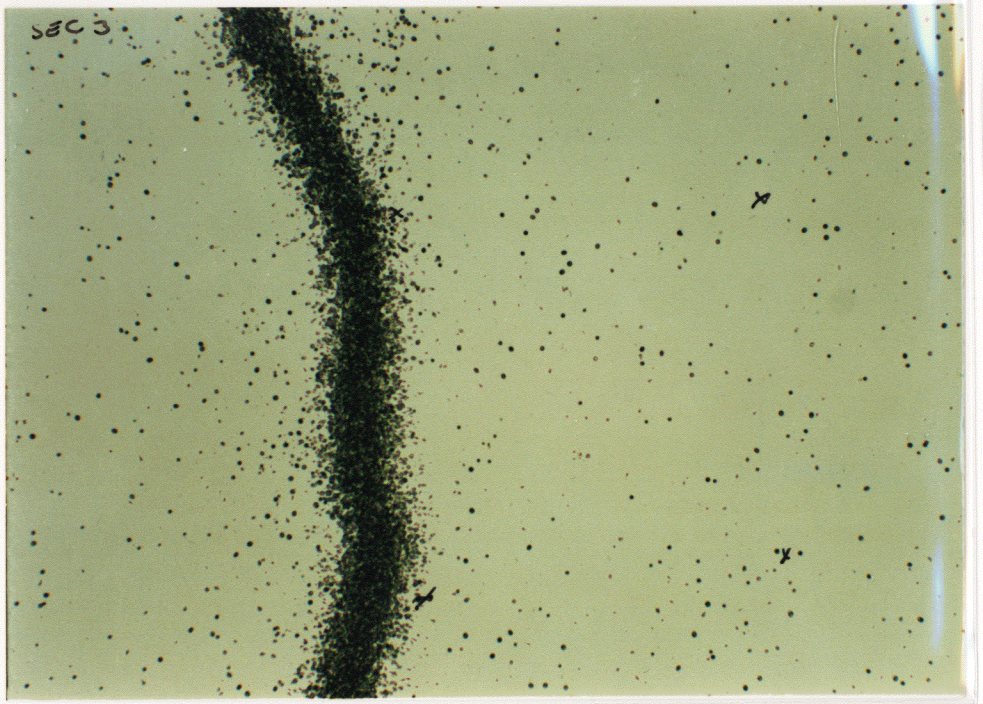

200
100
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
distance
Column 2
Column 3
Column 4
Column 5

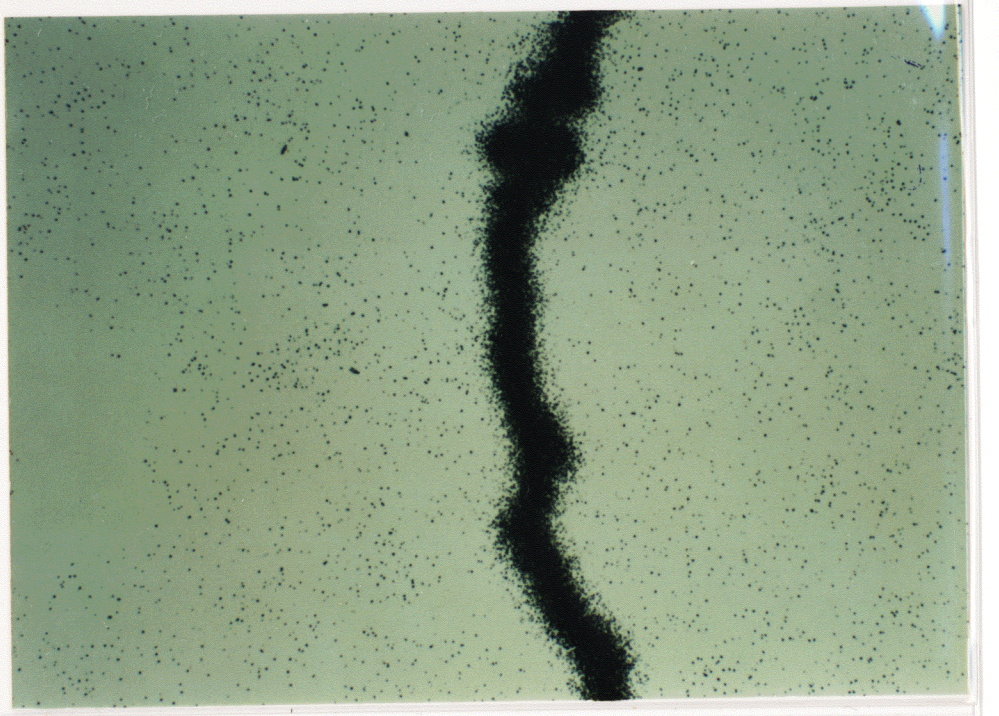

SEC1
SEC2

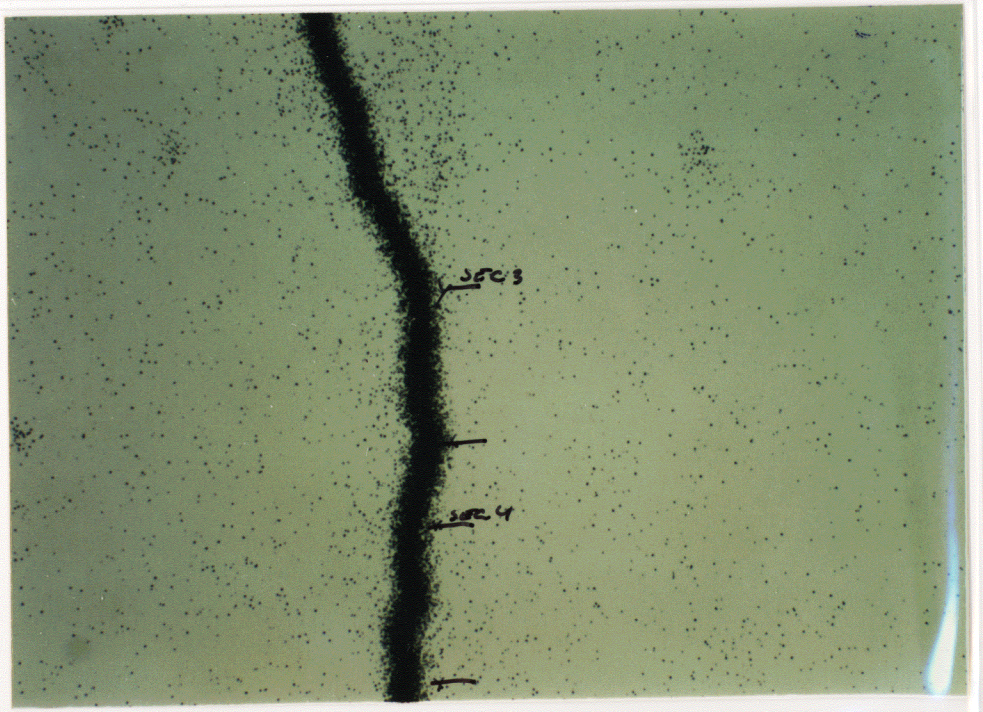


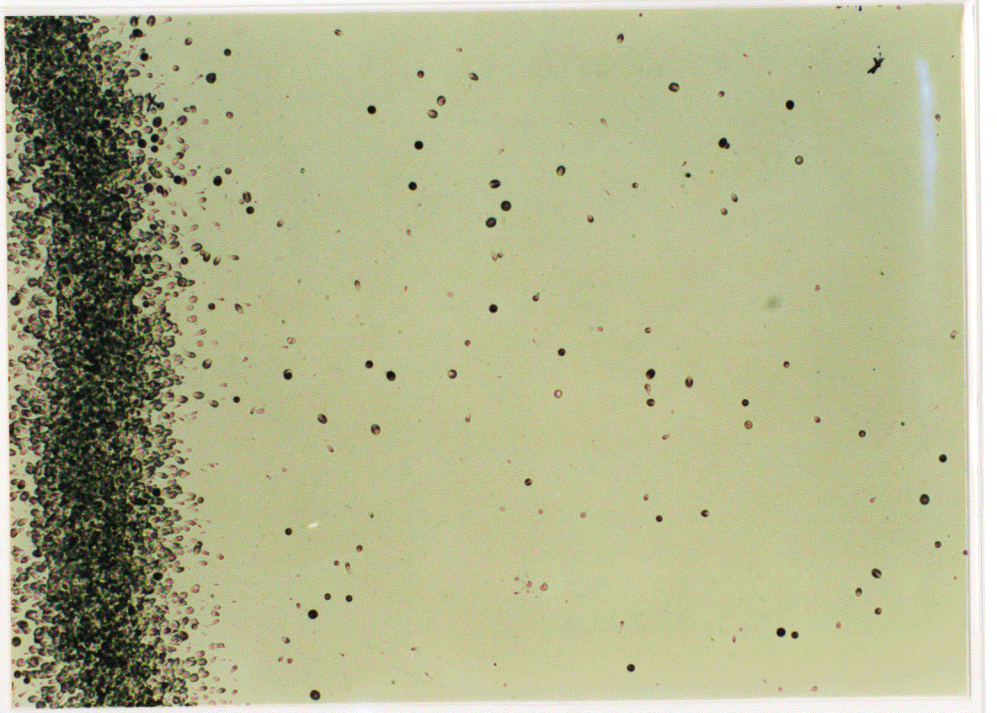


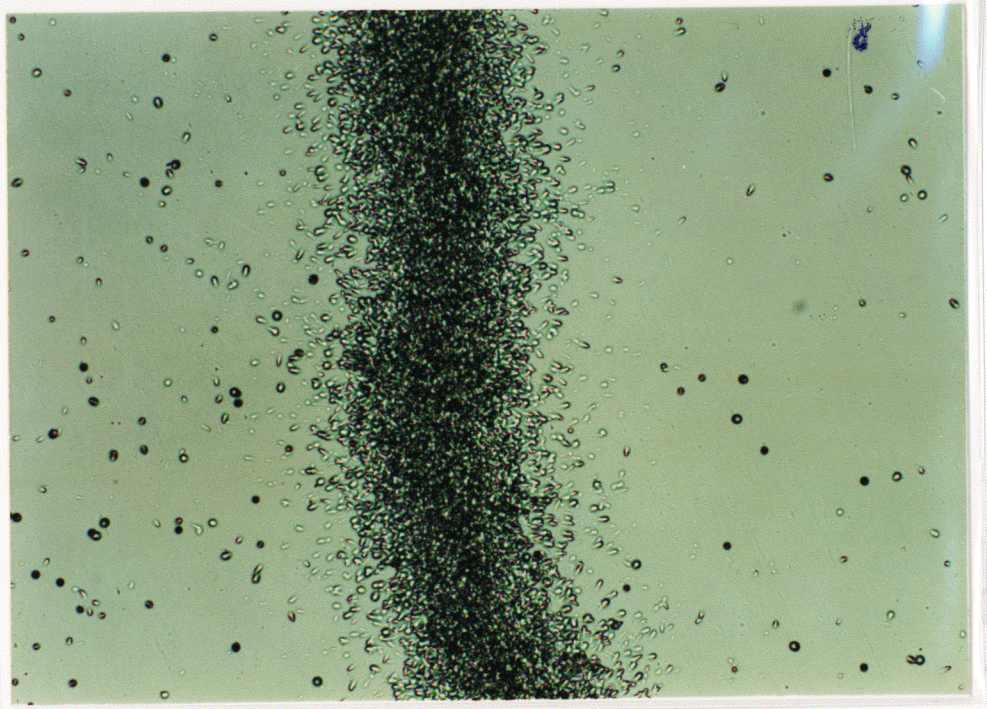

SEC1

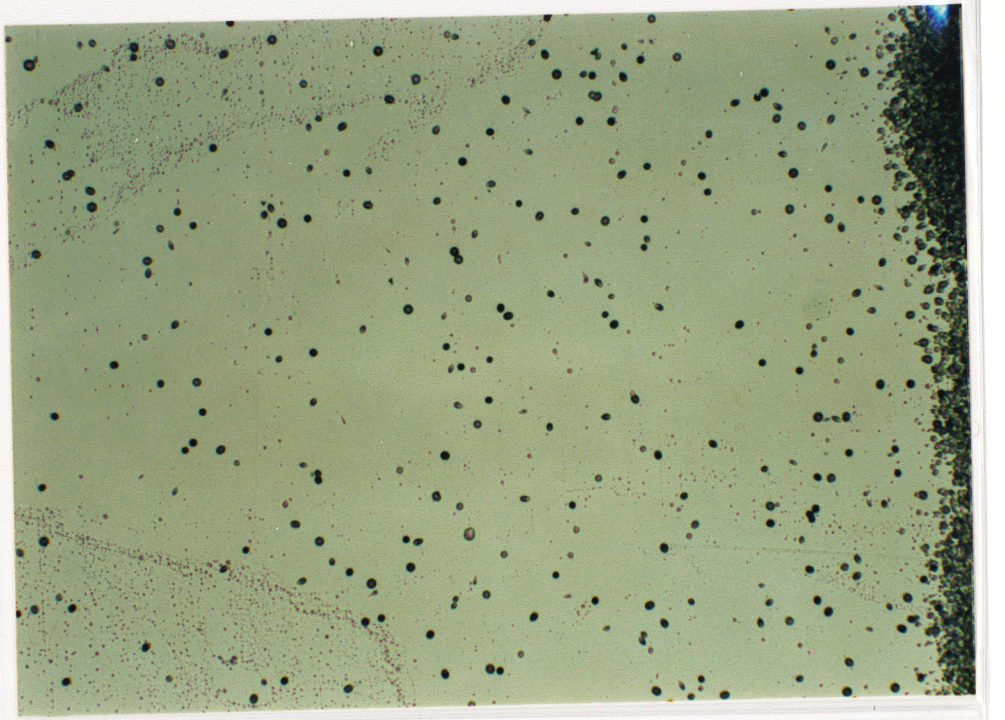

SEC 3

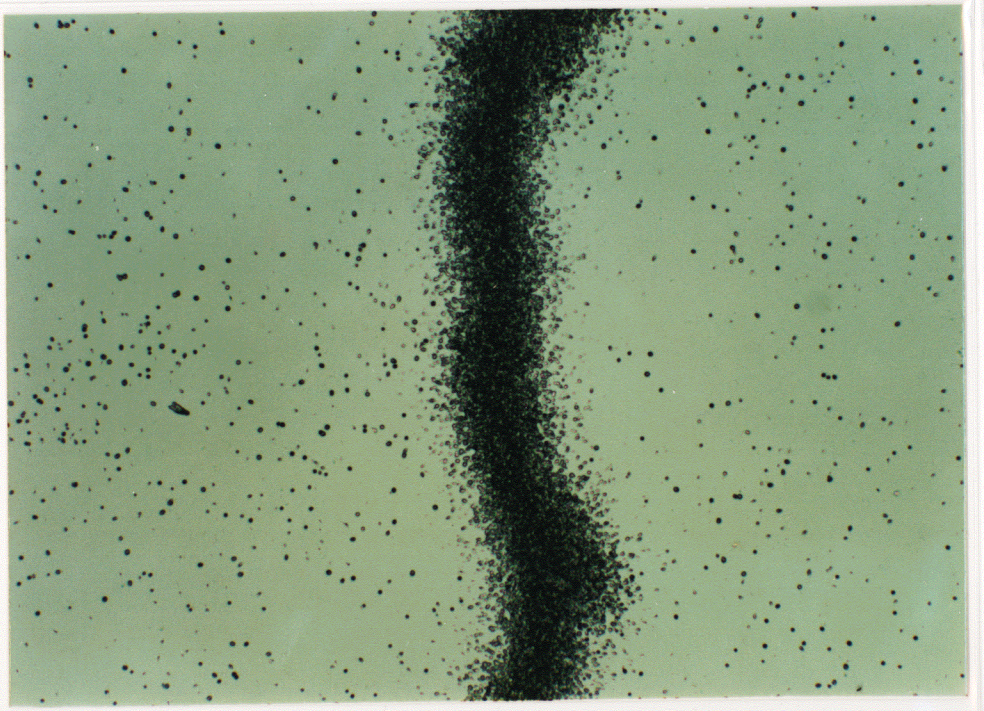


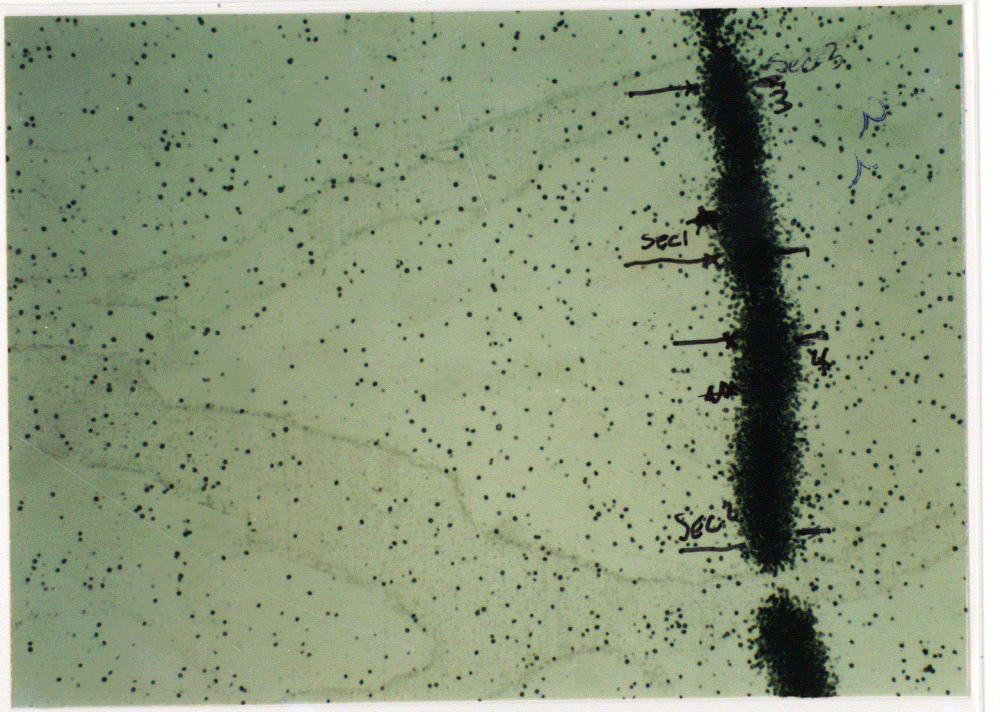

SEC 3
SEC 4

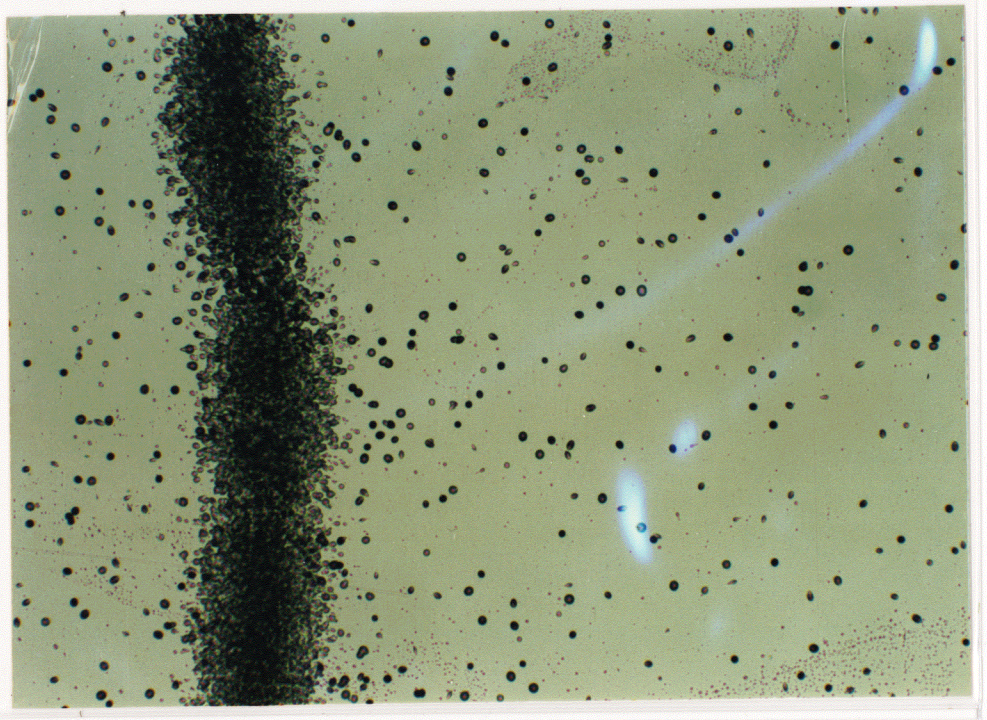


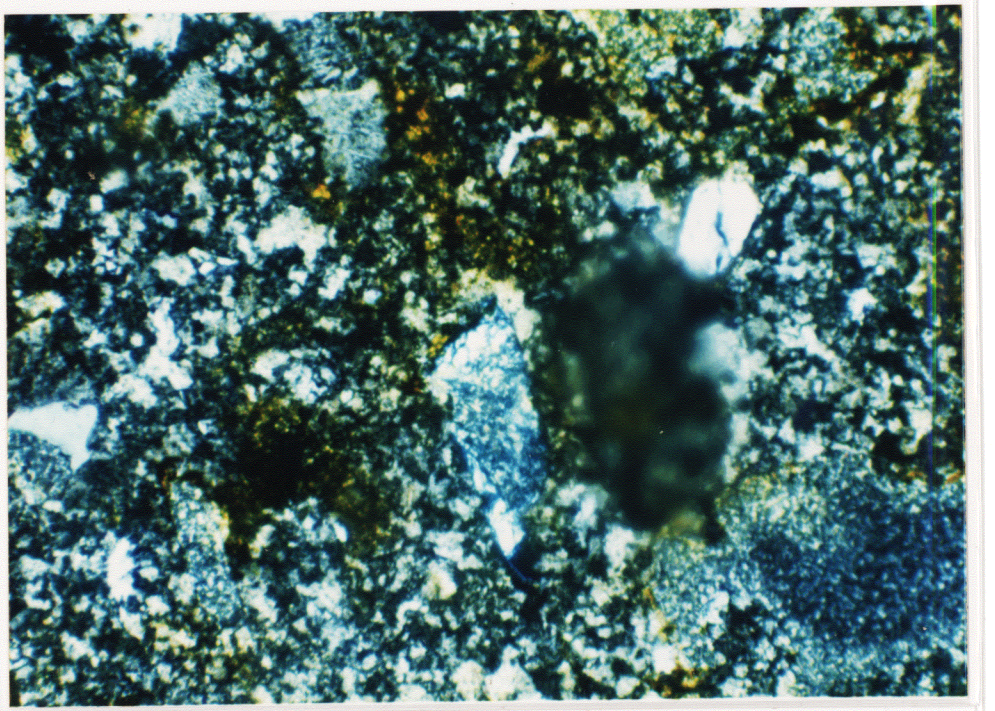


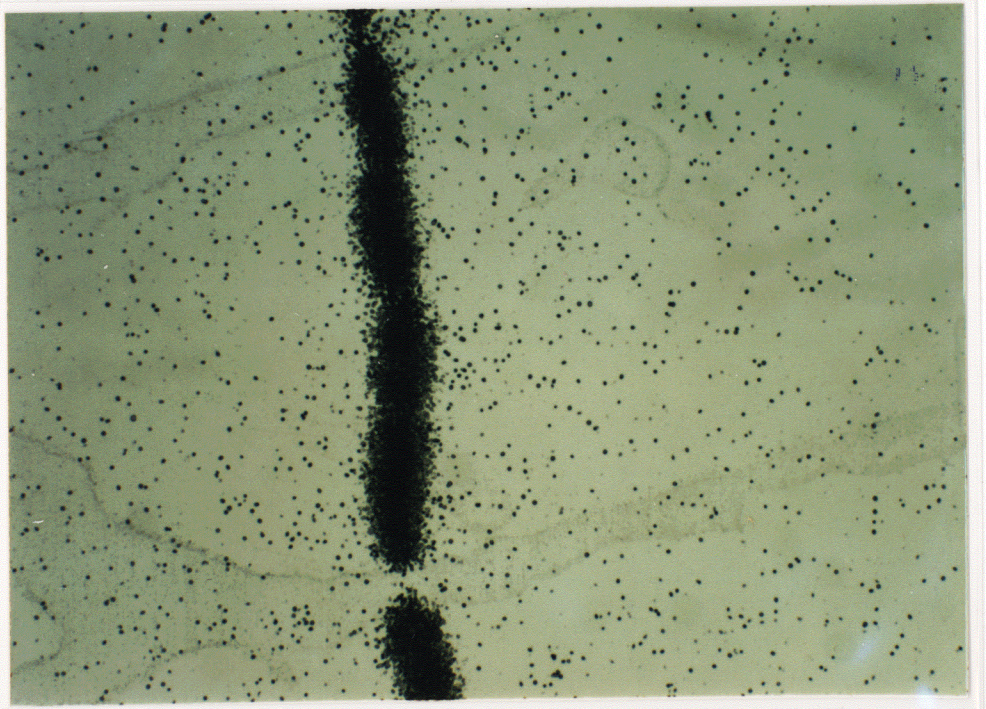


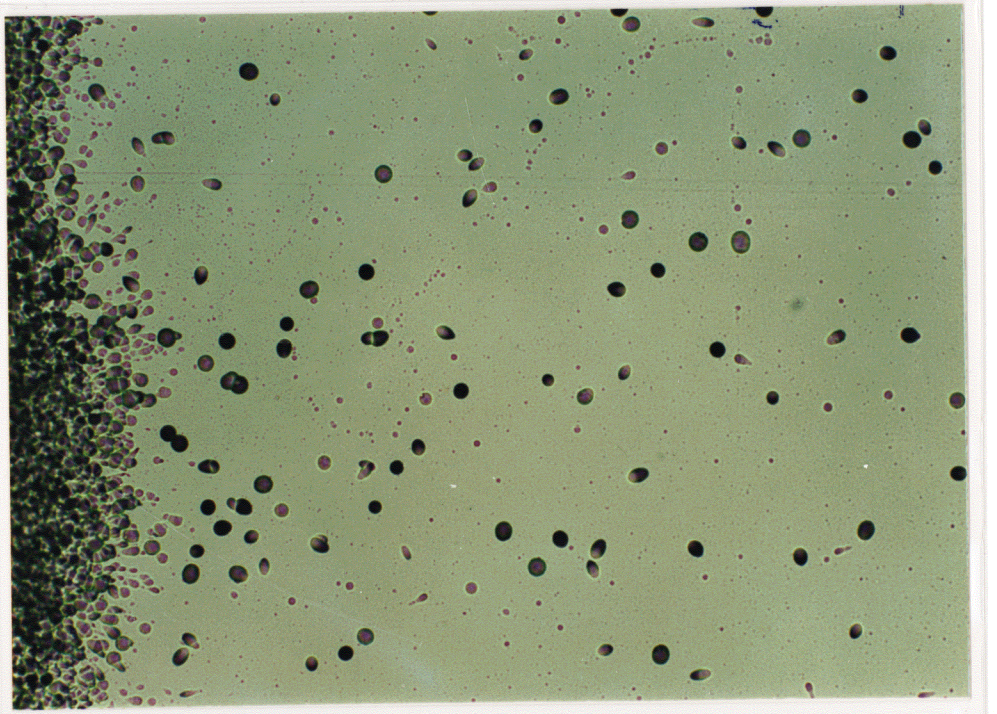


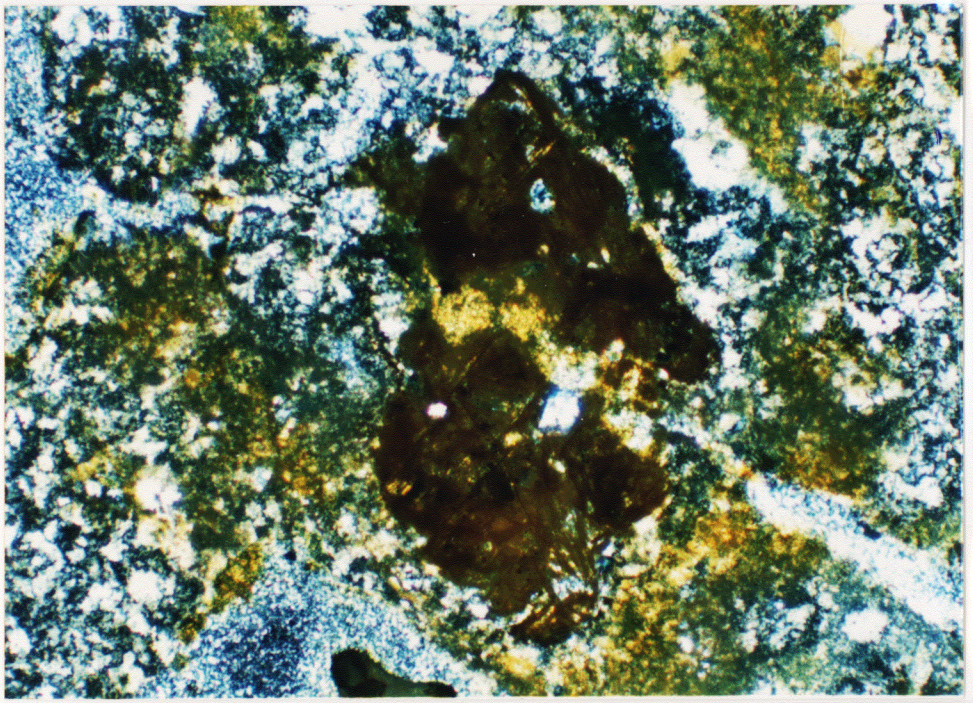

Sec 3
3
Sec1
4
Sec2

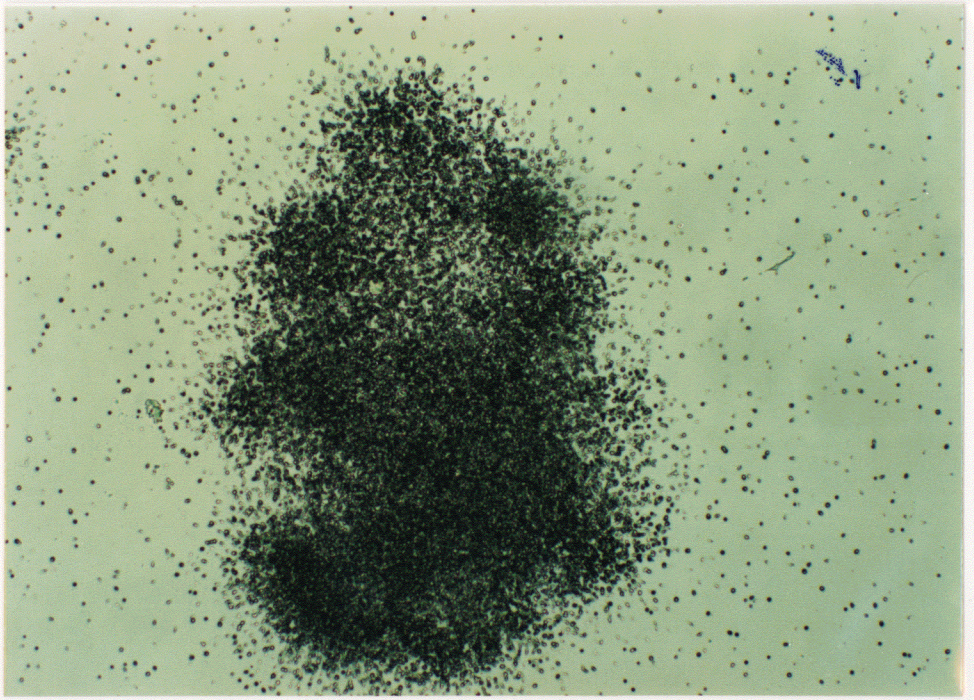


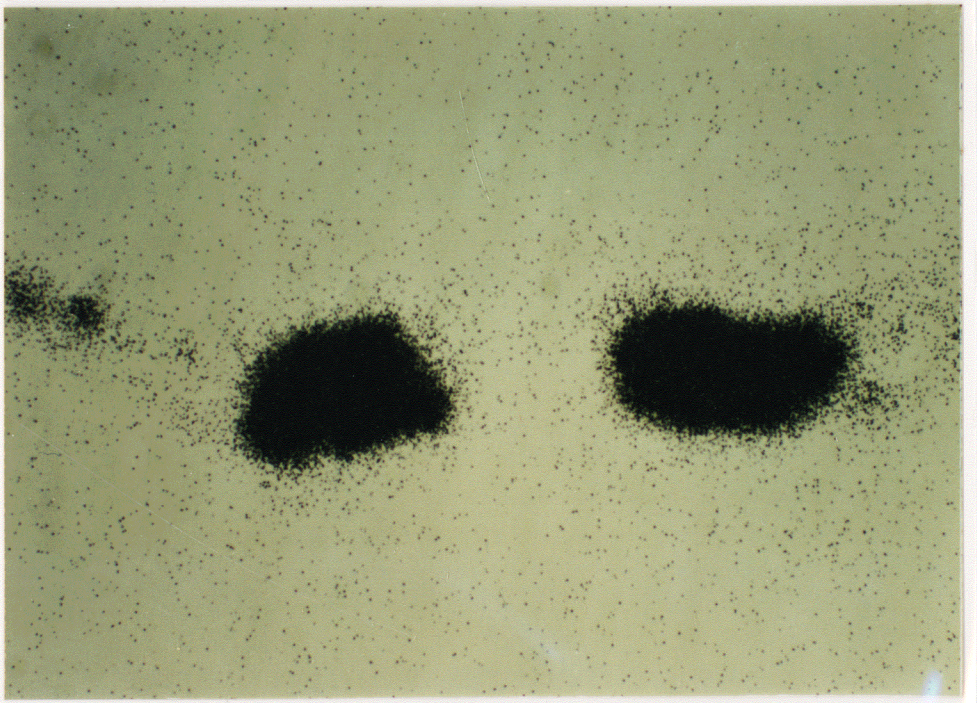


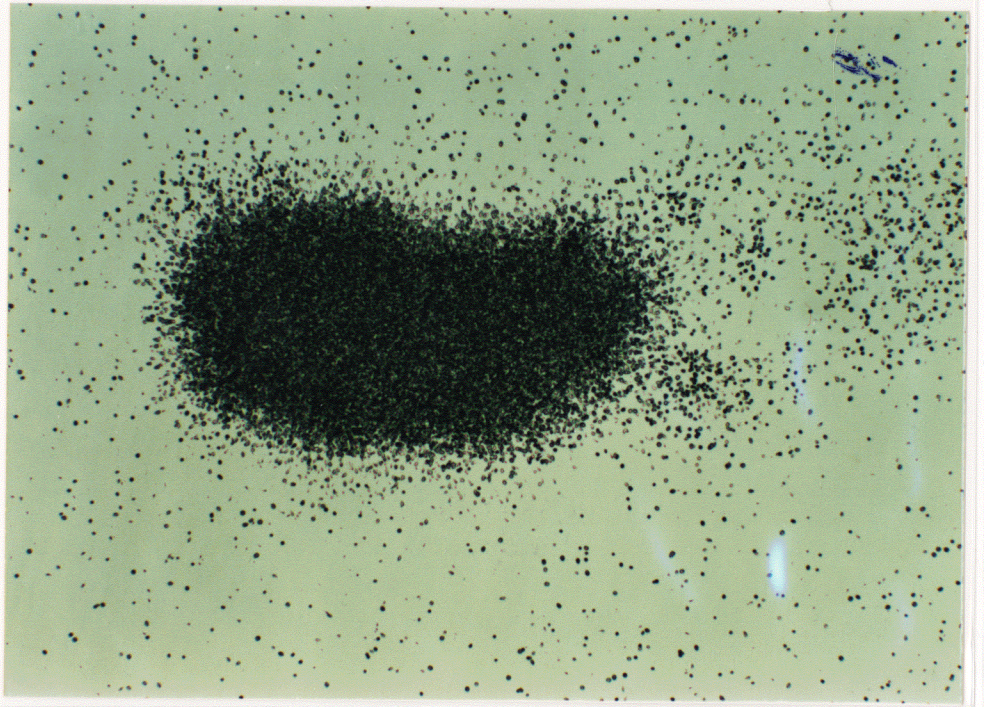


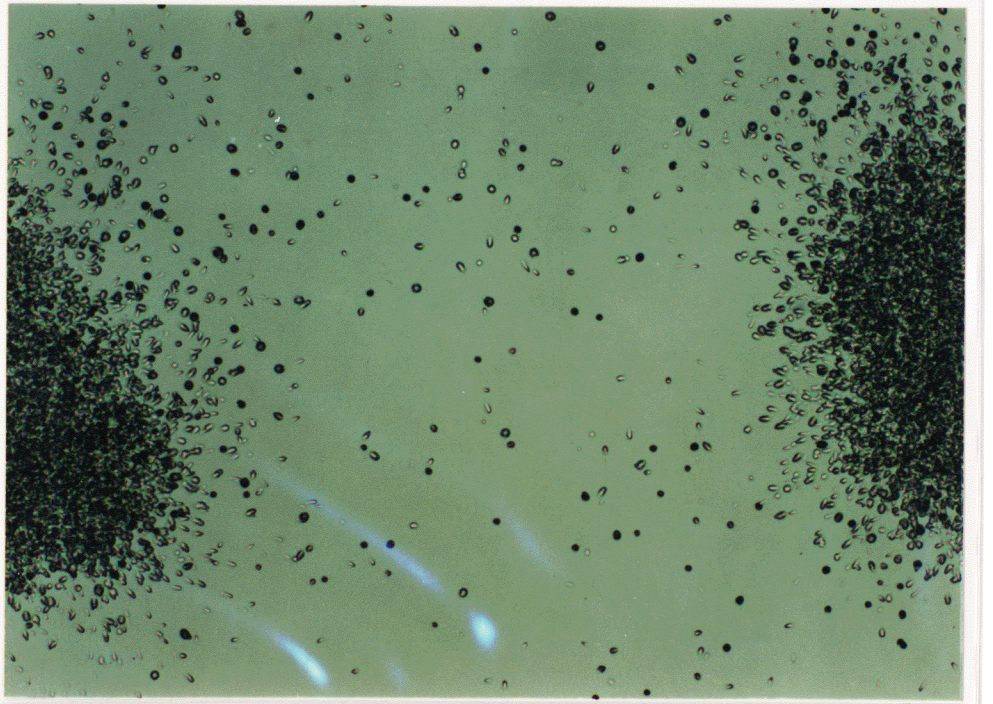


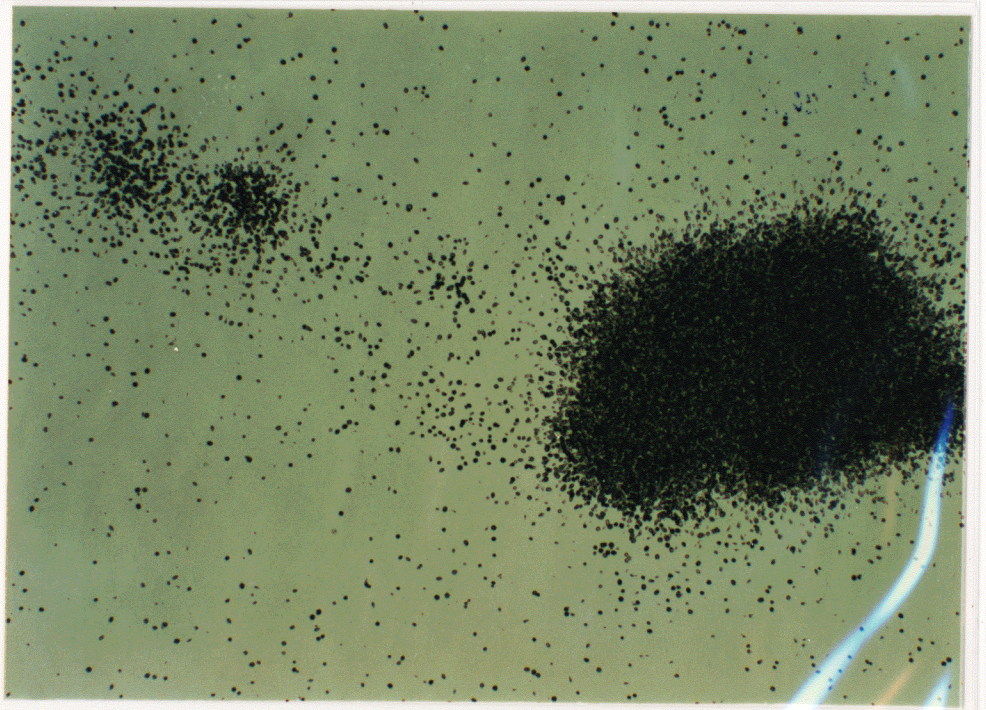


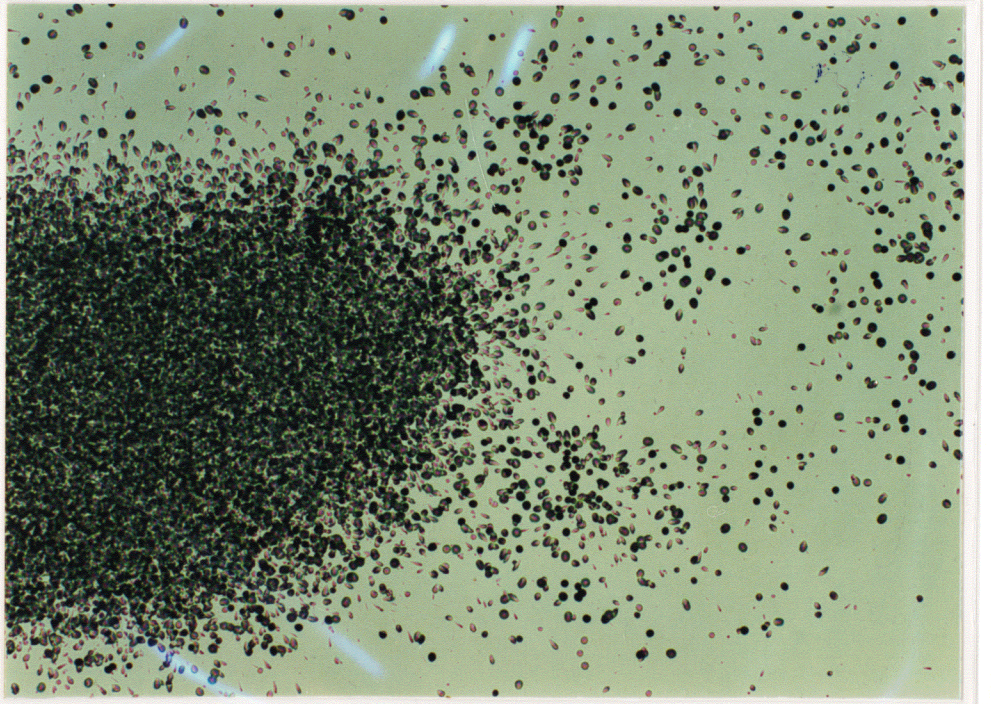












PHOTOGRAPHY

Photographer: pgh

Type of photography: CR-39

Date: 2/4/93

Microscope: Nikon

Camera: Nikon

Film: Ectachrome 100 Prints

Photo No.	Sample No. and description	Obj.	FOV	Light
3A				
1.	Left side of fracture	~~10~~ 5 x	2.6mm	XN
2.	Same as 1 - different light	5 x	2.6mm	PL
3.	Close up of 1	10 x	1.3mm	
4.	Close up - Notice elongation of hits	20 x	0.65	
5.	From other side of fracture	5 x	2.6mm	
		10 x	1.3mm	
6.	Same as 5	20 x	0.65mm	
7.	Same as 5			
8.	Another area - Near top right hand corner. X hairs centered on fracture	~~8~~ ~~10~~ x	~~2.6~~ ~~1.3~~ mm	
		~~10~~ ~~20~~ x	1.3mm	
9.	Close up of 8	20 x	0.65 mm	
10.	Close up of 8			
5A				
11.	Area in lower left hand corner of slide and left of fracture	~~8~~ ~~10~~ x	~~2.6~~ mm	
		~~10~~ ~~20~~ x	~~1.3~~ ~~0.65~~ mm	
12.	Close up of 11			
13.	To the right of fracture in 11.	5 x	2.6mm	
14.	Close up of 13	10 x	1.3mm	
15.	Close up of 13	20 x	0.65mm	

PHOTOGRAPHY

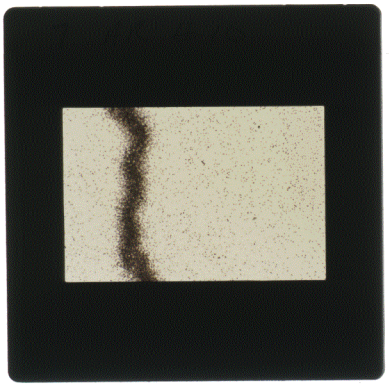
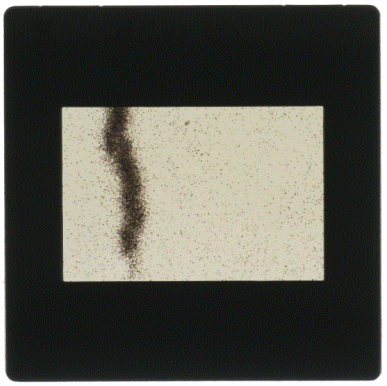
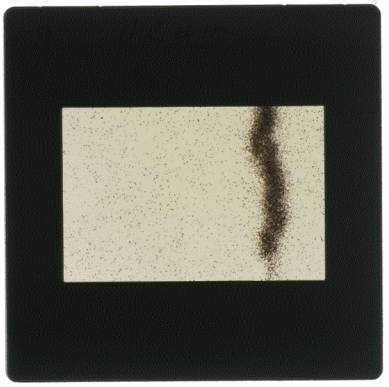
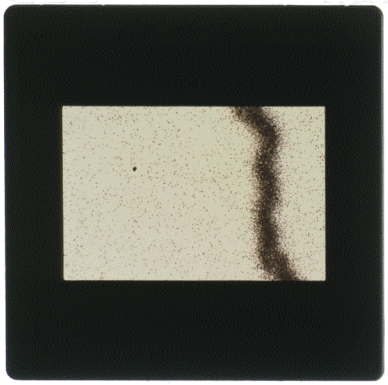
Photographer: Microscope:

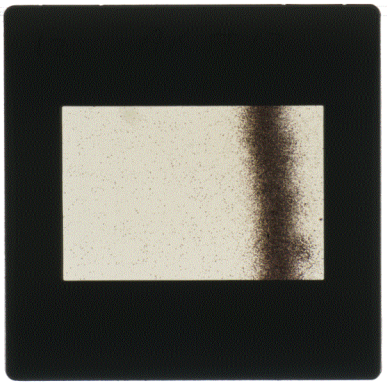
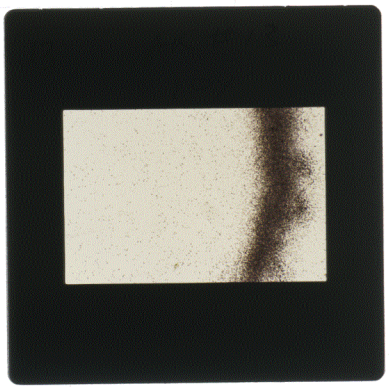
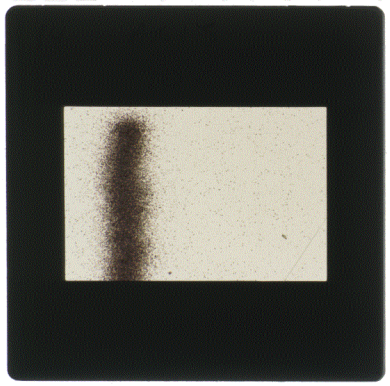
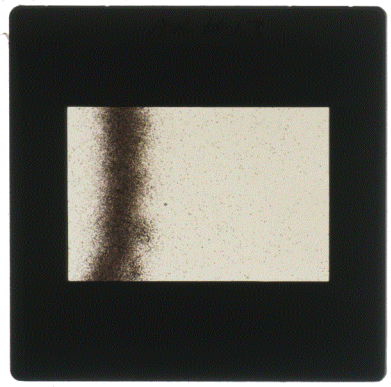
Type of photography: Camera:

Date: Film:

Photo No.	Sample No. and description	Obj.	FOV	Light
6A				
16.	Picture of CR-39 & TS Blurry area is CR-39	10x	1.3mm	XN
17.	CR-39 view of ilmenite	10x	1.3mm	
18.	TS of 17	10x	1.3mm	XN
19.	Two Dots toward the middle	5x	2.6mm	
20.	Close up of 19	10x	1.3mm	
21.	Left side of left dot	10x	1.3mm	
22.	Right side of right dot	10x	1.3mm	
23.	Close up of 22	20x	0.65mm	
24	Close up of 19	20x	0.65mm	

The following are photographs of the autoradiographic experiment started on 2/19/93 (Analog Notebook 024/239) and processed on 4/19/93 (Analog Notebook 024/277).

PHOTOGRAPHY

Photographer: PS

Type of photography:

Date: 4/23/93

Microscope: Nikon

Camera: Nikon

Film: Ektachrome 100

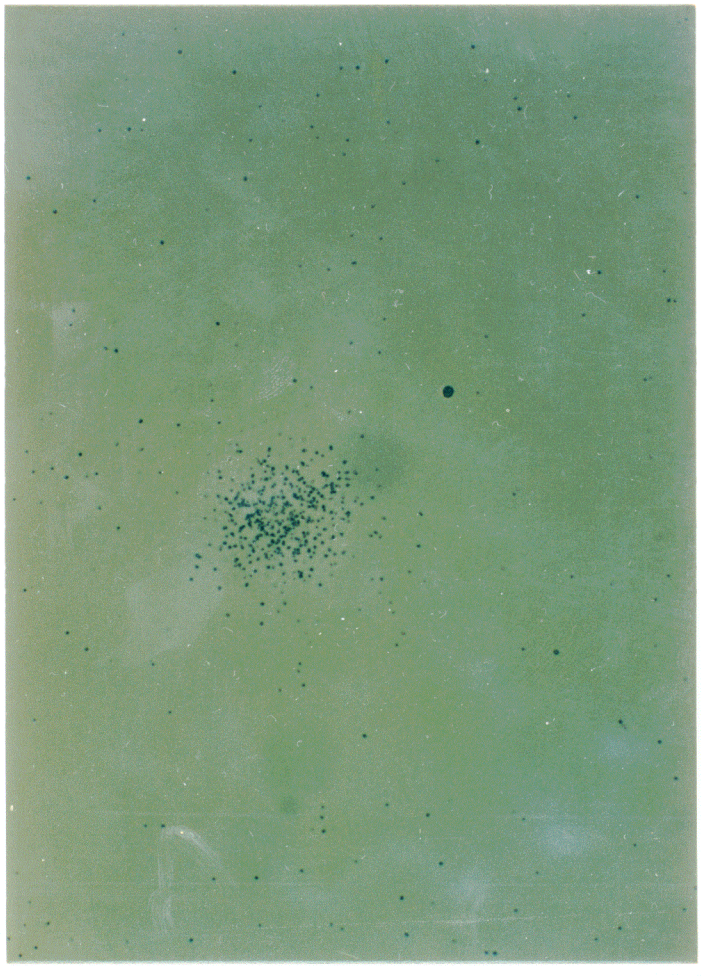
Photo No.	Sample No. and description	Obj.	FOV	Light
1.	26.85 /11.65 - TS1 shows xtl faces & birefringence	40x	0.325	XN
2.	Same as #1	40x	0.325	RL
3.	"	40x	"	XN
4.	"	40x	"	RL
5.	"	40x	"	PL

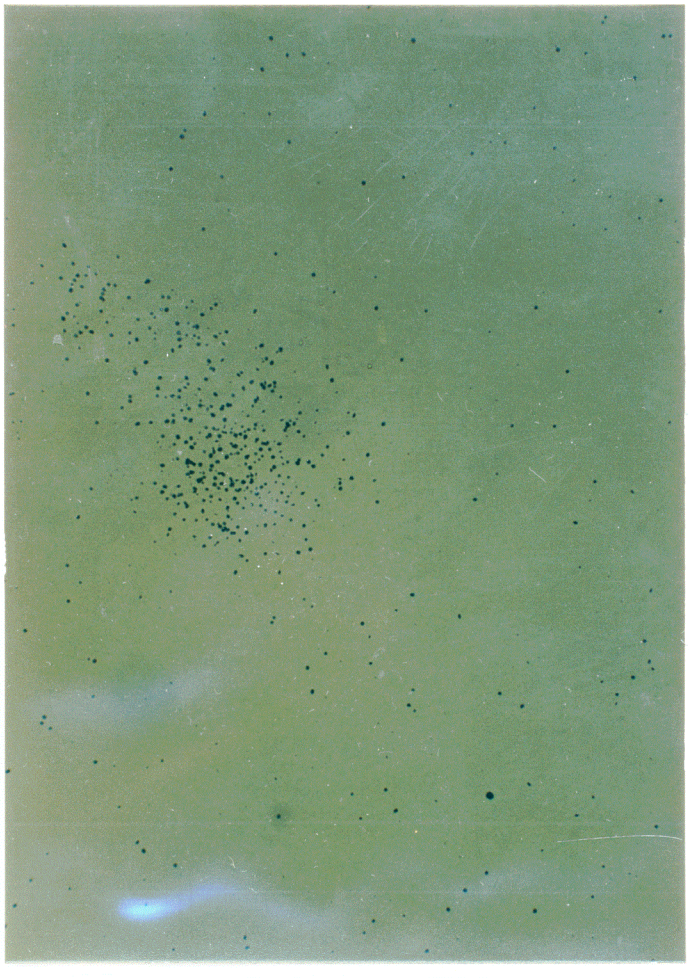
Autoradiographic #10

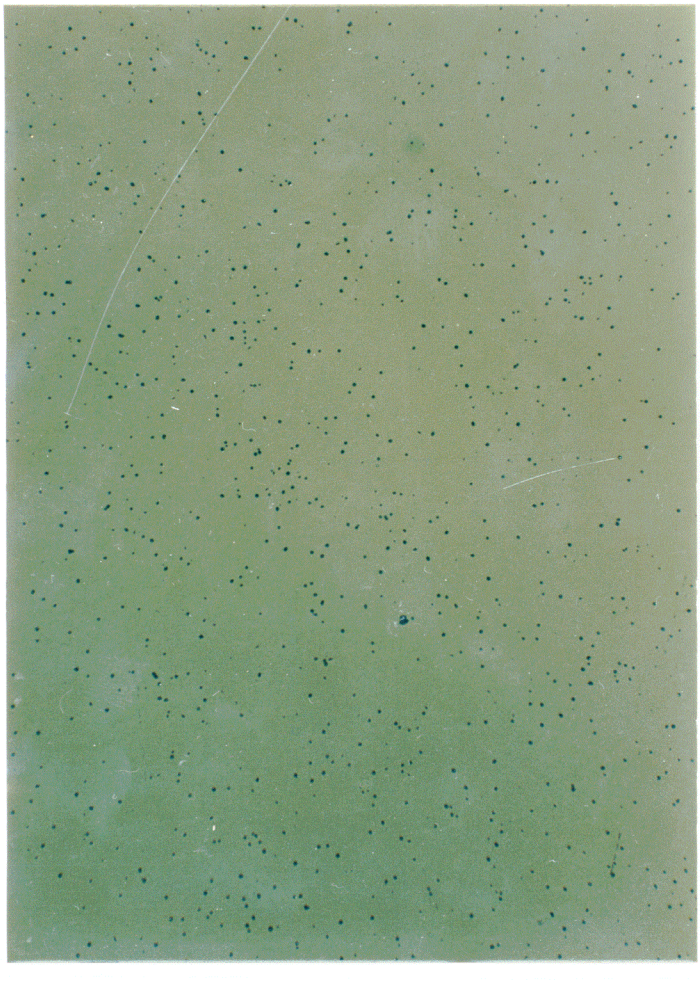
6.	upper right corner	5x
7.	" Left side of fracture top	10x
8	" Left side bottom	10x
9	" Right side bottom	10x
10	" Right side top	10x

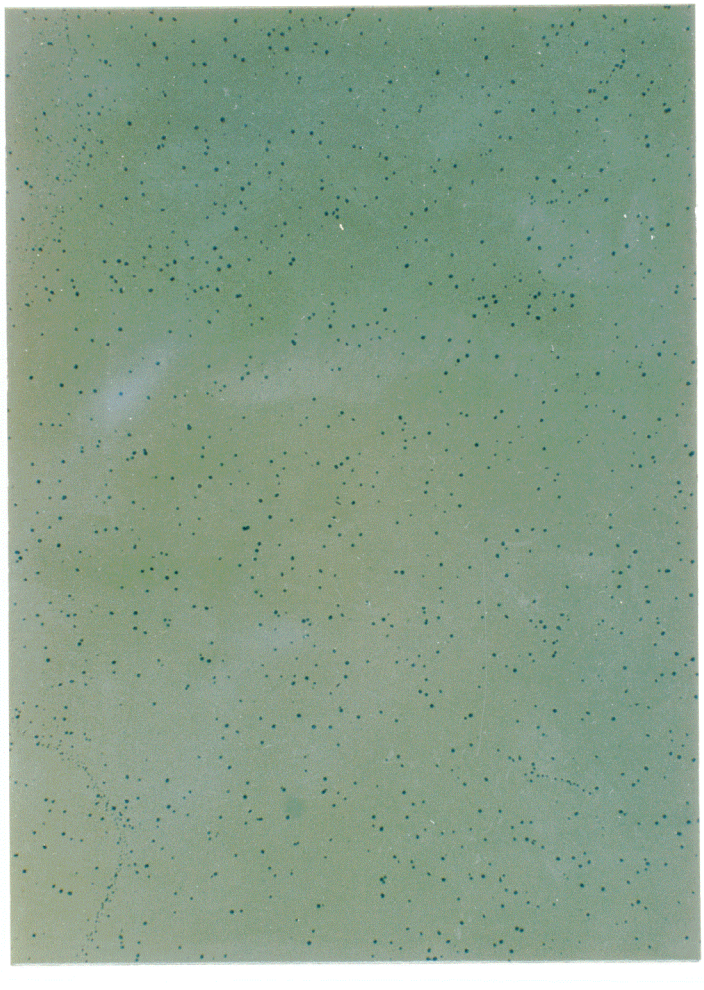
Autoradiographic #13

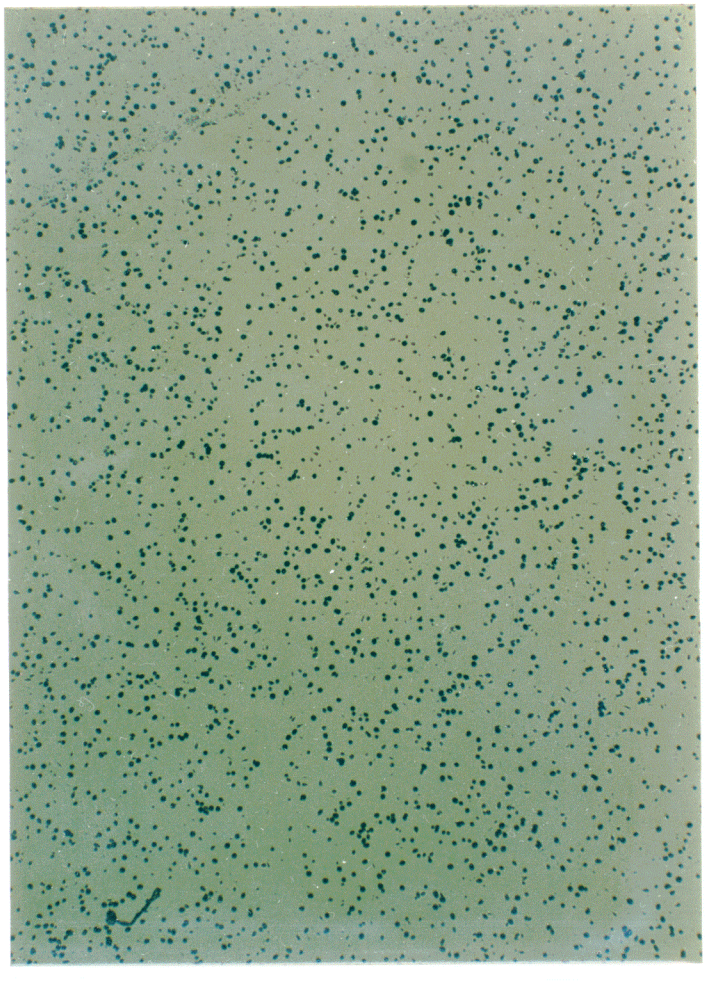
11	upper left corner	5x
12.	Rt side of fracture top	10x
13	" - bottom	10x
14	left side - top	10x
15	" - bottom	10x

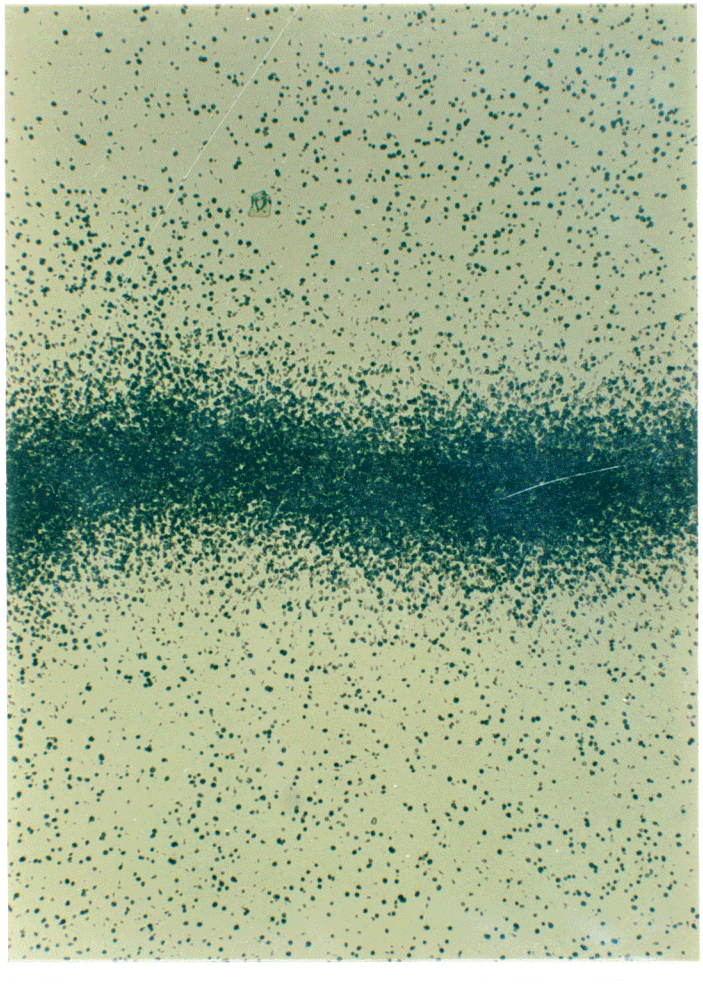


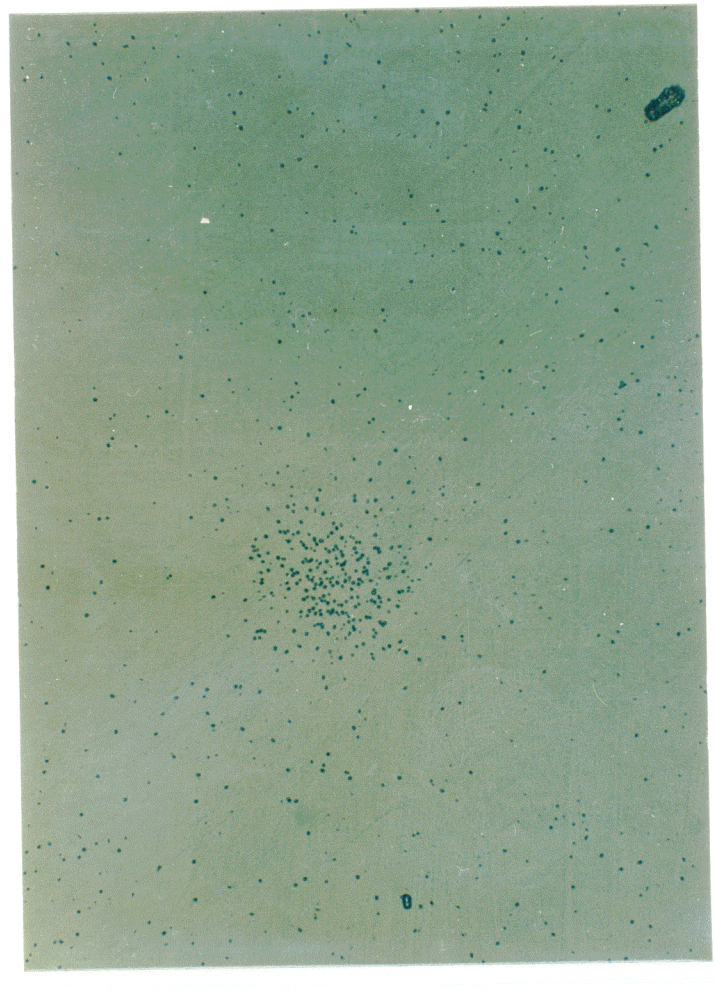


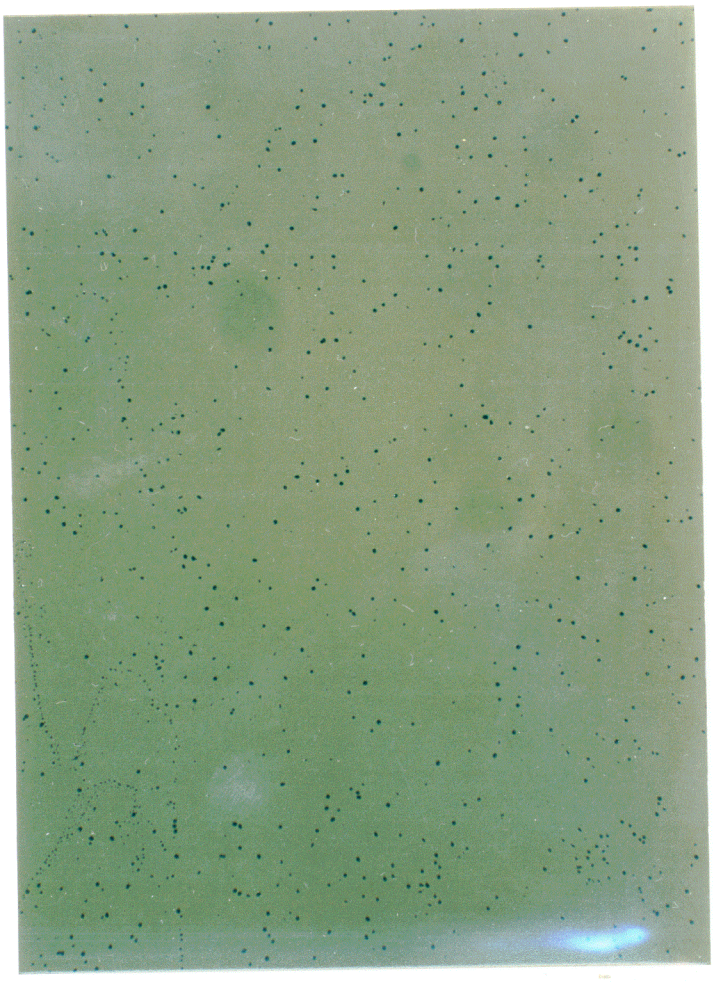


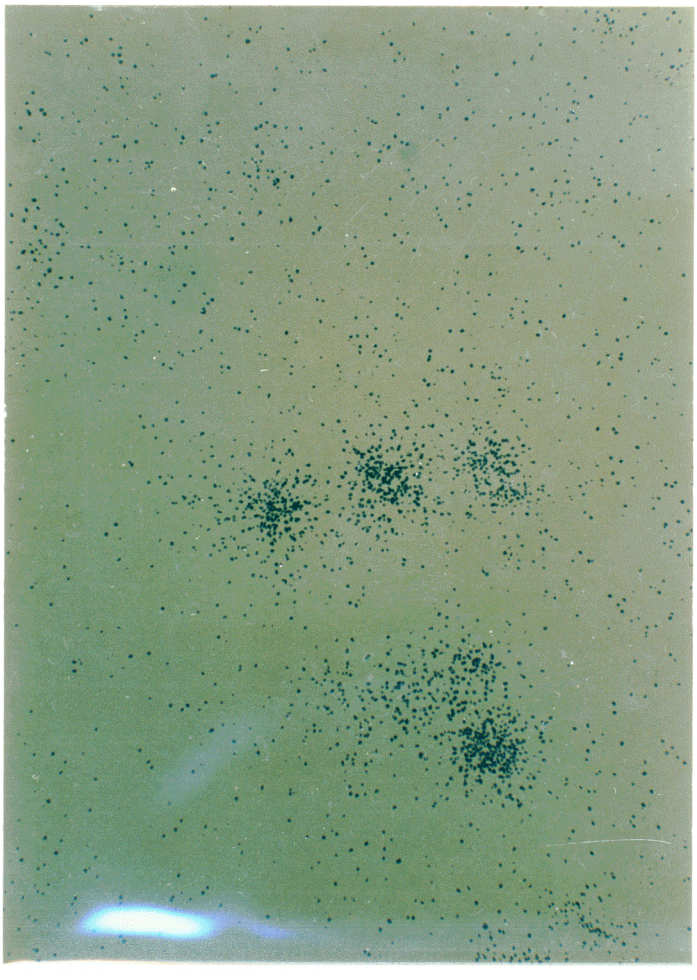


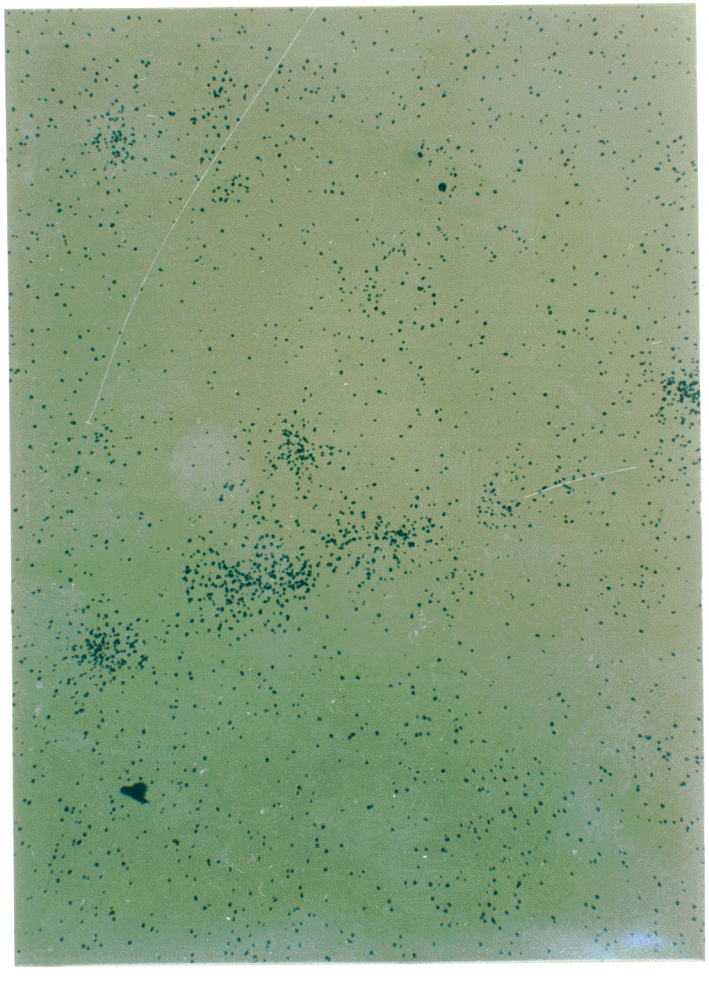


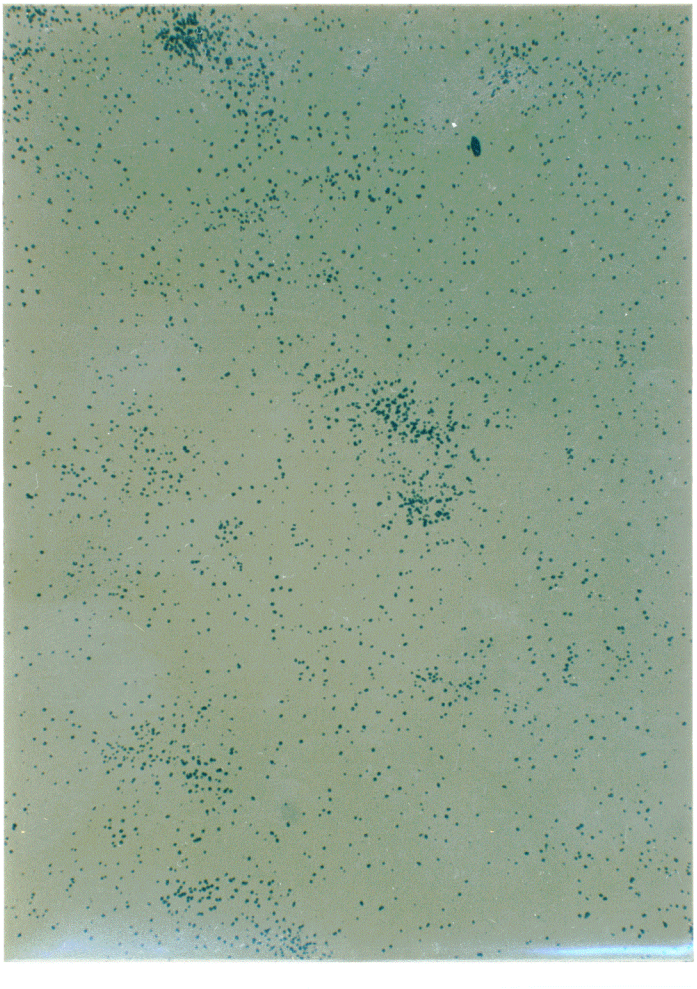


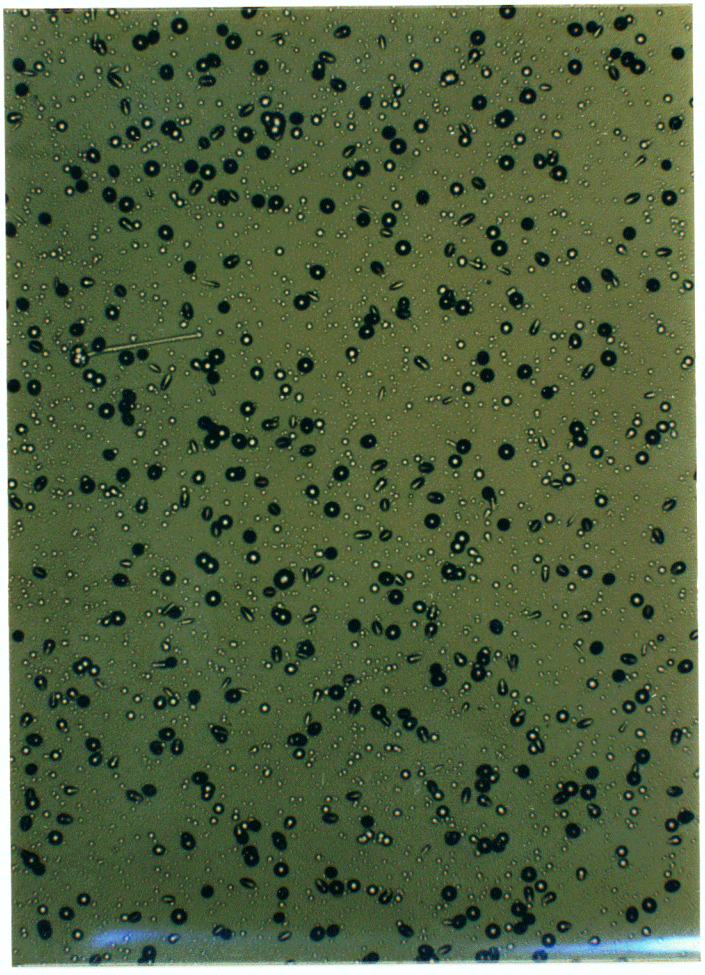


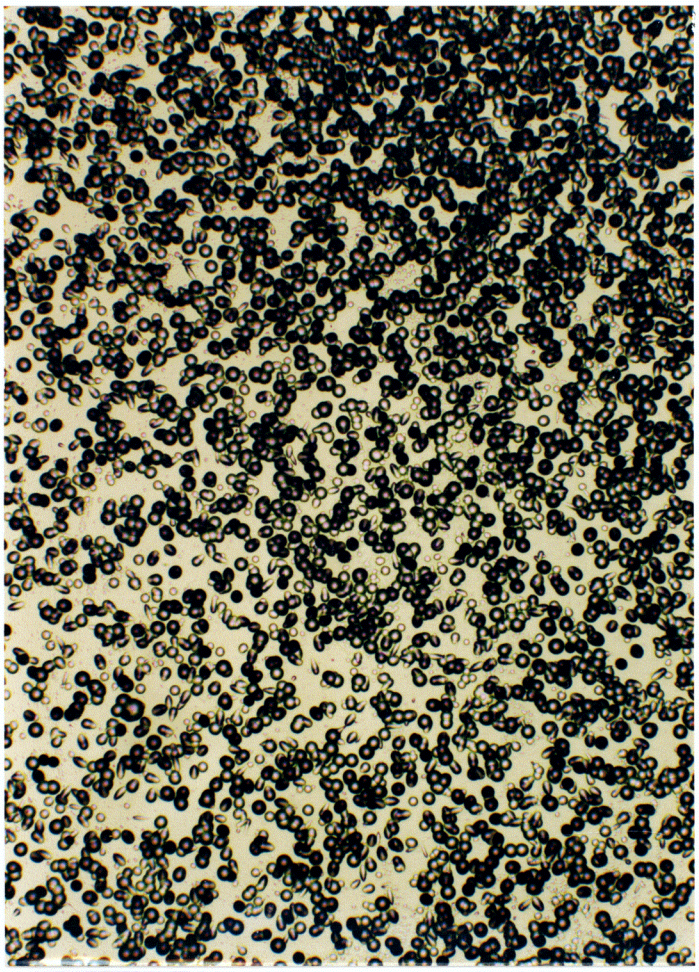


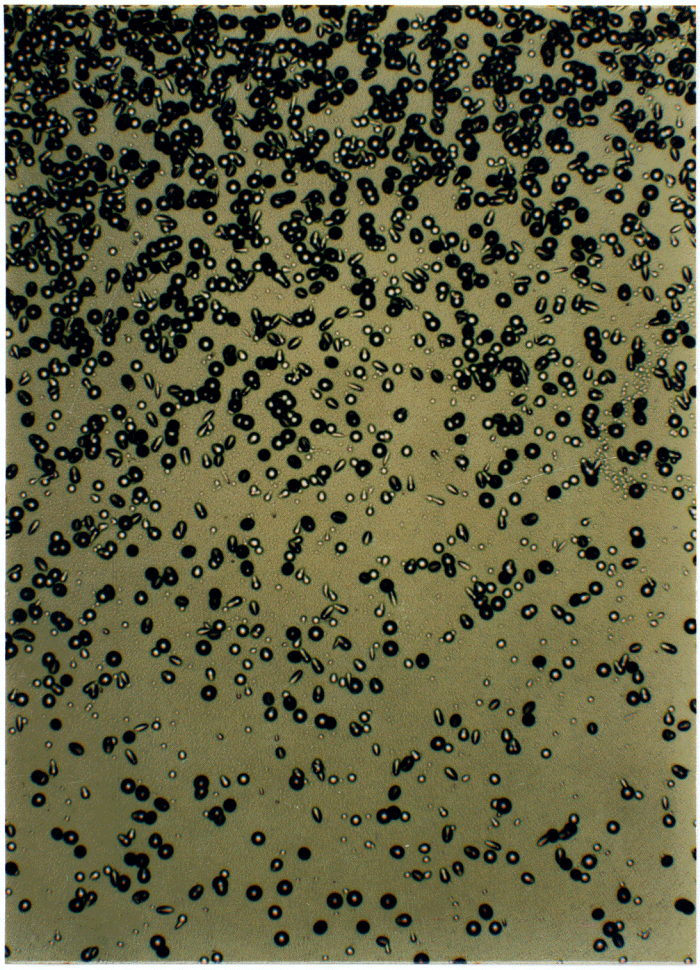












PHOTOGRAPHY

Photographer: Microscope:

Type of photography: Camera:

Date: Film:

Photo No.	Sample No. and description	Obj.	FOV	Light
1	RA 7	10 x	1.3mm	RL & PL
2	RA 8	10 x	1.3mm	RL
3	RA 9	10 x		
4	RA 9	10 x		
5	RA 10 - general matrix	10 x	1.3mm	
6	" Possible area to count	5 x	2.6mm	
7	"	10 x	1.3mm	
8	RA 11	10 x		
9	"	10 x		
10.	RA 12			
11	"			
12	"			

PHOTOGRAPHY

Photographer: Microscope:

Type of photography: Camera:

Date: Film:

Photo No.	Sample No. and description	Obj.	FOV	Light
13	RA 13	5x		
14	"	10x		
15	"	5x		
16	Possible area for counting	10x		
17	"	10x		
18	another area	10x		
19	RA 14	10x		
20	"	5x		
21	within fracture	5x		
22	area where count was done	10x		
23	"	5x		
24				