
بسم الله الرحمن الرحيم

I . Pesyanian

Medical physics MSc

Department of Radiology

Paramedical School

Tabriz university of Medical sciences

The Radiograph

Sensitometry

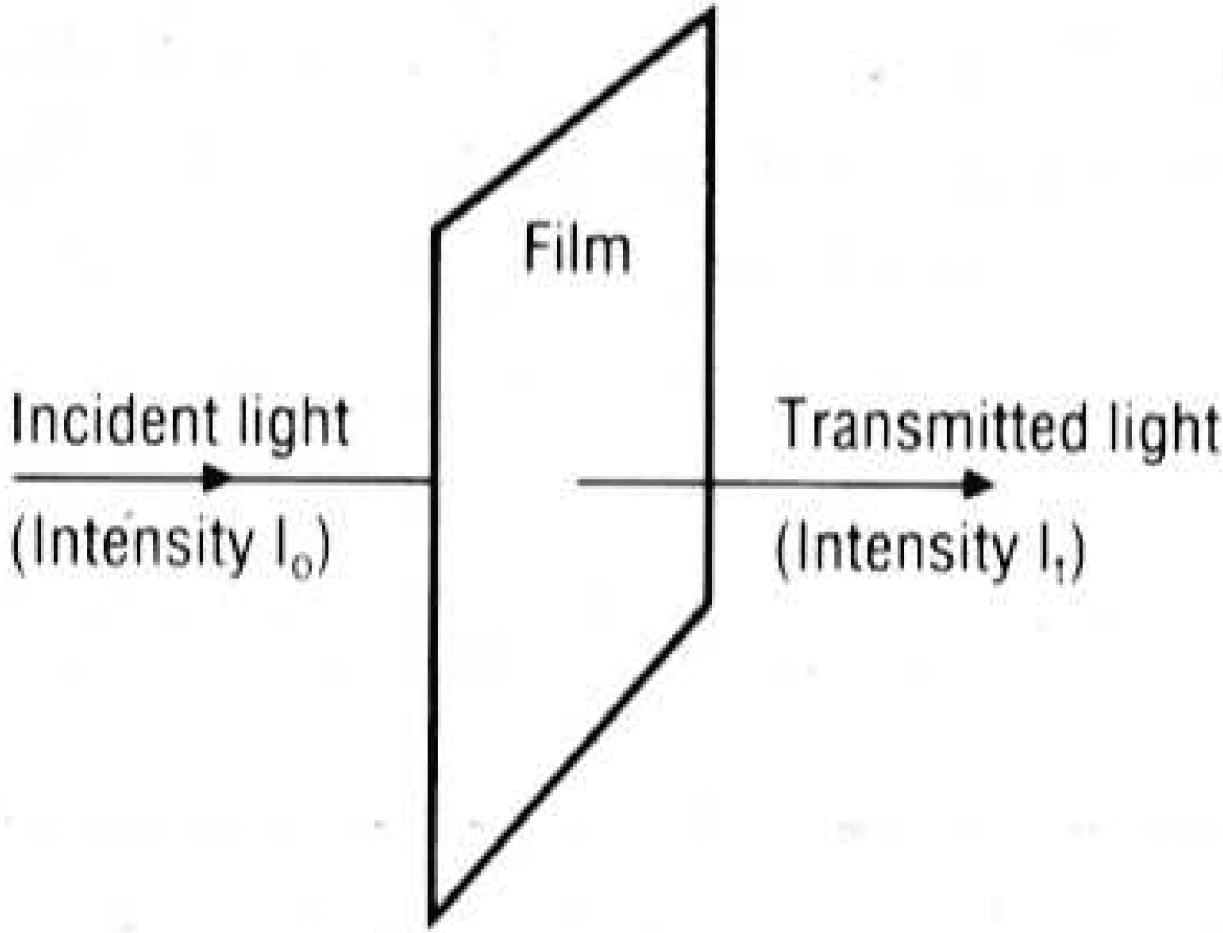
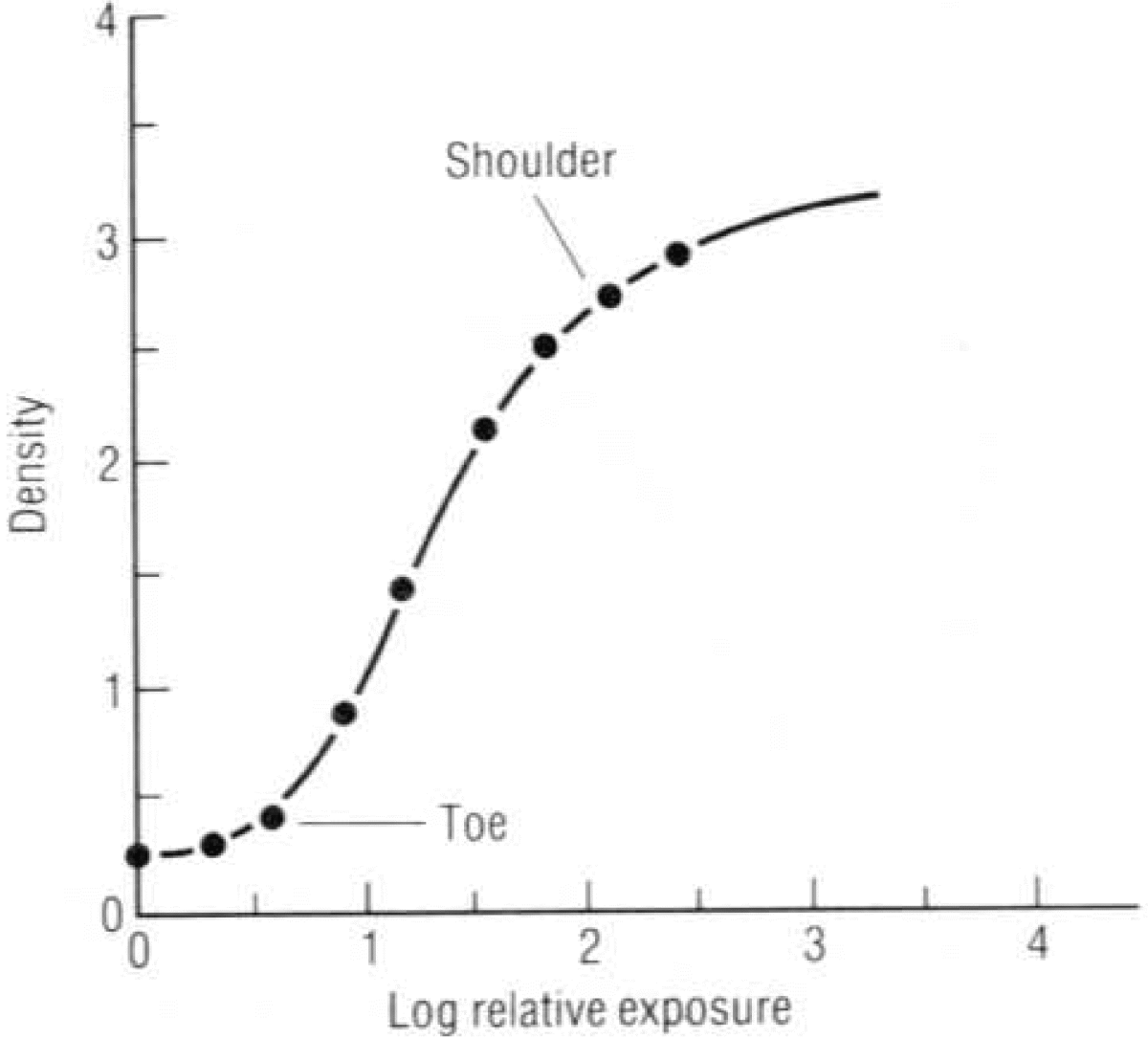

Film
Incident light
(Intensity I_o)
Transmitted light
(Intensity I_t)

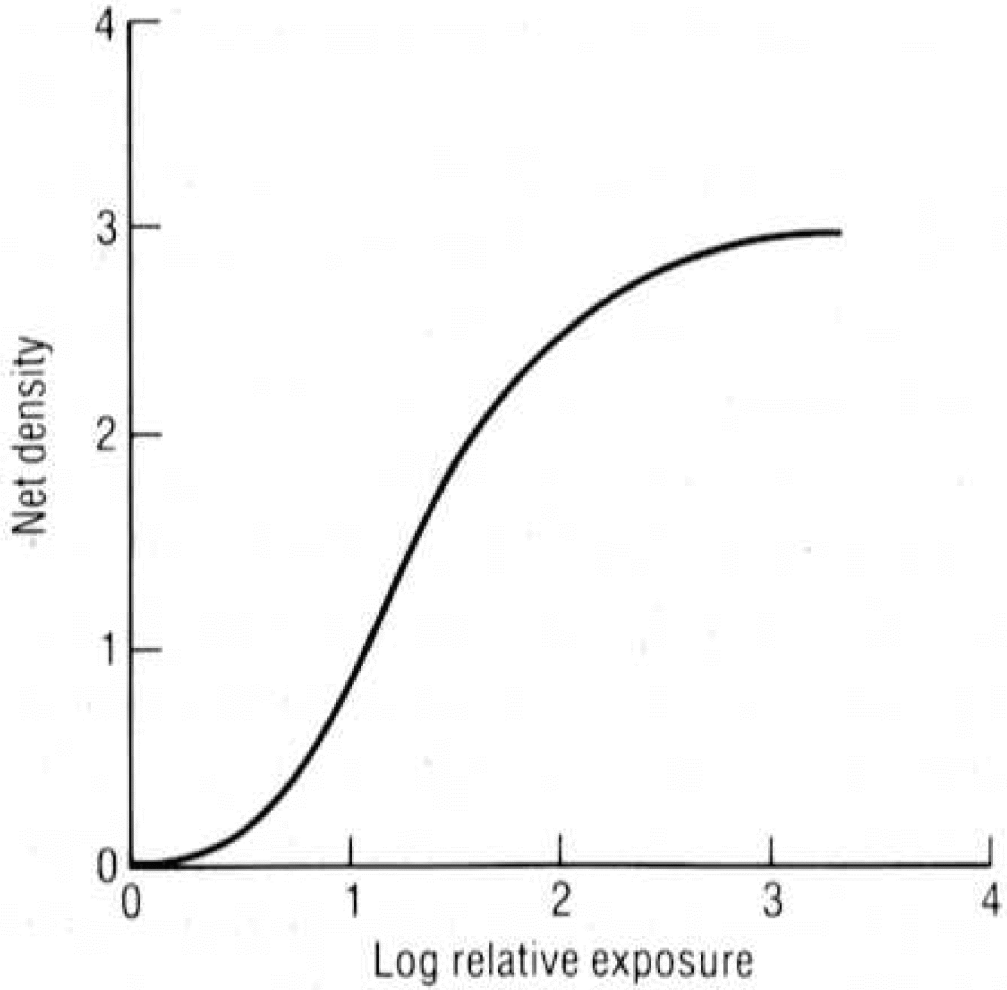
Table 4.1. The relative exposures received by different areas of the film

Area	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
Relative exposure	1	2	4	8	16	32	64	128	256

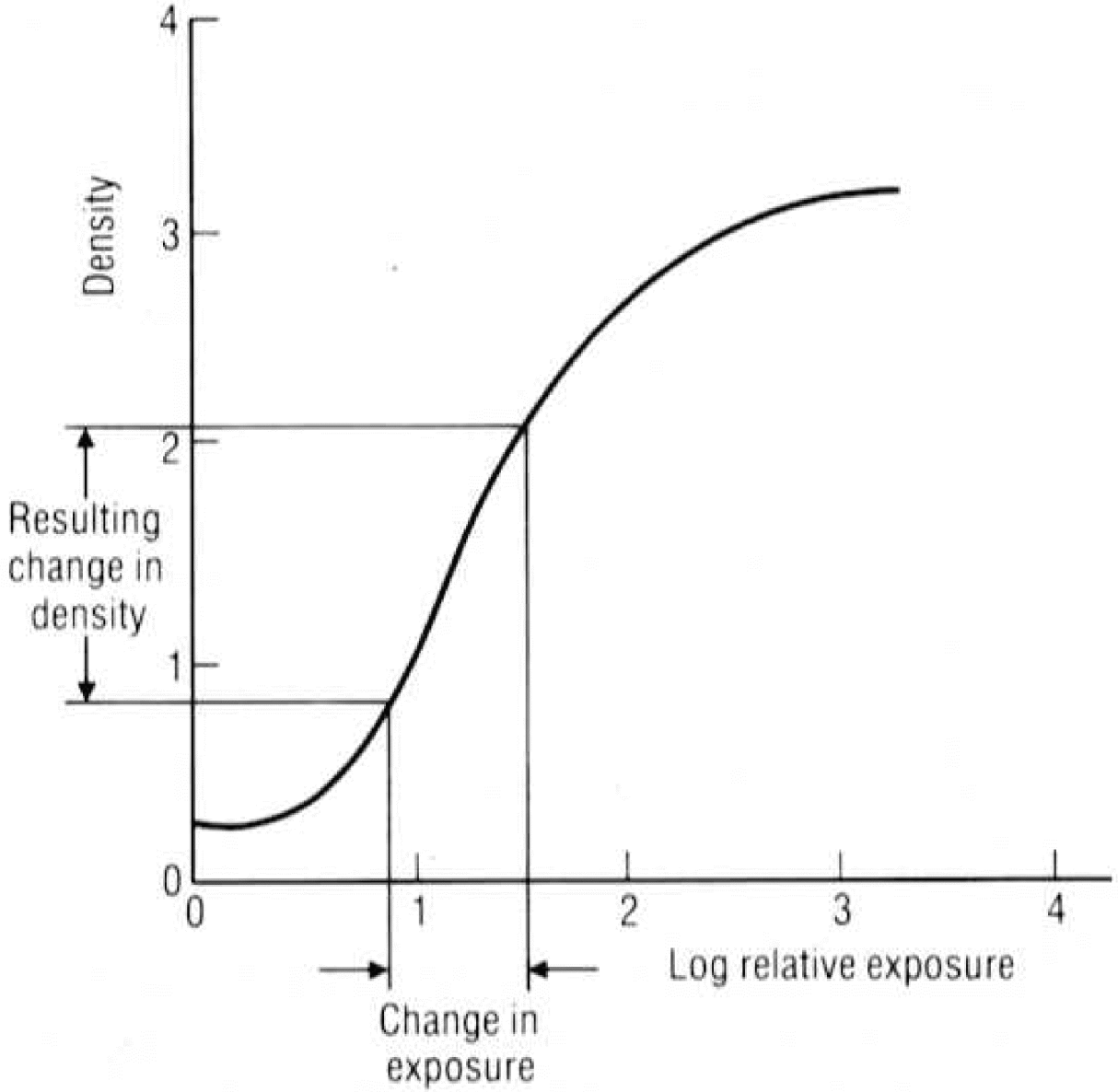
Table 4.2. Tabulation of results obtained prior to plotting a characteristic curve

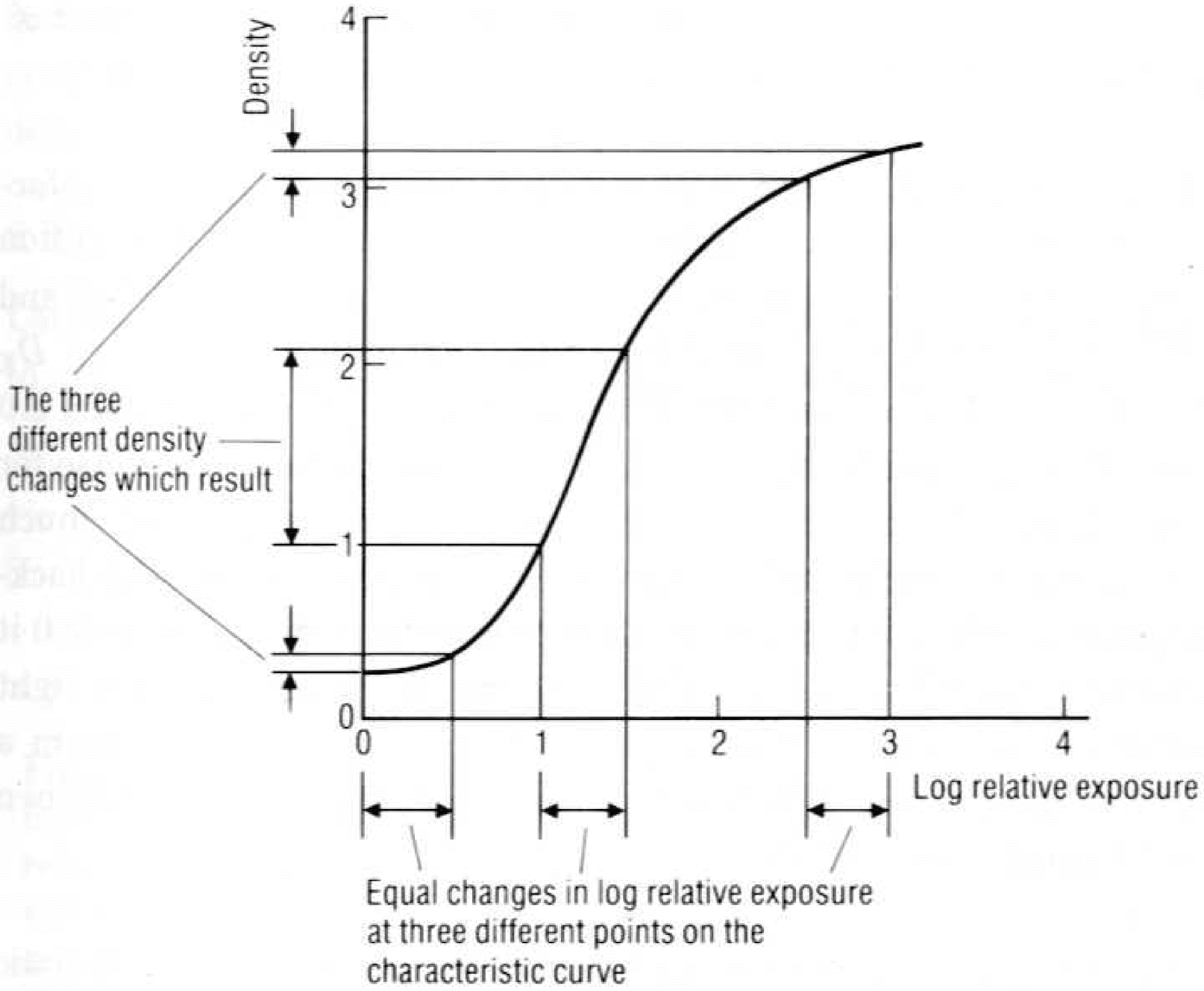
Area	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
Density	0.25	0.3	0.4	0.9	1.45	2.1	2.5	2.7	2.9
Relative exposure	1	2	4	8	16	32	64	128	256
Log relative exposure	0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4

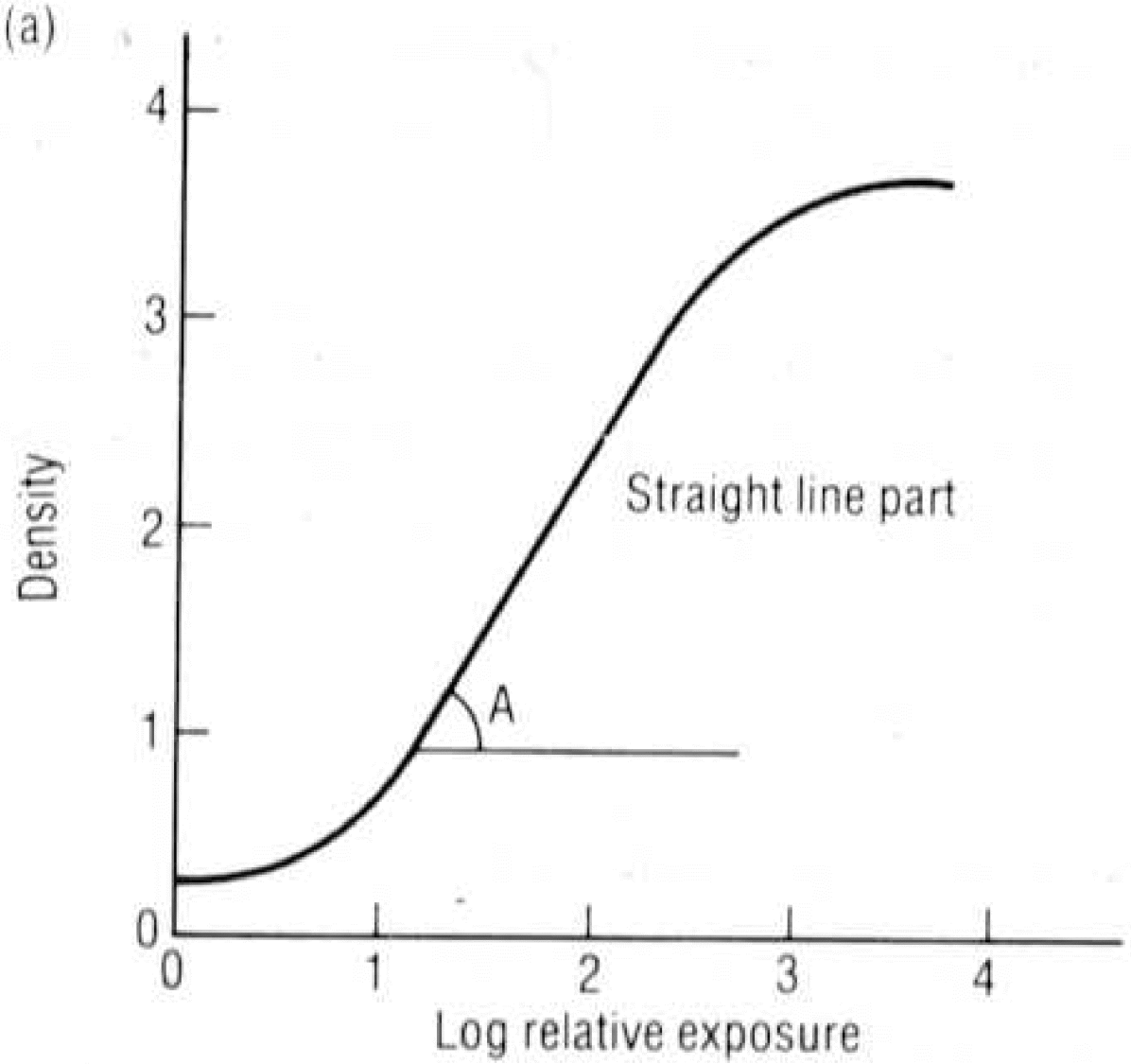

4
3
2
1
0
Density
Shoulder
Toe
0
1
2
3
4
Log relative exposure

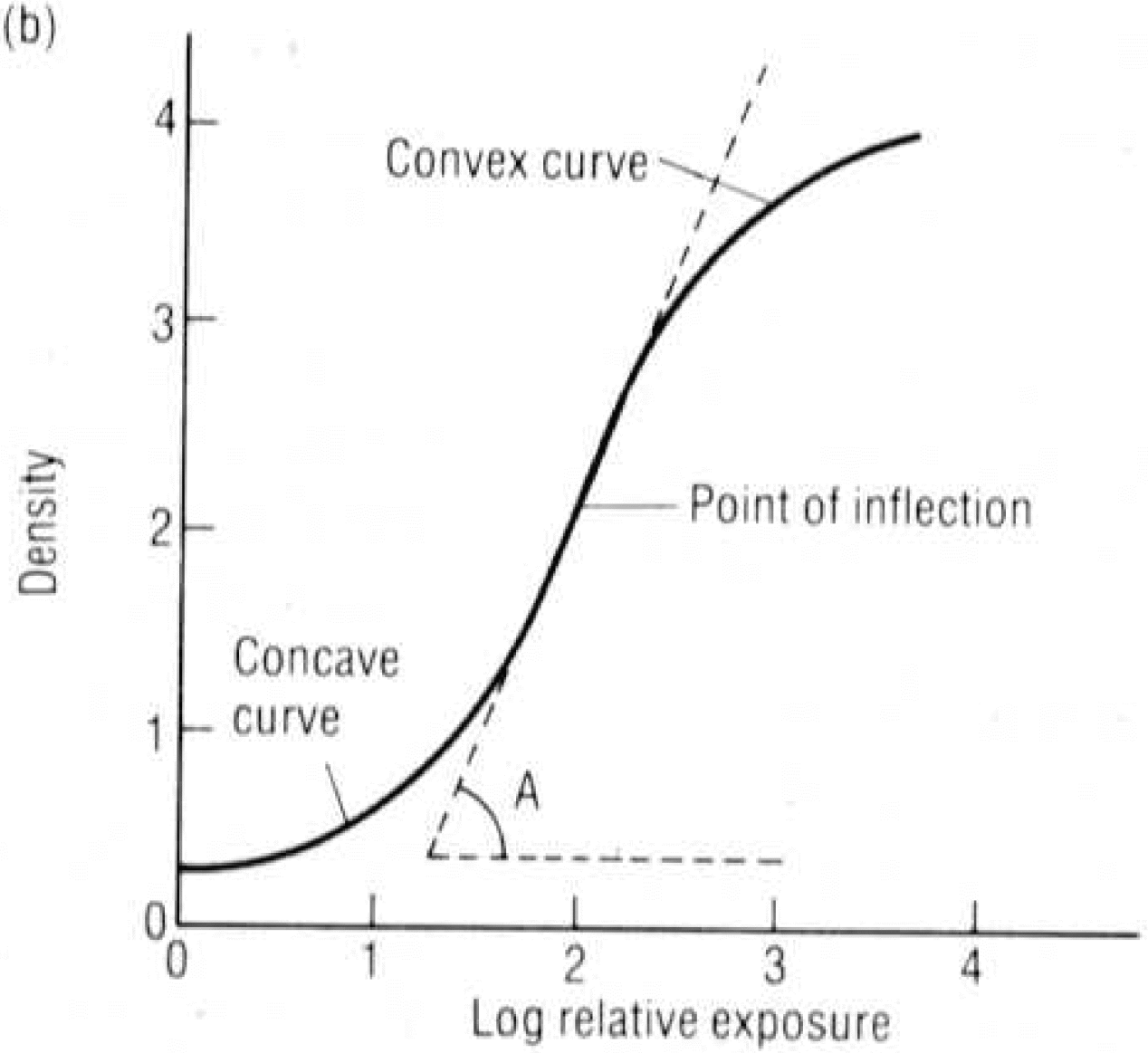


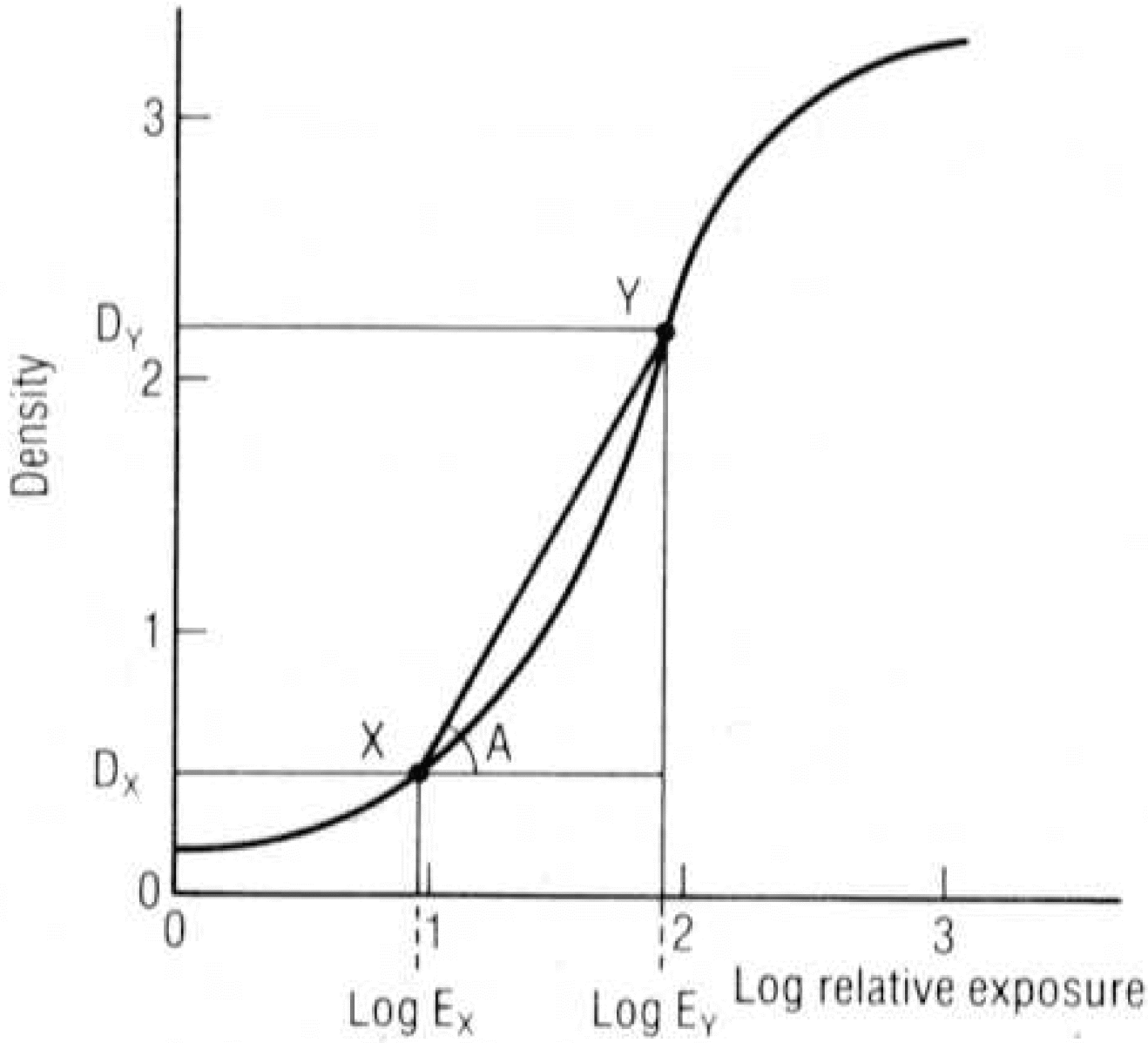
4.14 A characteristic curve obtained by plotting *net* values of ity. Note that the curve appears to pass through the origin of linates.

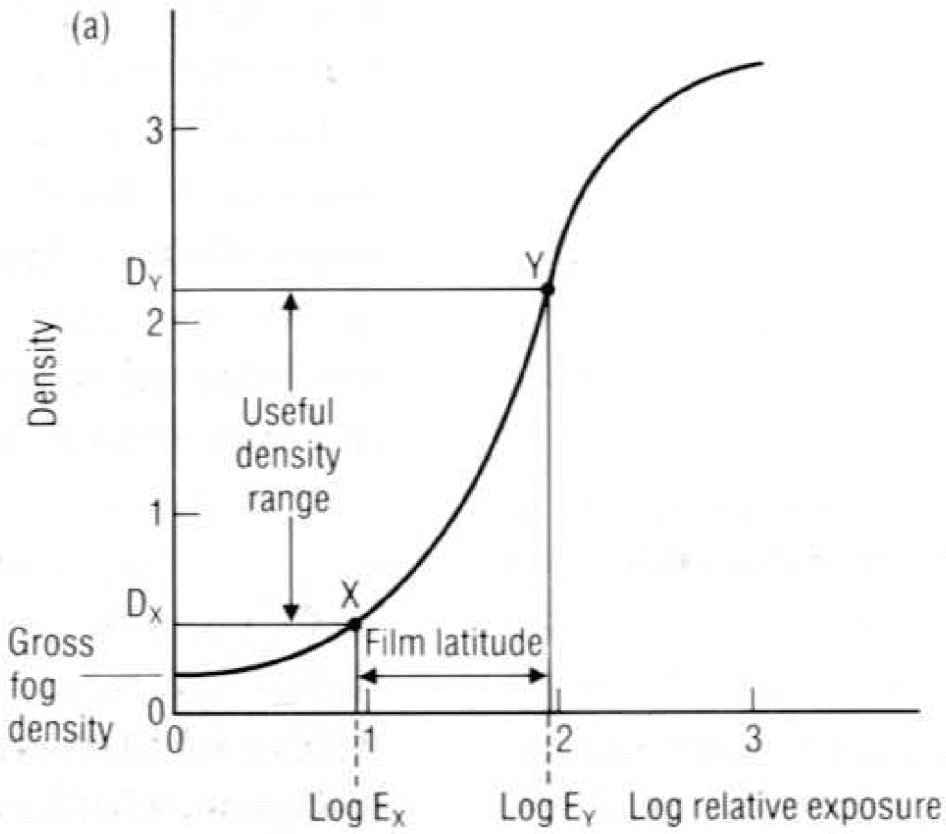

4
3
2
1
0
Density
Resulting change in density
0
1
2
3
4
Log relative exposure
Change in exposure

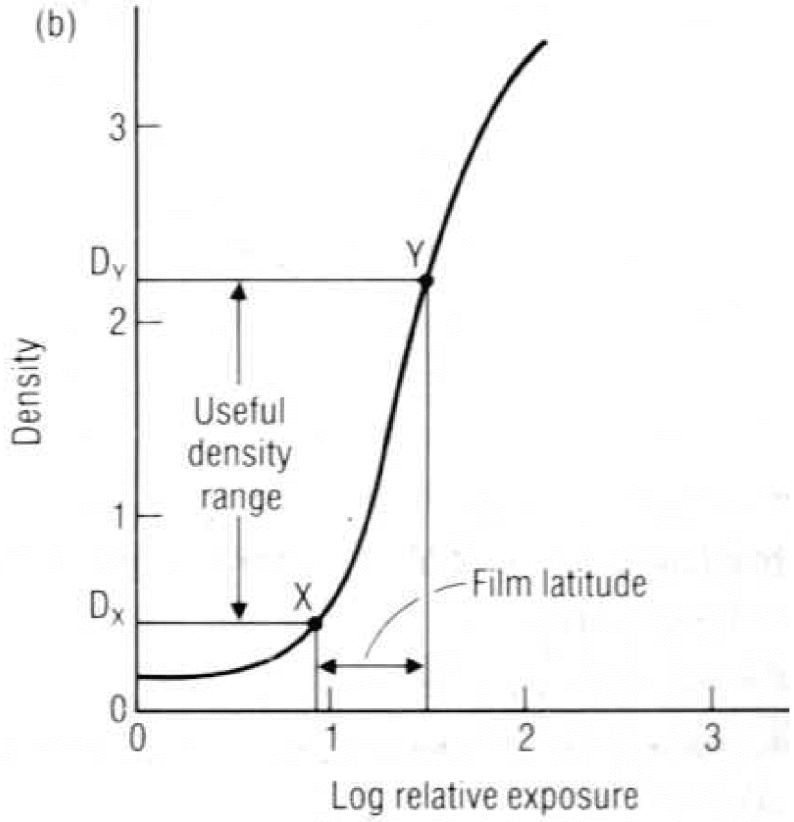

Density
4
3
2
1
0
0
1
2
3
4
Log relative exposure
The three different density changes which result
Equal changes in log relative exposure at three different points on the characteristic curve

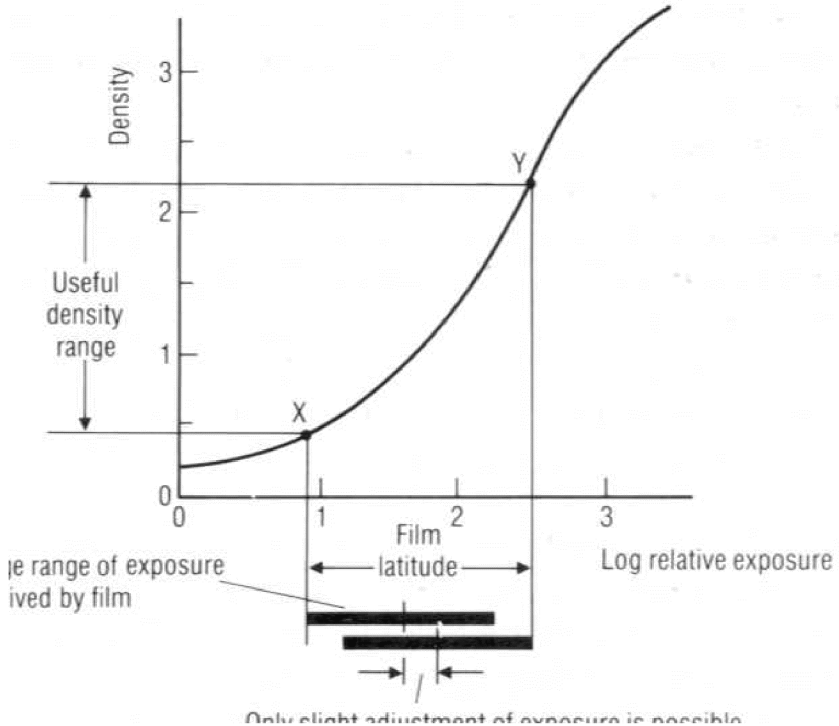

(a)
Density
4
3
2
1
0
0
1
2
3
4
Log relative exposure
Straight line part
A

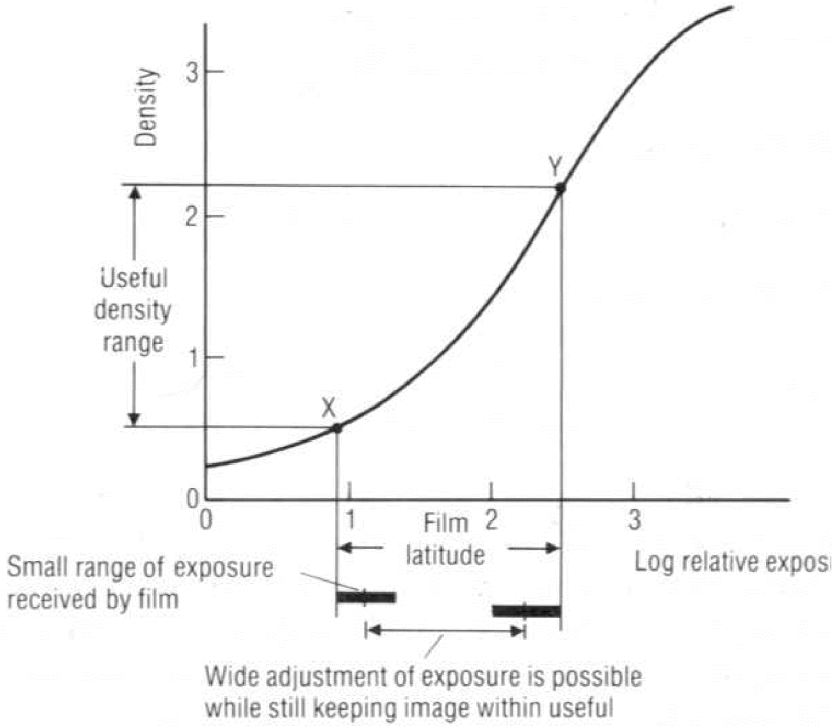

(b)
Density
4
3
2
1
0
Convex curve
Point of inflection
Concave
curve
A
0
1
2
3
4
Log relative exposure

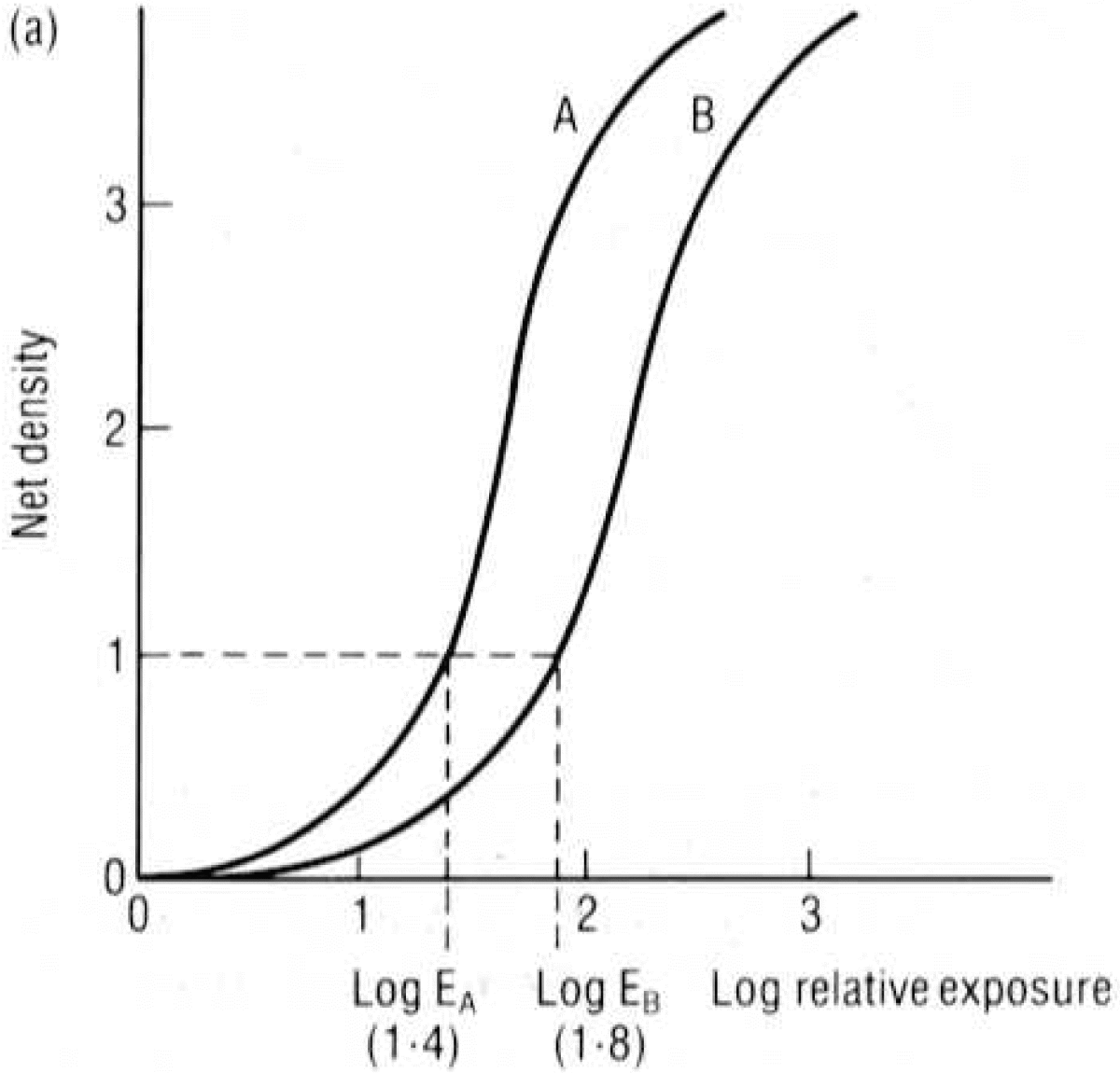

Density
3
2
1
0
D_Y
D_X
Y
X
A
0
1
2
3
Log E_X
Log E_Y
Log relative exposure

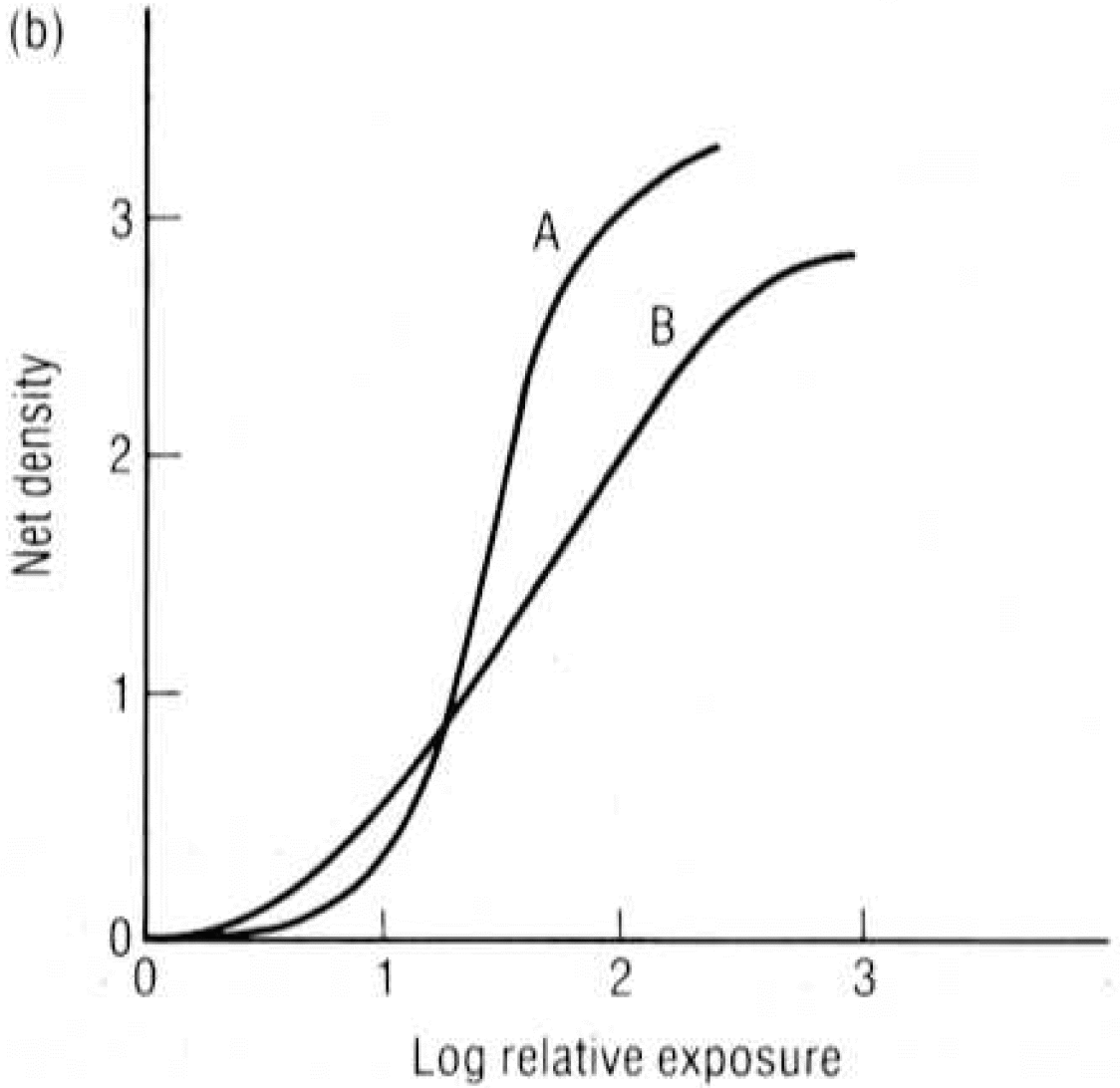

(a)
3
D_Y
2
Density
Useful
density
range
1
D_X
X
Y
Gross
fog
density
0
Film latitude
0
1
2
3
Log E_X
Log E_Y
Log relative exposure

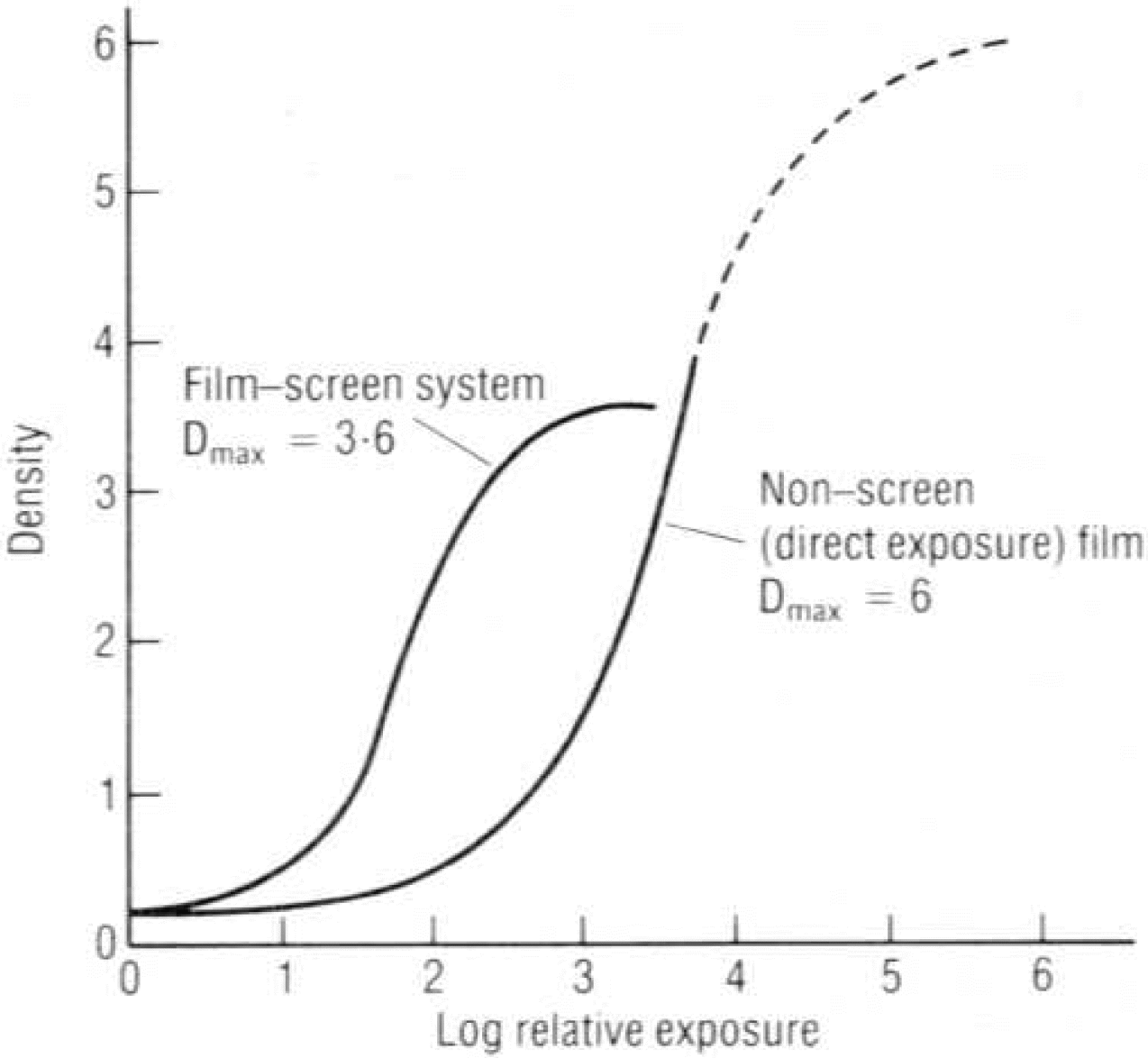

(b)
3
D_Y
2
Density
Useful
density
range
1
D_X
X
Y
Film latitude
0
0
1
2
3
Log relative exposure

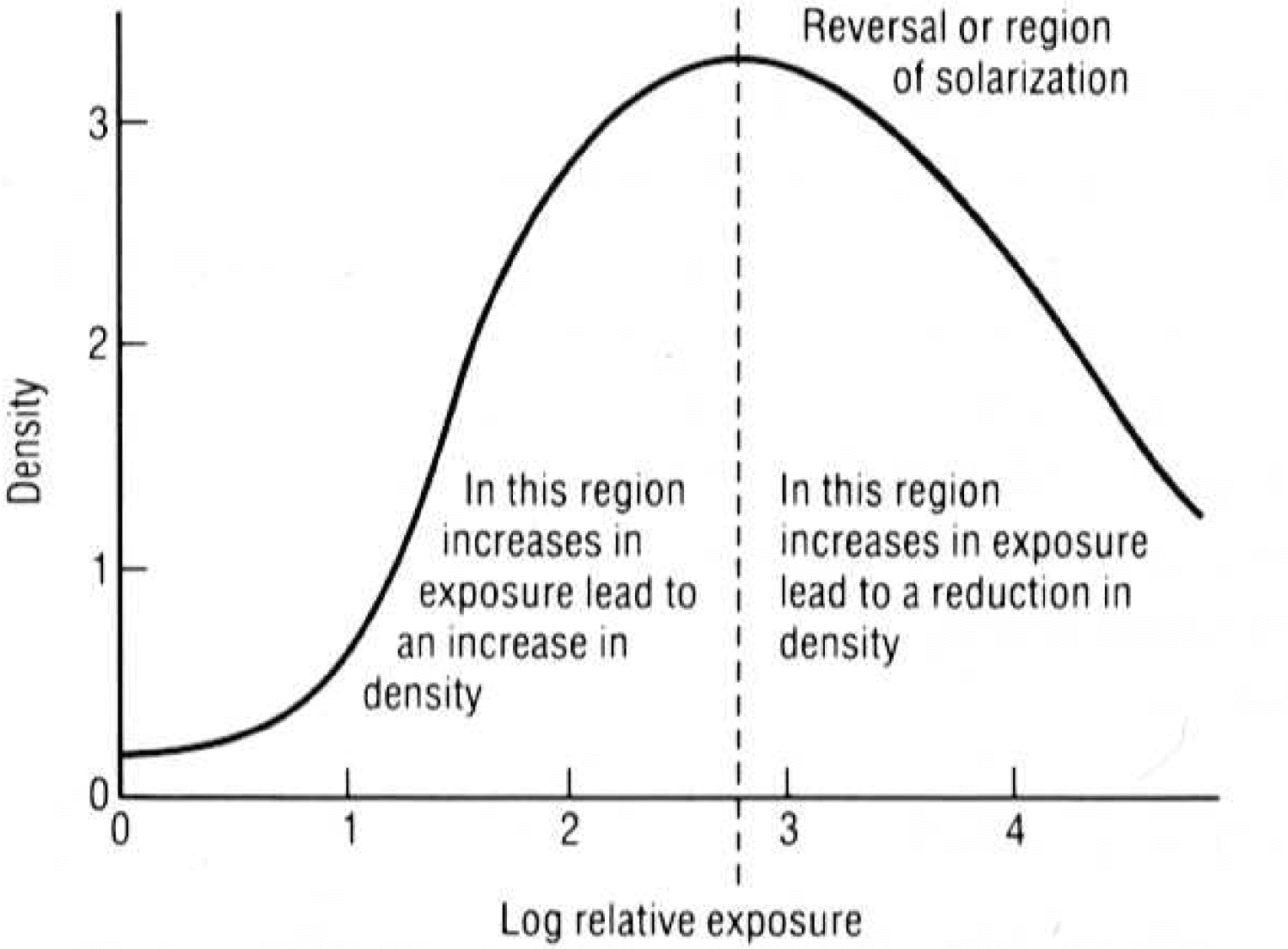

Density
3
2
1
0
Useful
density
range
X
Y
0
1
2
3
Film
latitude
Log relative exposure
ıe range of exposure
ived by film
Only slight adjustment of exposure is possible


Density
3
2
1
0
Useful
density
range
X
Y
0
1
2
3
Film
latitude
Log relative exposi
Small range of exposure
received by film
Wide adjustment of exposure is possible
while still keeping image within useful


(a)
A
B
3
2
1
0
Net density
0
1
2
3
Log E_A
(1·4)
Log E_B
(1·8)
Log relative exposure


(b)
Net density
3
2
1
0
A
B
0
1
2
3
Log relative exposure


Density
6
5
4
3
2
1
0
Film–screen system
D_{max} = 3·6
Non–screen
(direct exposure) film
D_{max} = 6
0
1
2
3
4
5
6
Log relative exposure


Reversal or region
of solarization
In this region
increases in
exposure lead to
an increase in
density
In this region
increases in exposure
lead to a reduction in
density
Density
0
1
2
3
0
1
2
3
4
Log relative exposure

References

- 1- John Ball,Tony Price,”Chesneys’ Radiographic Imaging” latest edition.