

# PRACTICAS DE MAPAS GEOLOGICOS

Domingo Aerden



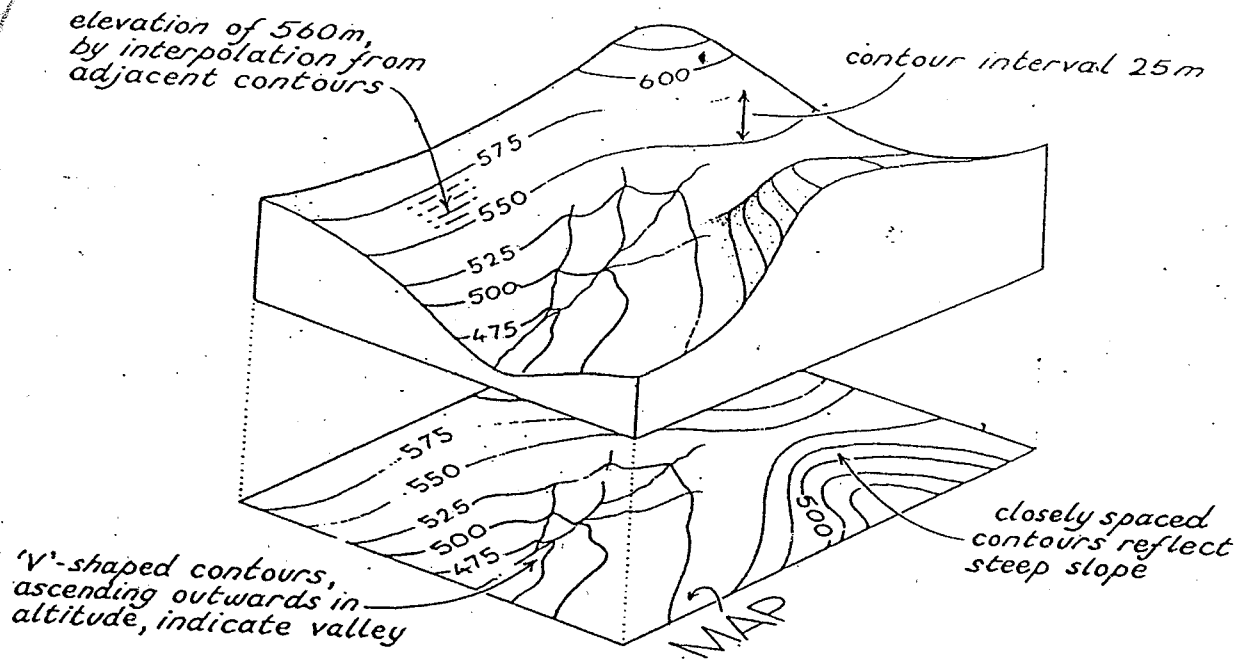
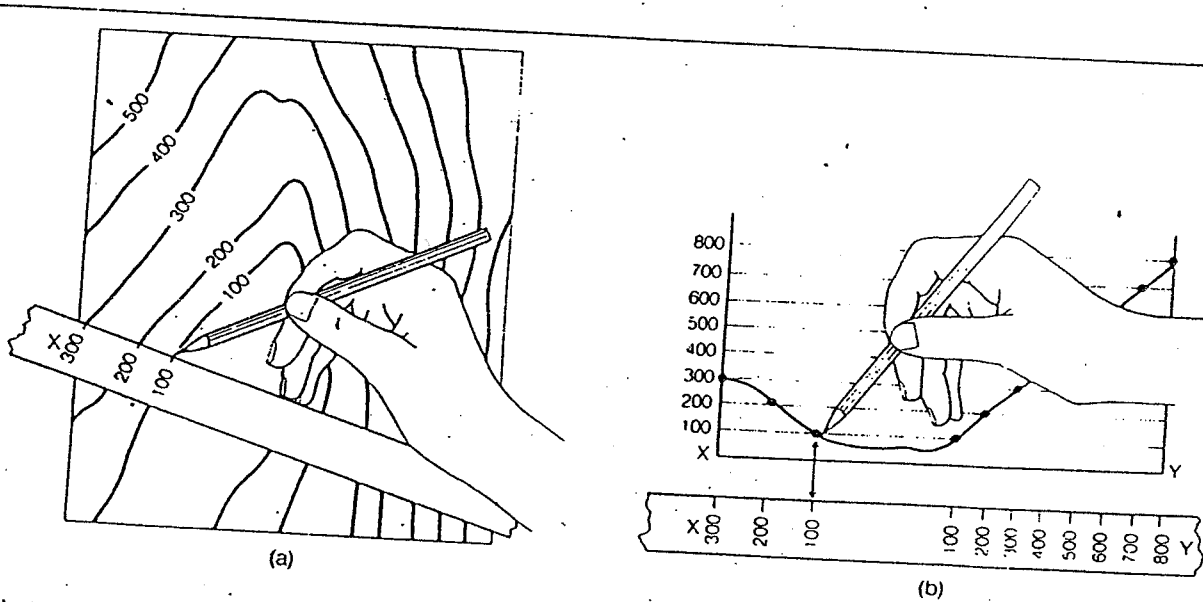


Fig. 1.5 Diagram showing relationships between topographic contours and relief.

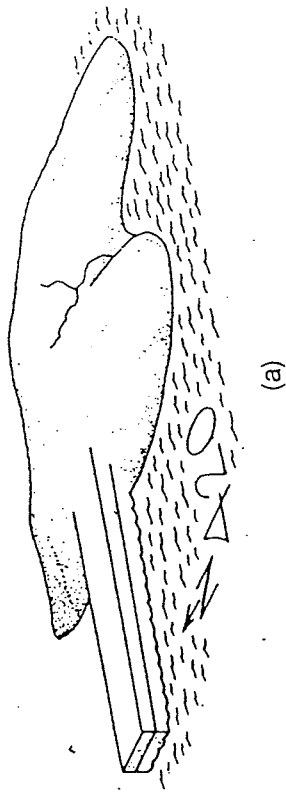


- (a) 1. Lay a strip of paper along the line of section, in this example X-Y.
2. Mark on the paper the position of intersection of each contour and label the altitude.
- (b) 3. Draw a grid of width X-Y, and height to correspond with the contour altitudes. Except in certain circumstances, use a vertical scale equal to the horizontal scale, otherwise vertical exaggeration will result (see section 5.3, figure 5.1).
4. Place paper strip at base of grid to bring X-Y into register with the grid. Project the labelled contour intersections on the strip up to the appropriate altitudes on the grid, using a set-square for accuracy.
5. Smoothly connect the projected points to form the topographic profile.

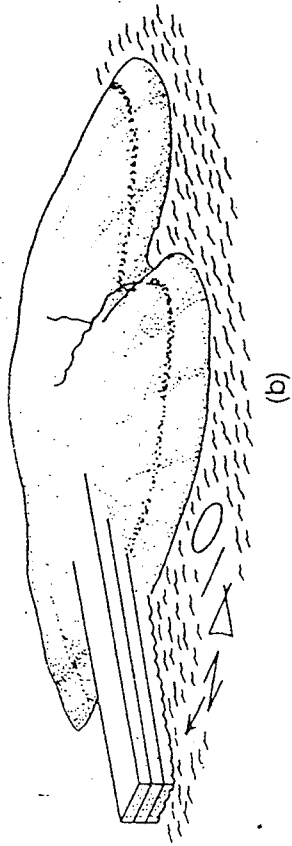
Fig. 1.6 Instructions for drawing a topographic profile from a map.

COMO CONSTRUIR UN PERFIL TOPOGRAFICO

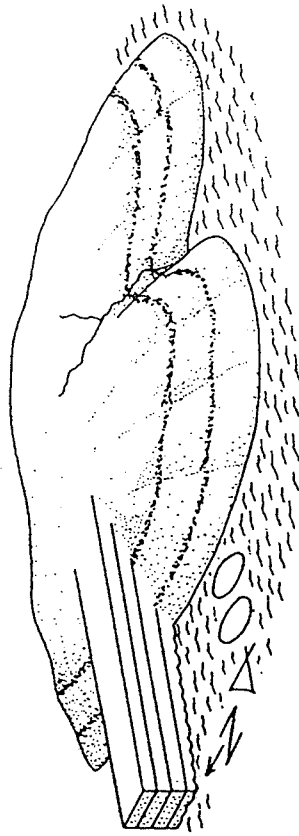
CURVAS DE NIVEL



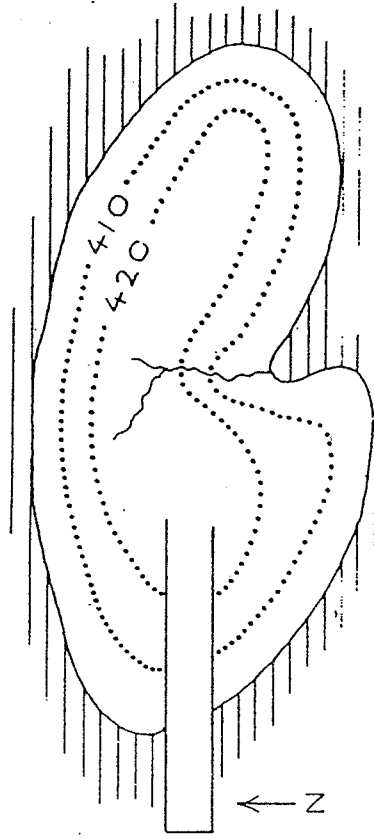
(a)



(b)



(c)



(d)

Fig. 1.4 The concept of topographic contours, illustrated by a small island in a lake with dropping water level. (a) Lake level at 420 m altitude. (b) Lake level dropped to 410 m. (c) Lake level dropped to 400 m. Note that the previous lake levels are represented by strand lines on the island. These, like the lake levels, are horizontal, and at 420 m and 410 m. (d) Topographic map of the island, lake level at 400 m. Contour interval 10 m. The topographic contour lines, being horizontal, coincide with the strand lines shown in (c).

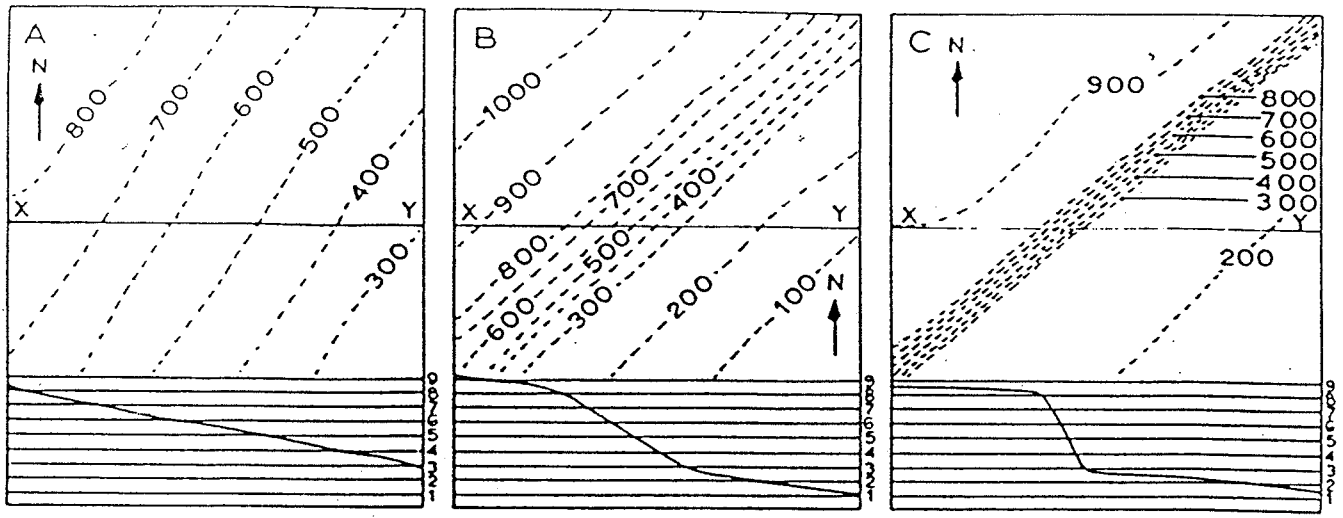
200

4-33

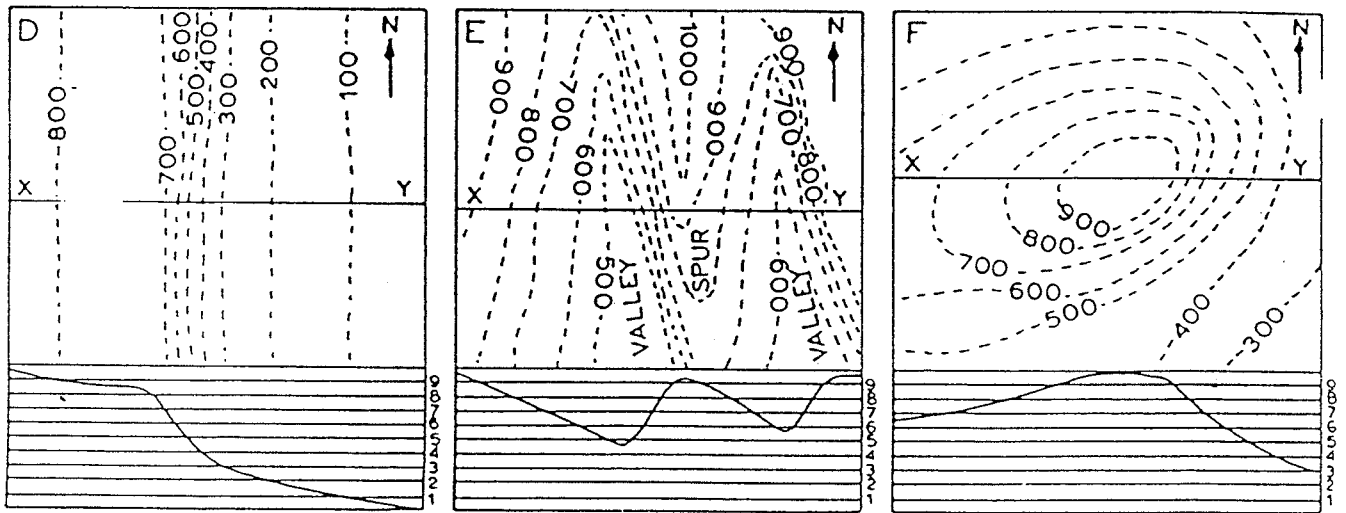
7

# CURVAS DE NIVEL

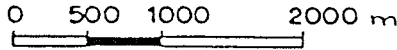
3



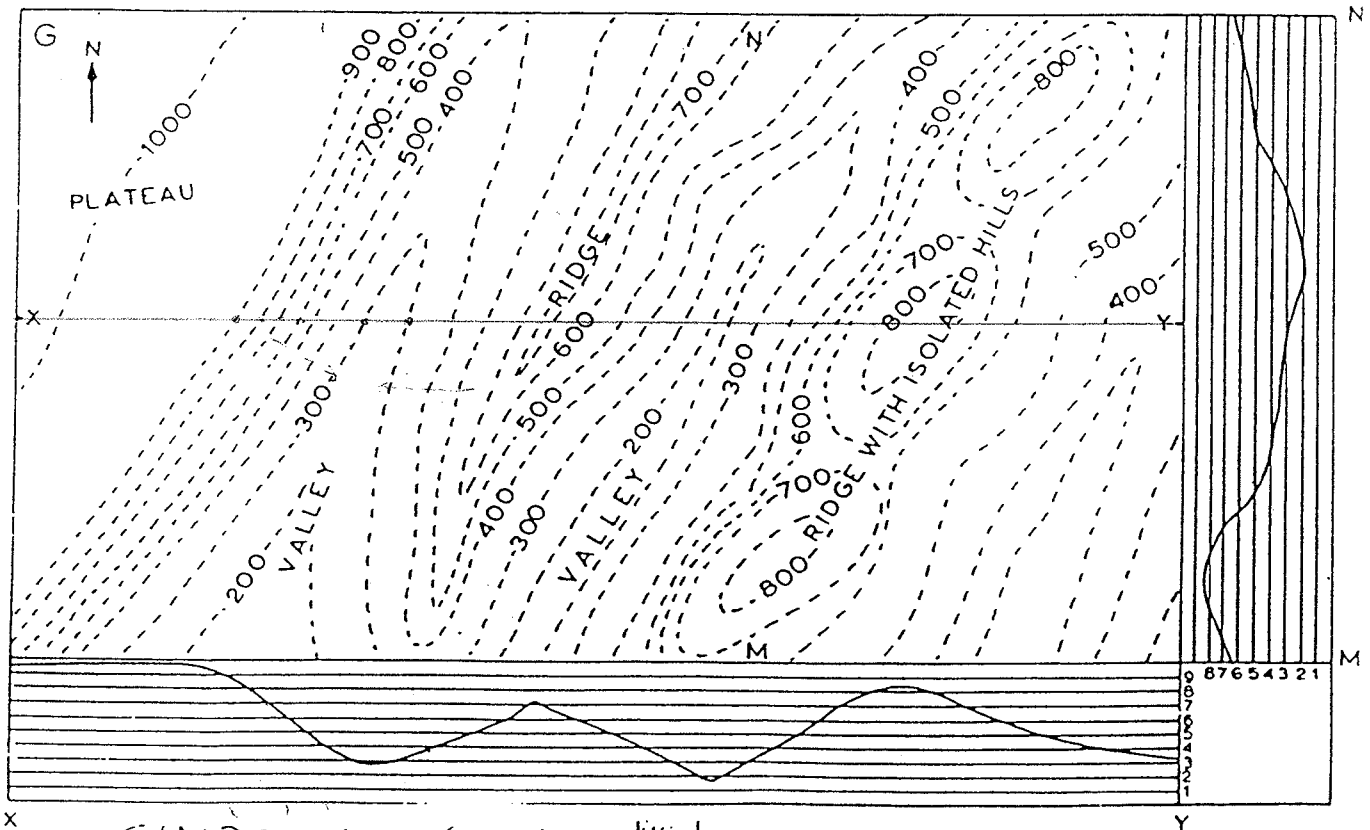
VERTICAL INTERVALS IN ALL SECTIONS AT 100 m



VERTICAL AND HORIZONTAL SCALE



ALL DIAGRAMS TO THE SAME SCALE



SIMPSON, B. (1970)  
"Geological Maps"

FIG. 1

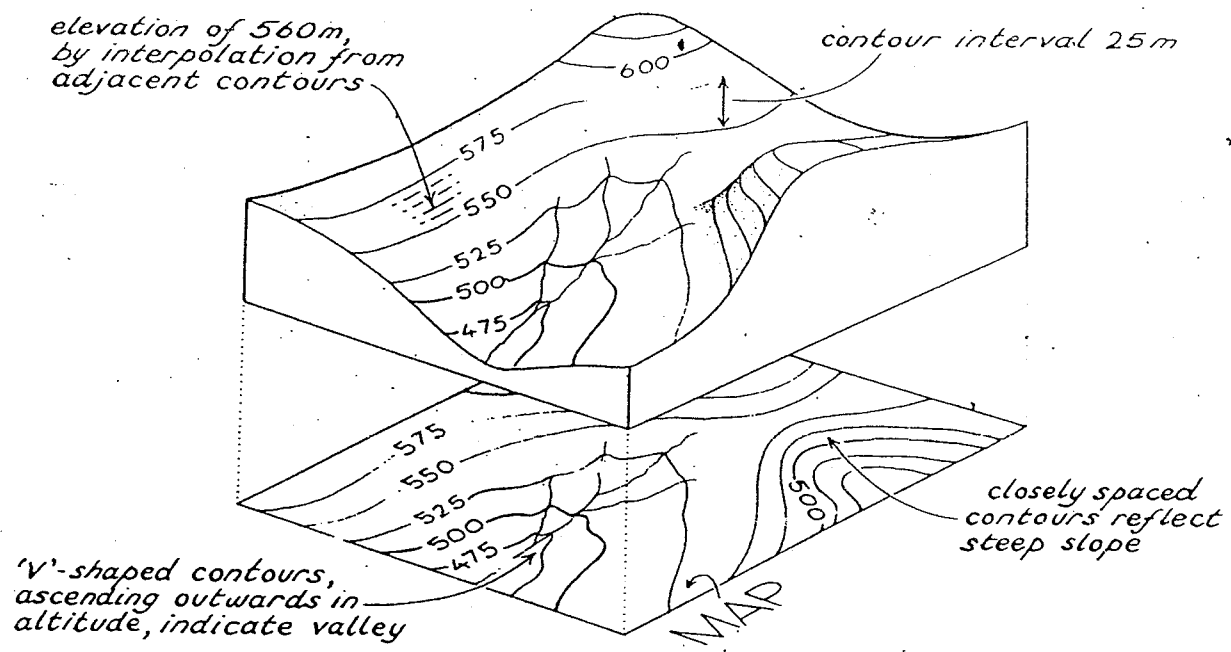
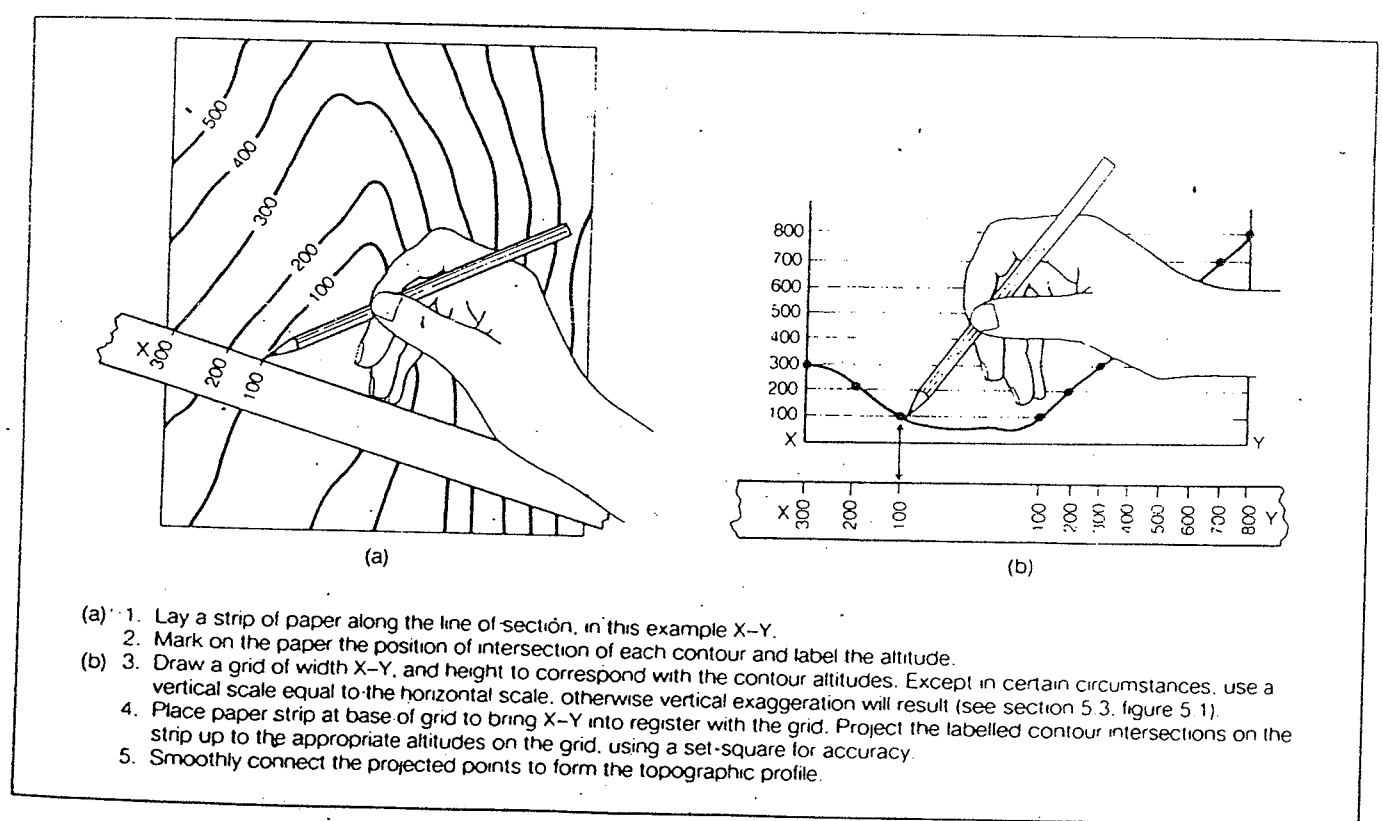


Fig. 1.5 Diagram showing relationships between topographic contours and relief.

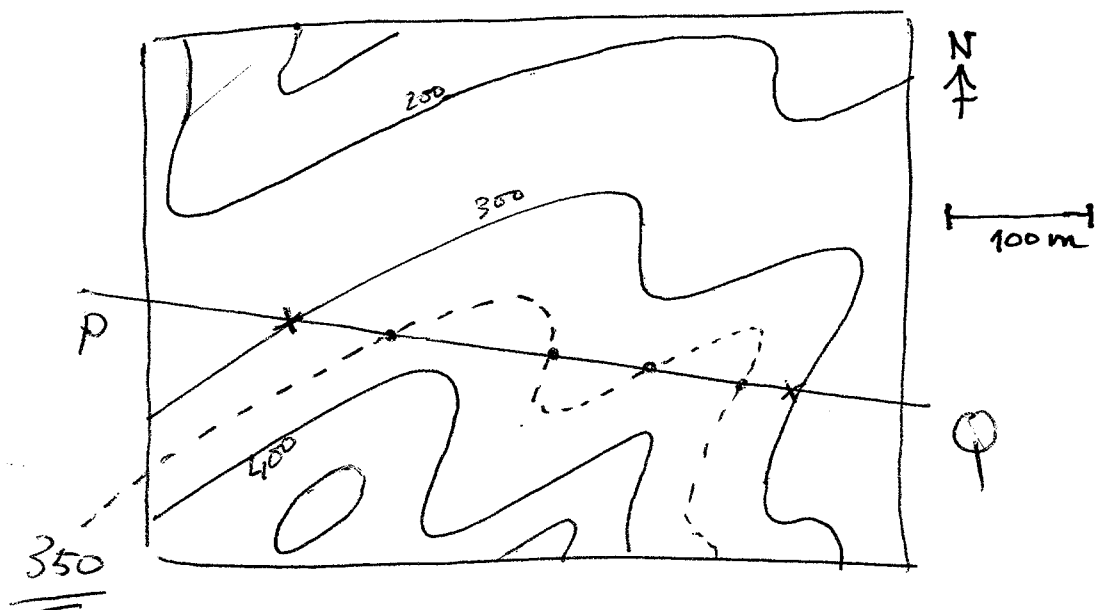


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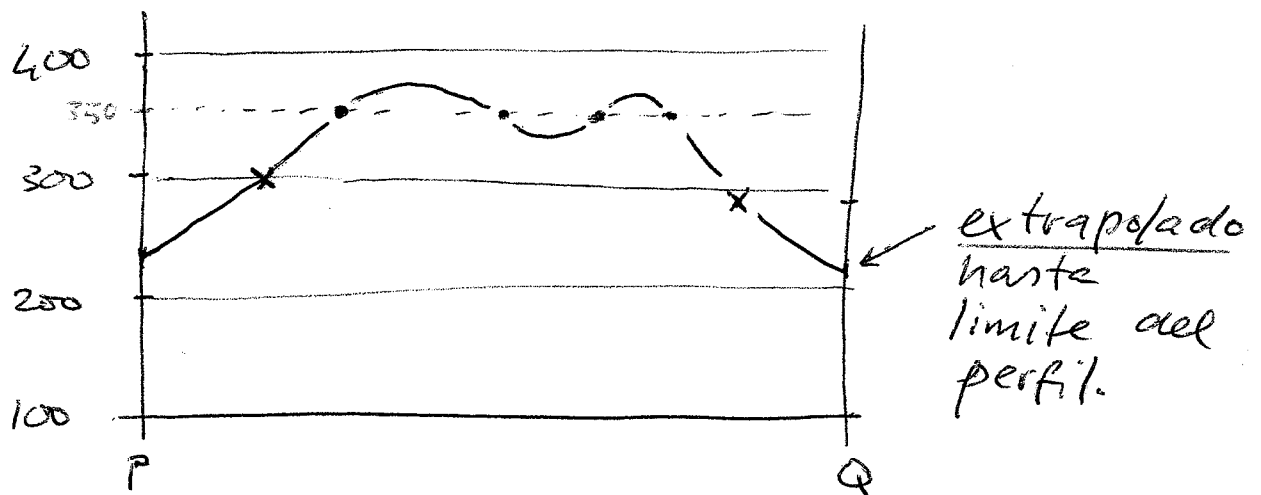
Fig. 1.6 Instructions for drawing a topographic profile from a map.

COMO COSTRUIRE UN PERFIL TOPOGRAFICO

# construir perfil topográfico



Curva de nivel interpolada ("inventada")



$$1\frac{1}{2} \text{ cm} = 100 \text{ m.}$$

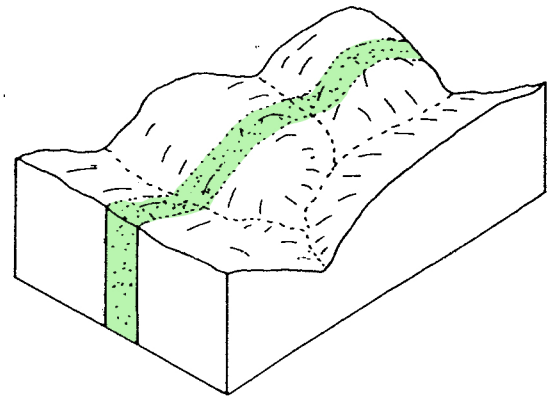
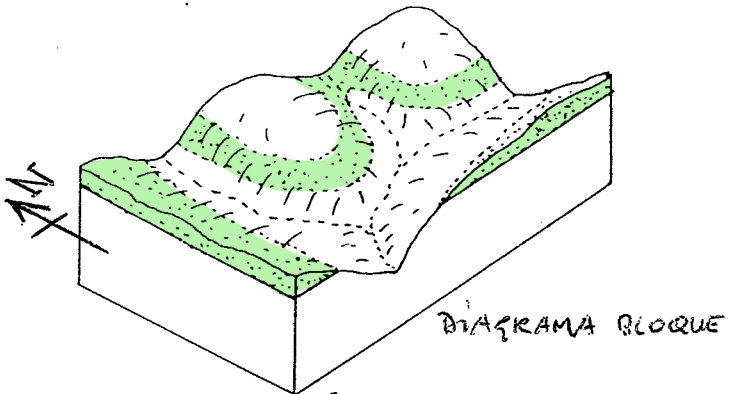
$$1 \text{ cm} = 66,66 \text{ m.}$$

$$\text{escala} = 1: 6666$$

CAPAS SEDIMENTARIAS (ESTRATOS) EN EL MAPA

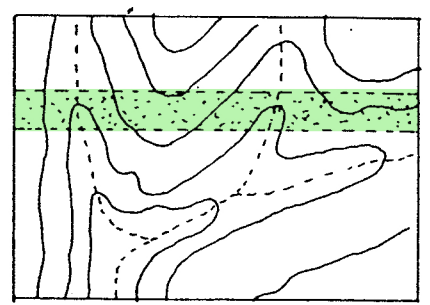
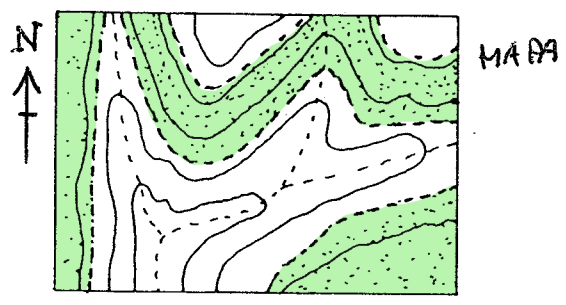
estrato horizontal

vertical



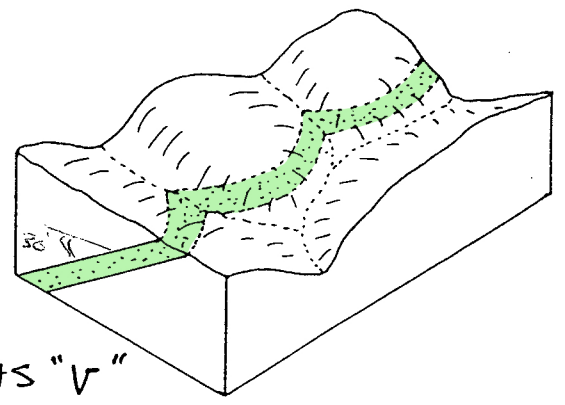
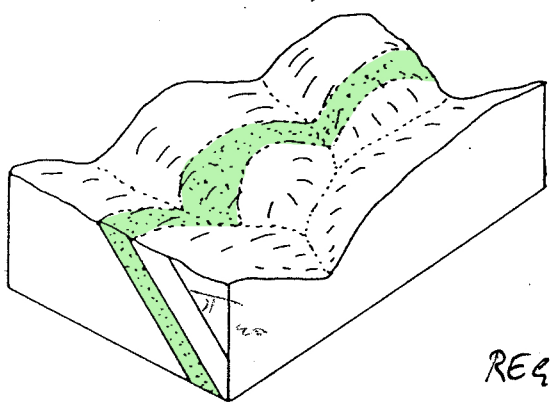
**A**

**B**



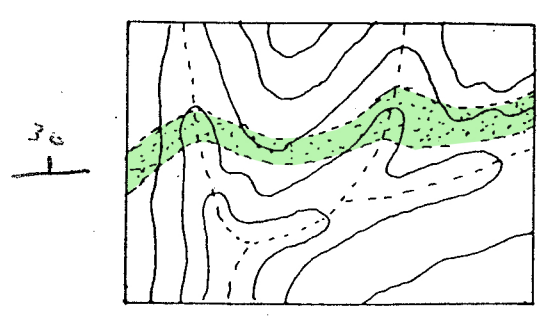
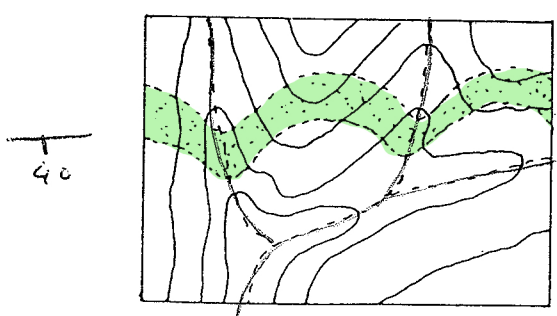
inclinado

inclinado

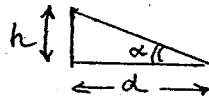
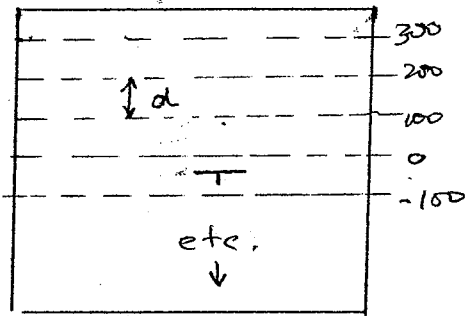
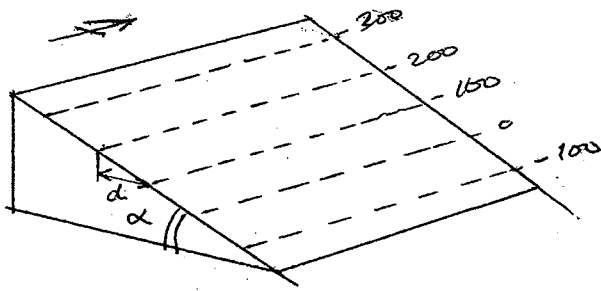


**C**

**D**



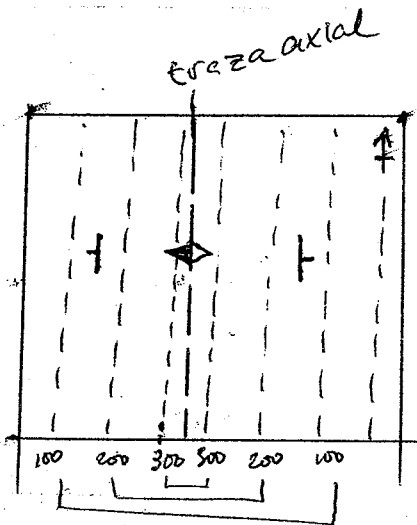
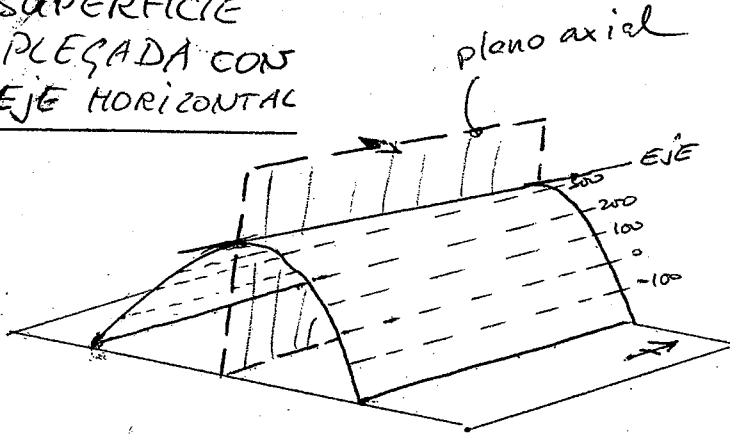
# SUPERFICIE PLANA INCLINADA



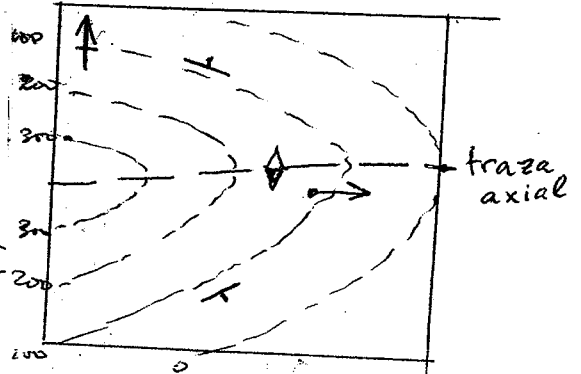
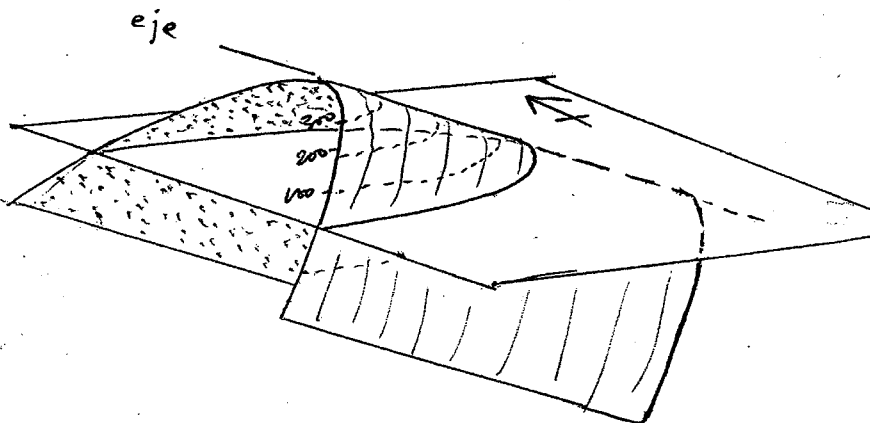
$$\text{tg } \alpha = \frac{h}{d}$$

$$\alpha = \text{arctg } \frac{h}{d}$$

# SUPERFICIE PLEGADA CON EJE HORIZONTAL



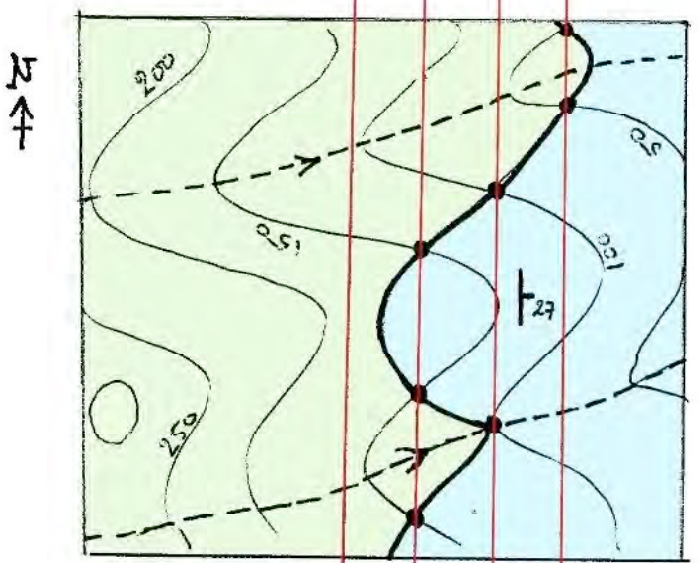
# PLIEGUE CON EJE INCLINADO



PUNTO

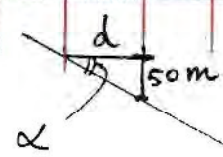


horizontales de capa del plano P  
P200 P150 P100 P50

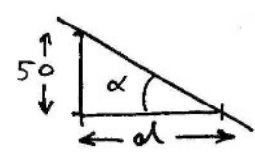
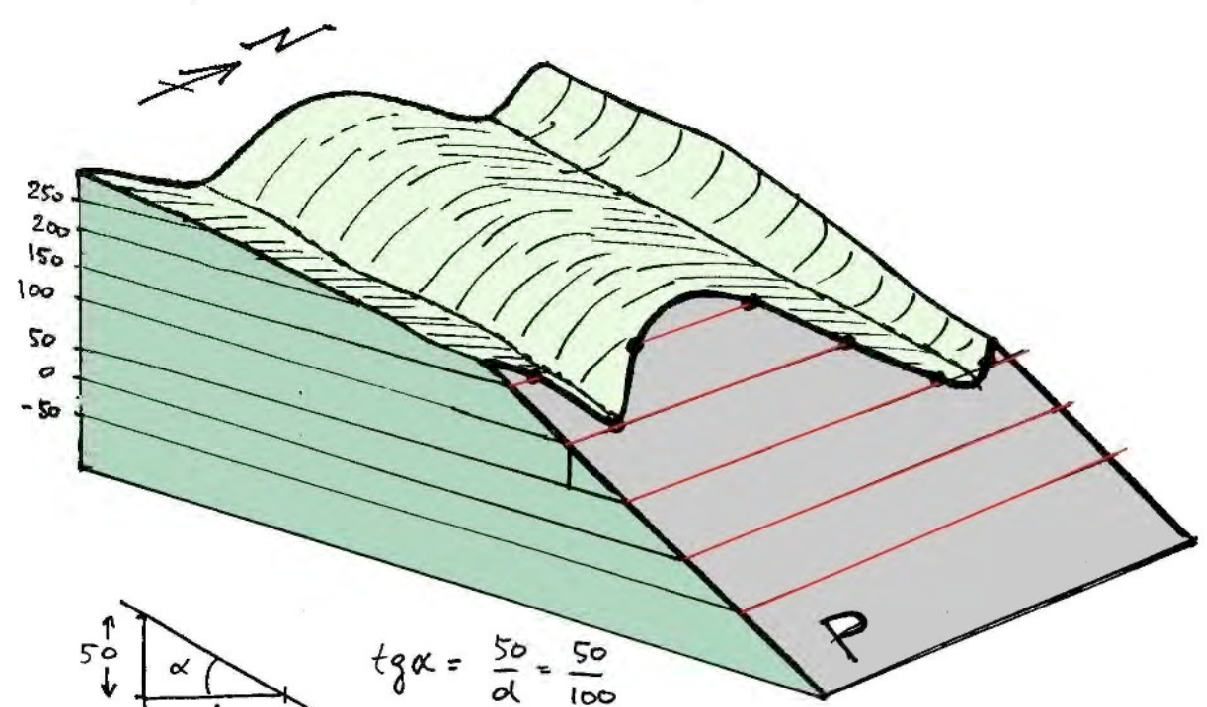


Dirección del plano: 0°  
Buzamiento: 27°  
Azimut del buzamiento: 90° (N90E)

1:10,000  
(1cm = 100m)



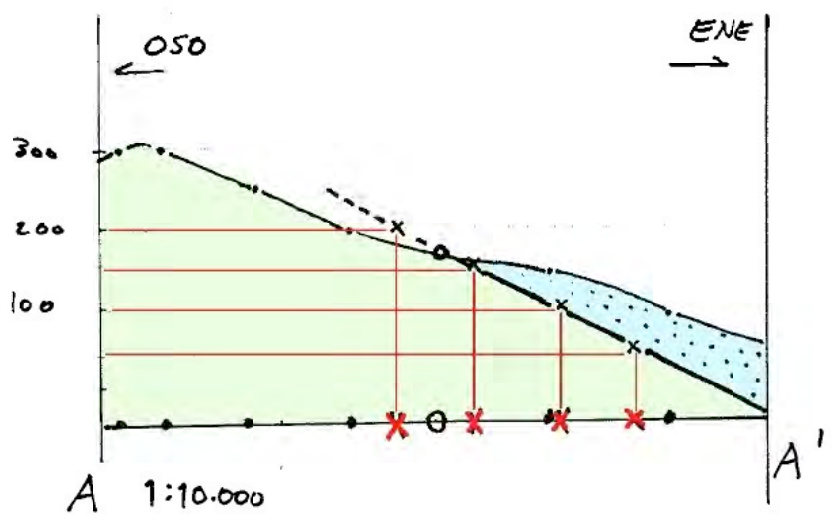
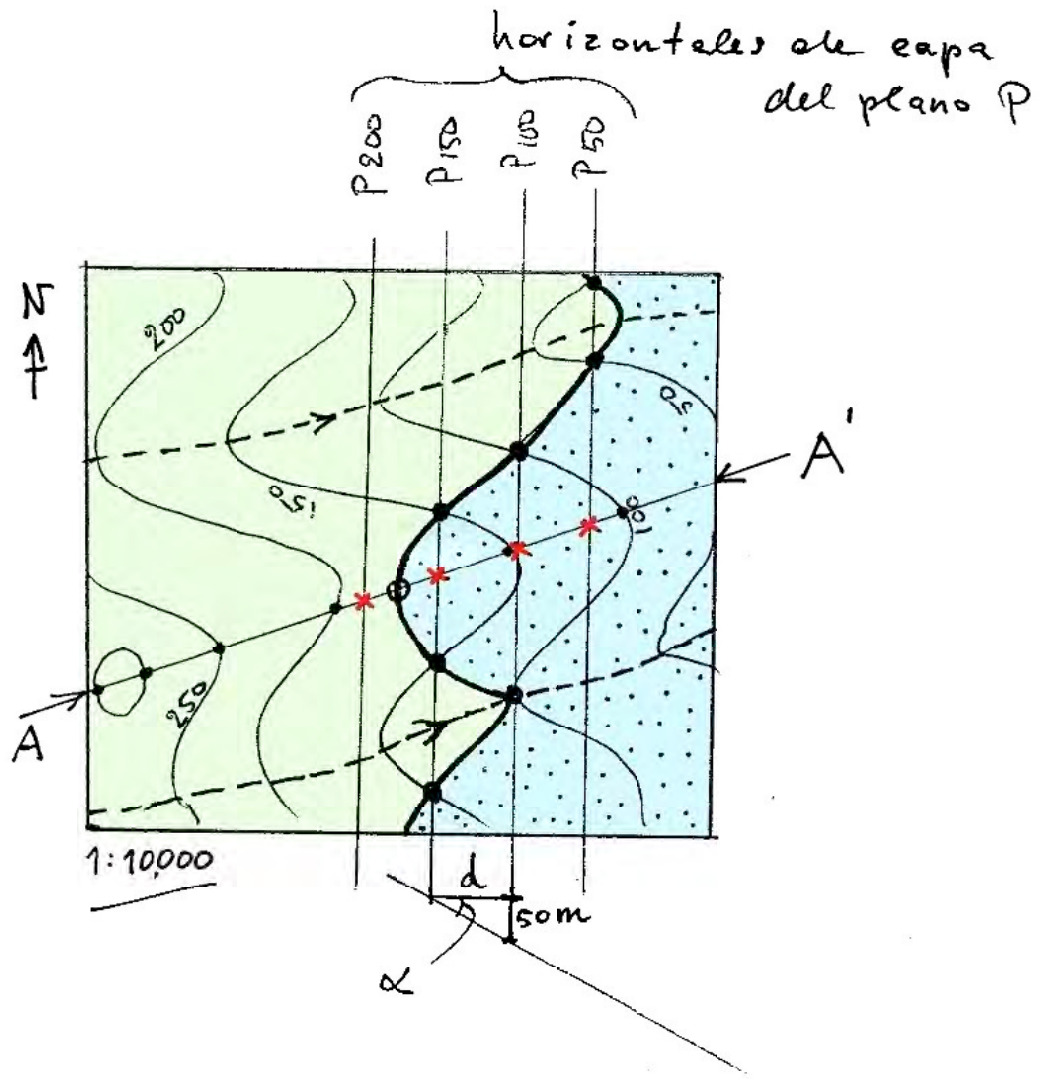
27



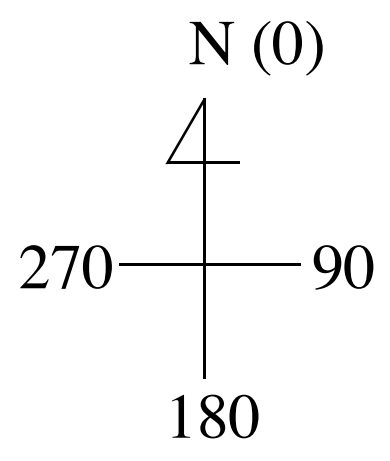
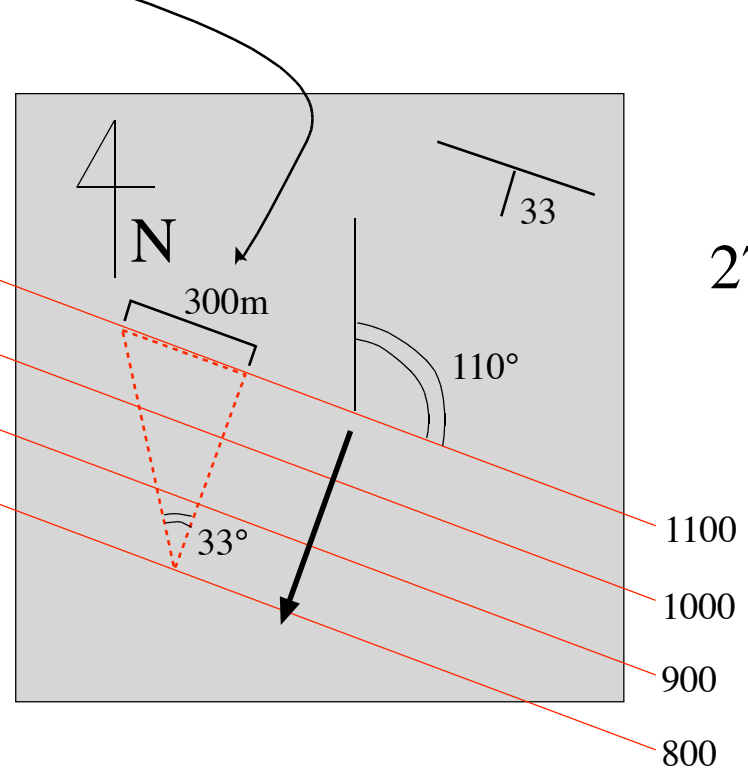
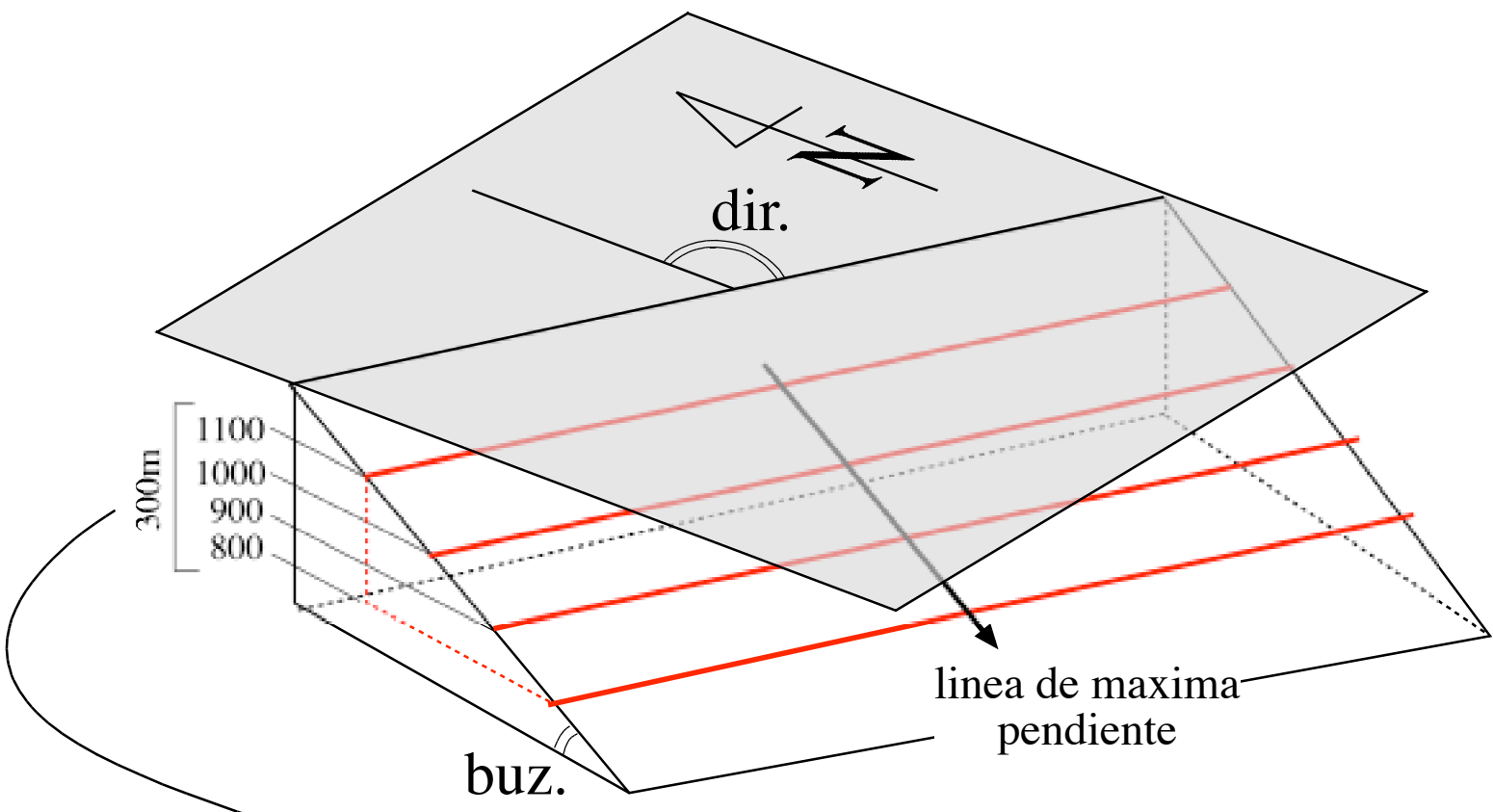
$$\text{tg } \alpha = \frac{50}{d} = \frac{50}{100}$$

$$\alpha = 27^\circ$$

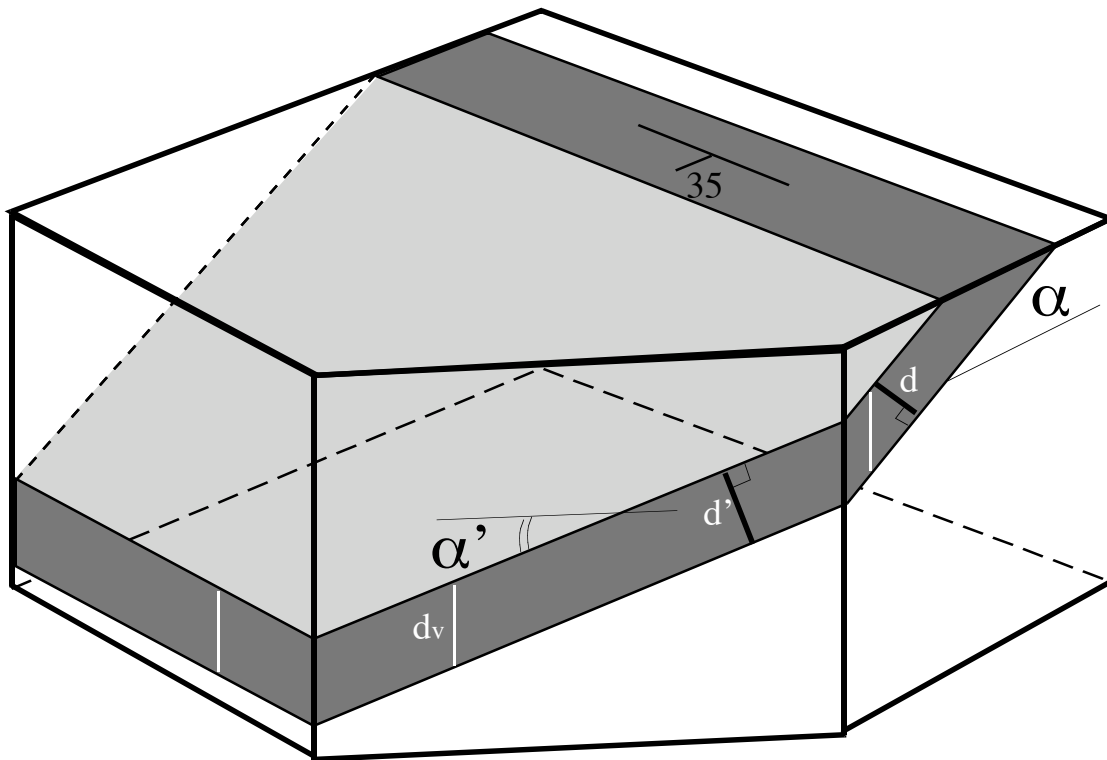
En este diagrama se ha eliminado la capa azul para ver las líneas horizontales del plano P



- x = horizontales de capa
- = curvas de nivel topografico
- o = interseccion entre plano P y superficie



dirección: 110 (anotación alternativa: N110E = N70W)  
 buzamiento: 33°  
 (dirección de línea de máxima pendiente: 200°)



$\alpha$  = buzamiento

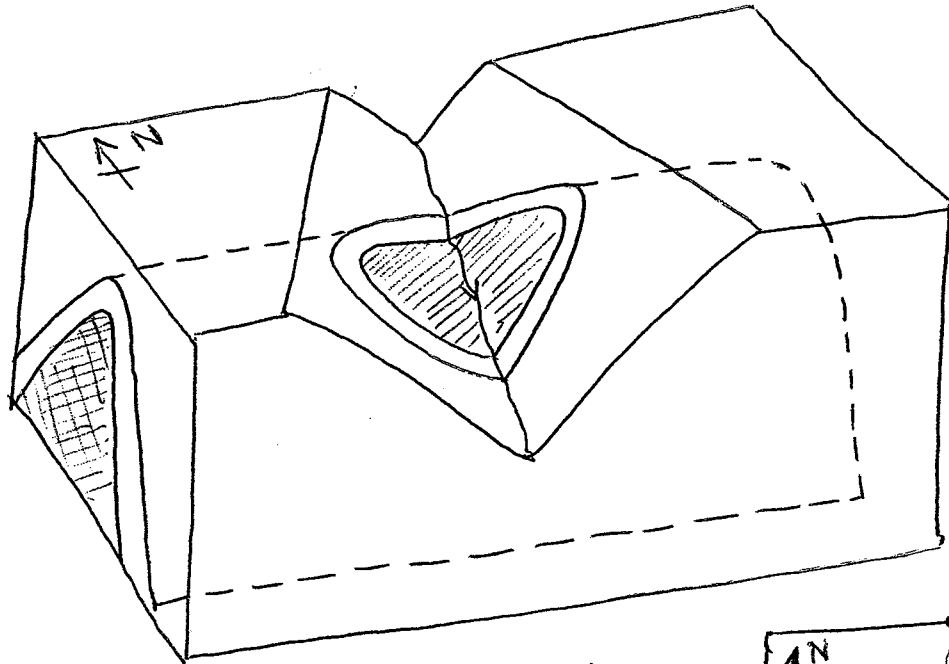
$\alpha'$  = buzamiento aparente ( $< \alpha$ )

$d$  = espesor

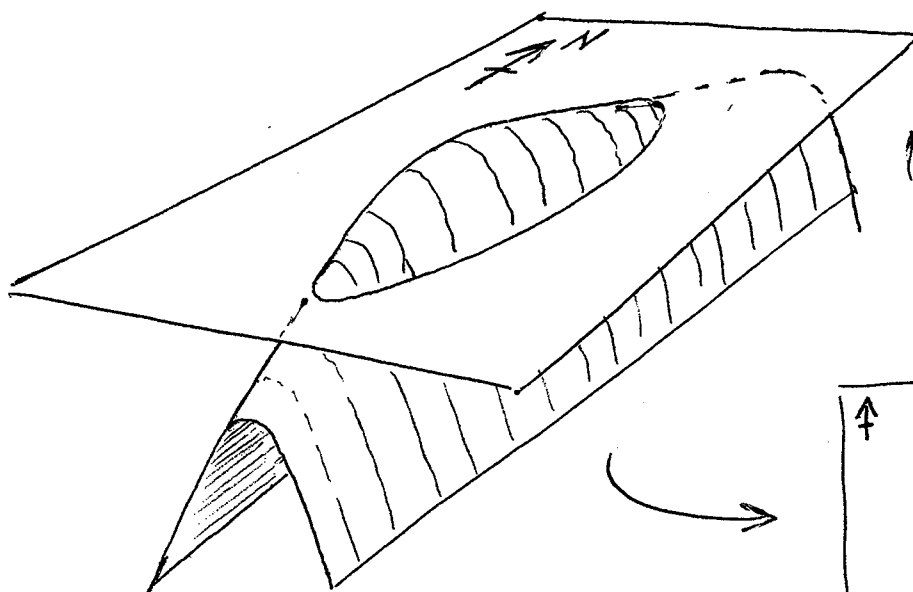
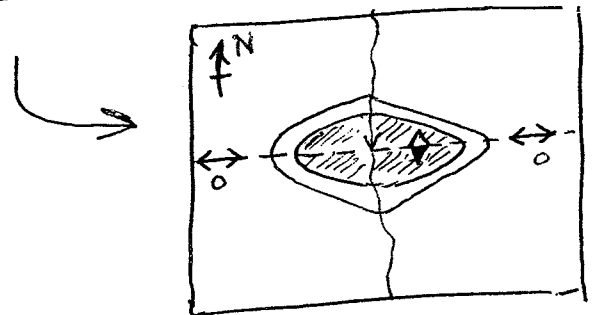
$d'$  = espesor aparente ( $> d$ )

$d_v$  = espesor vertical (constante en todas secciones)

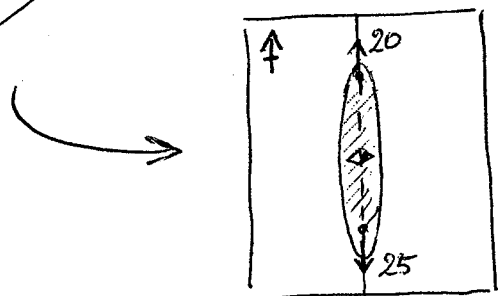
pliegue cilíndrico / relieve no plano



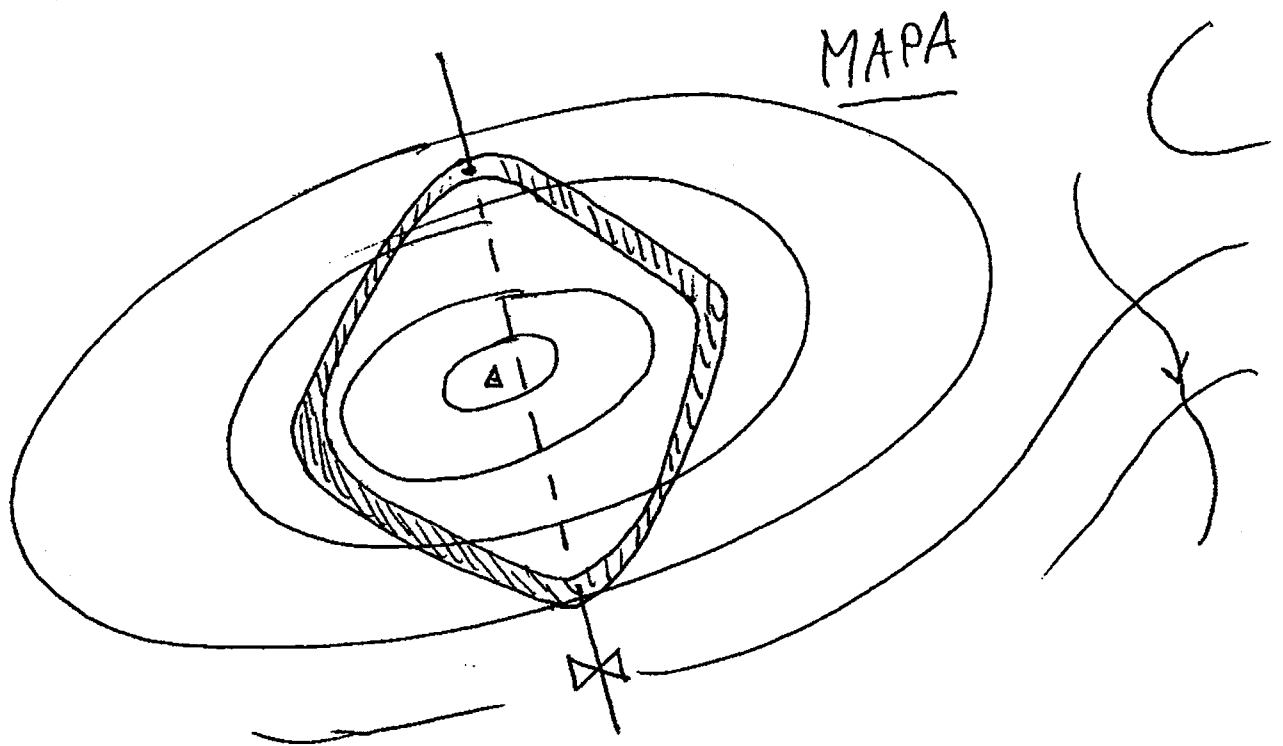
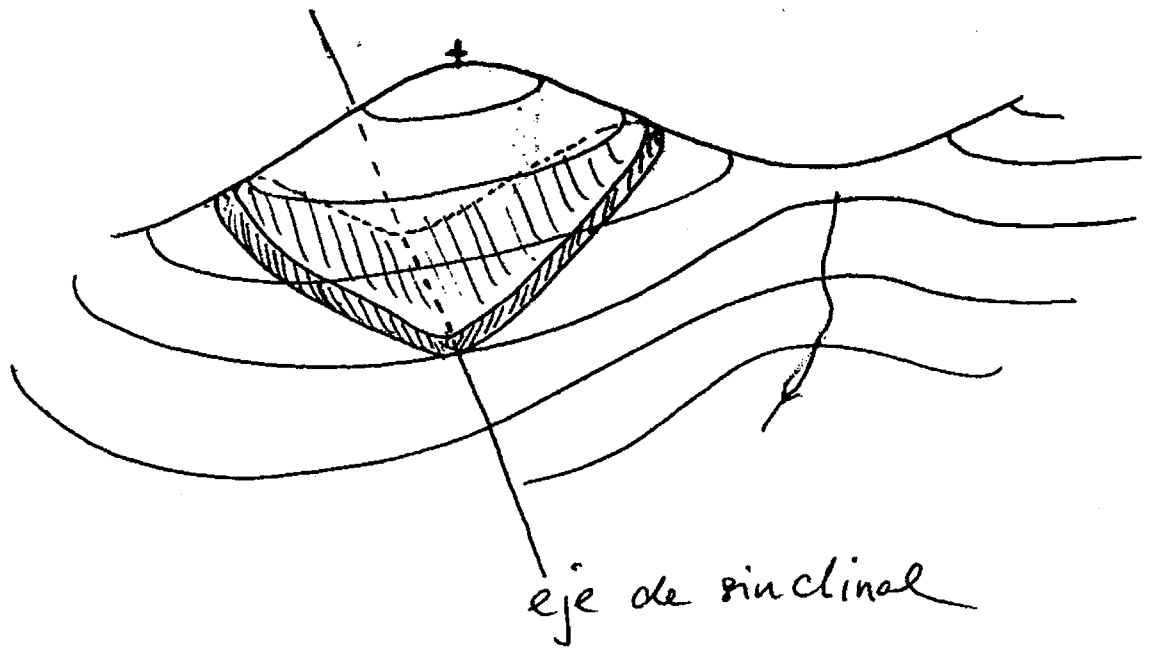
EN EL MAPA:

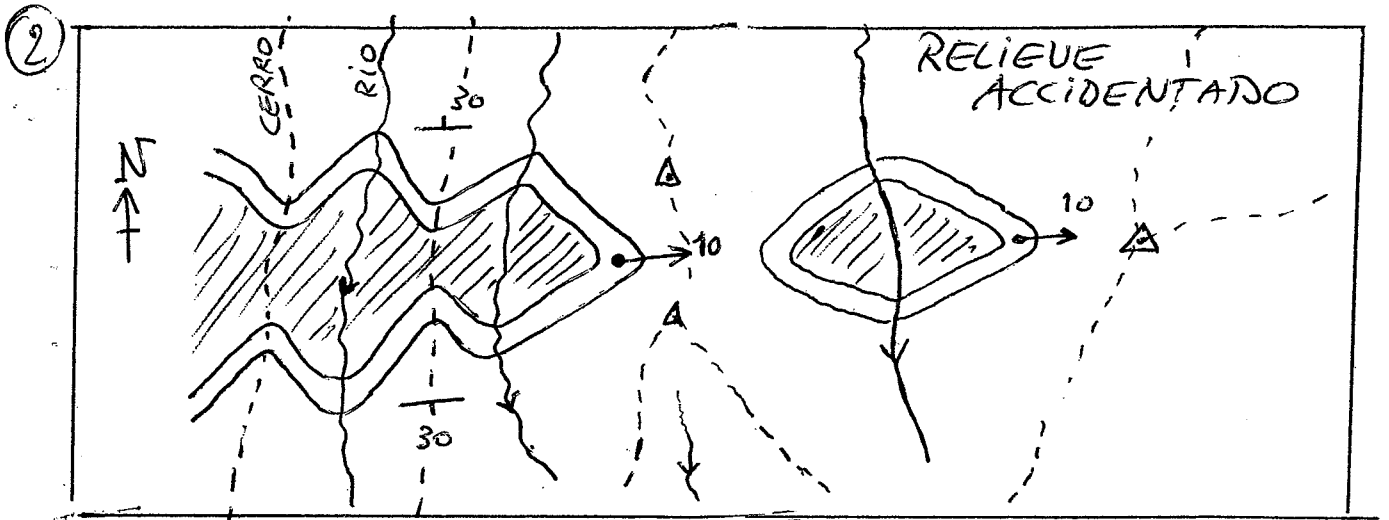
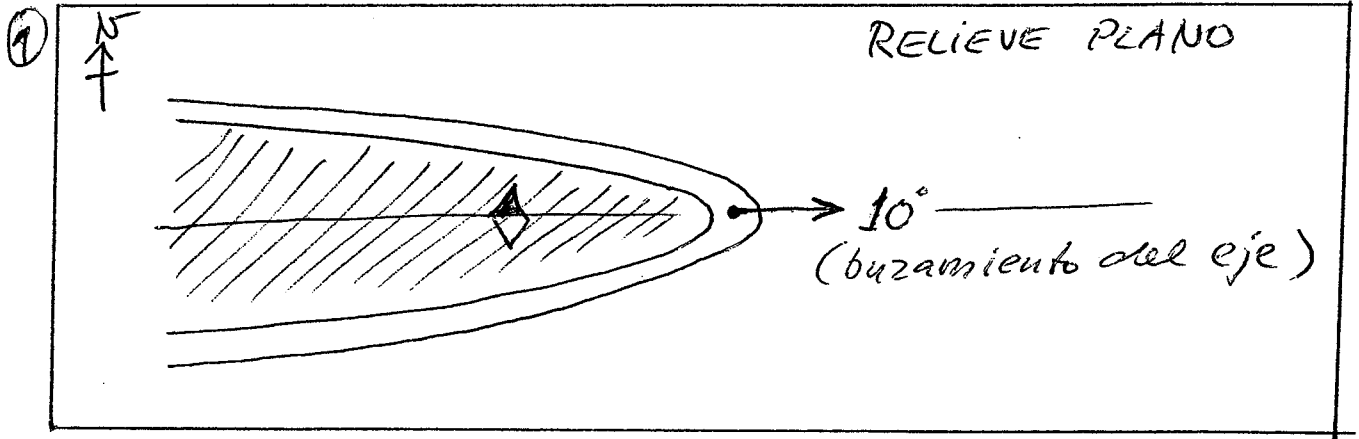


pliegue no-cilíndrico / relieve plano



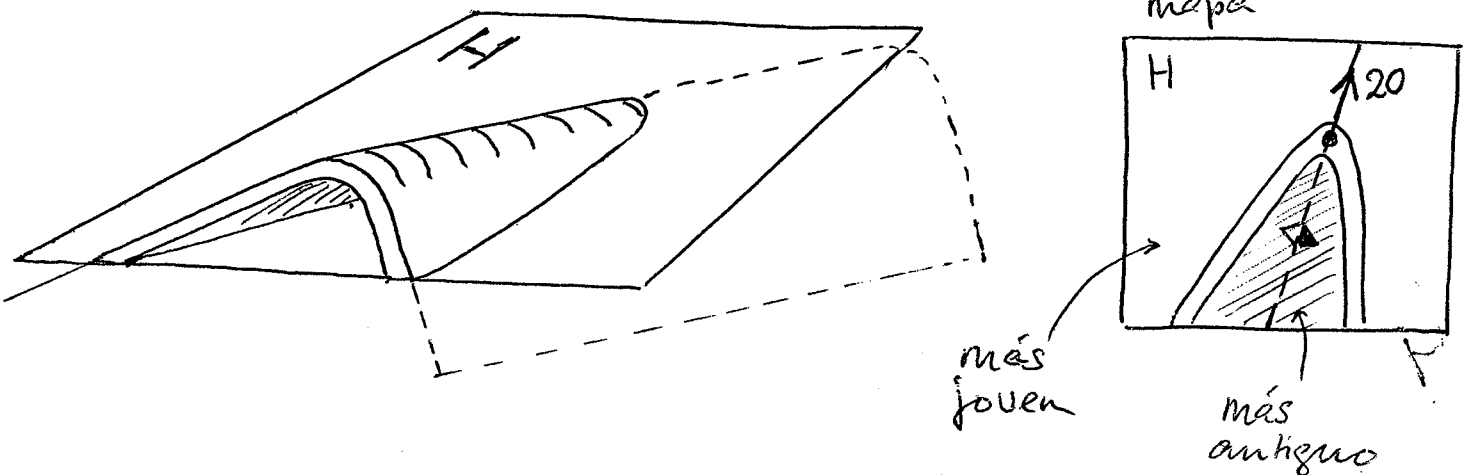
explicación del ejercicio 29



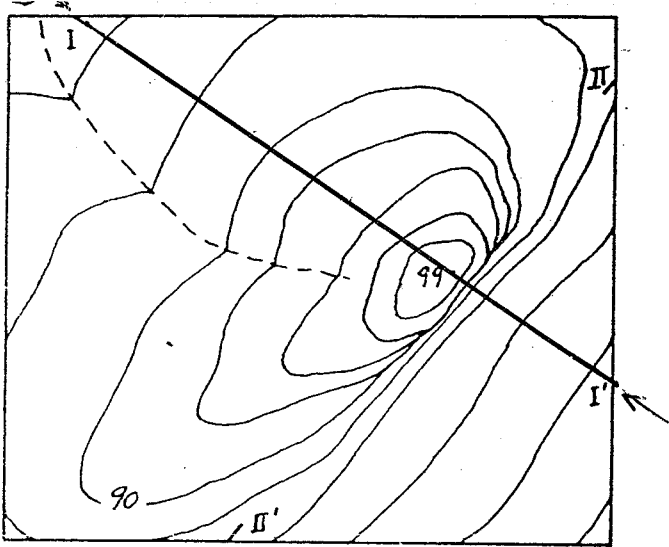


IDENTICA ESTRUCTURA GEOLÓGICA PERO  
DISTINTOS RELIEVES en ① y ②

eje con buzamiento de 20°

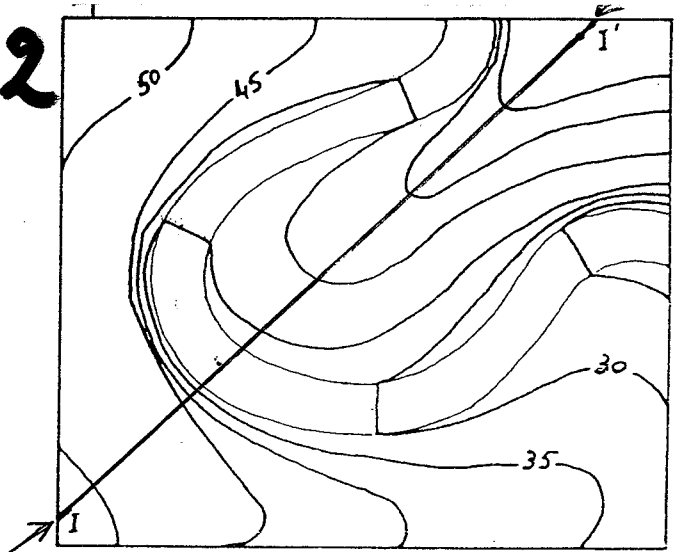


1



Escala 1 : 500 equidistancia = 2m

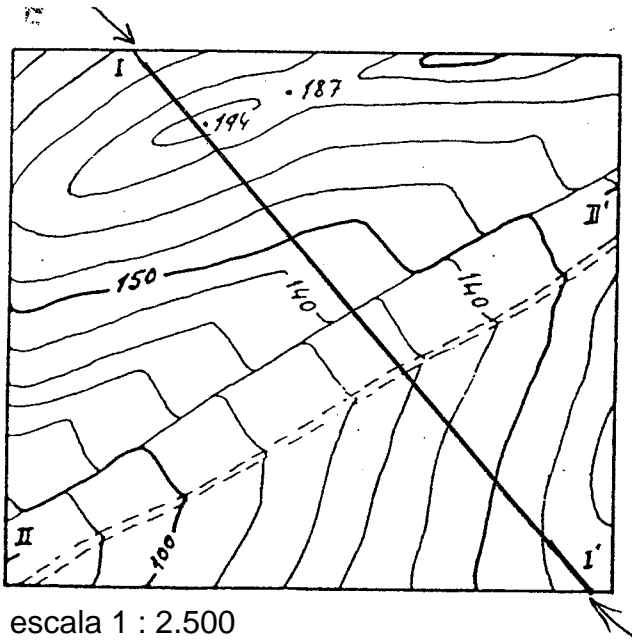
2



escala 1 : 1.250

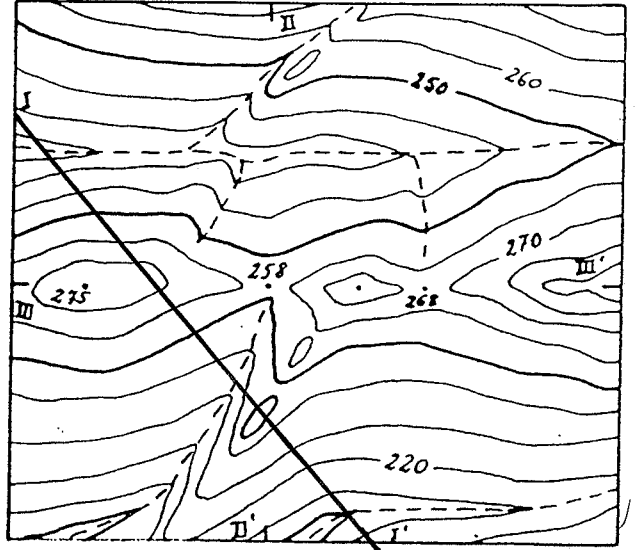
¿Cuál es la pendiente del río entre las curvas de 25 y 40 m ?

3



escala 1 : 2.500

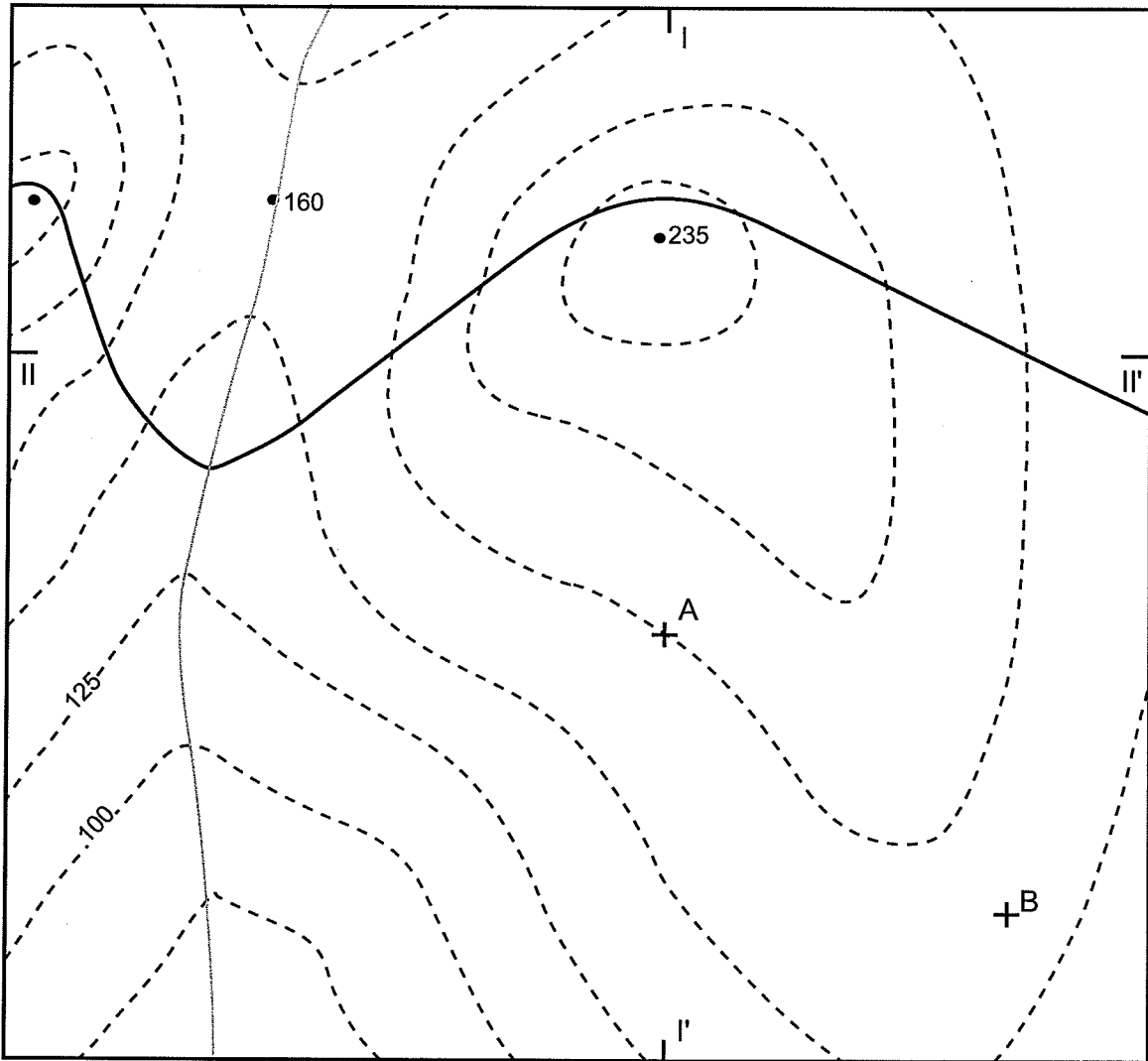
4



escala 1 : 5.000



1



**Escala 1:5.000**

1. Dibujar la escala gráfica para este mapa

En la región representada aflora una capa de carbón cuya potencia es despreciable a escala del mapa.

2. Esta capa de carbón ¿Es plana en este área o está plegada?

3. Hallar la dirección y el buzamiento

4. Realizar el corte geológico I-I'

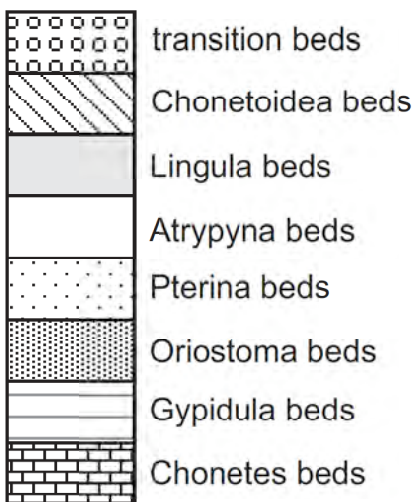
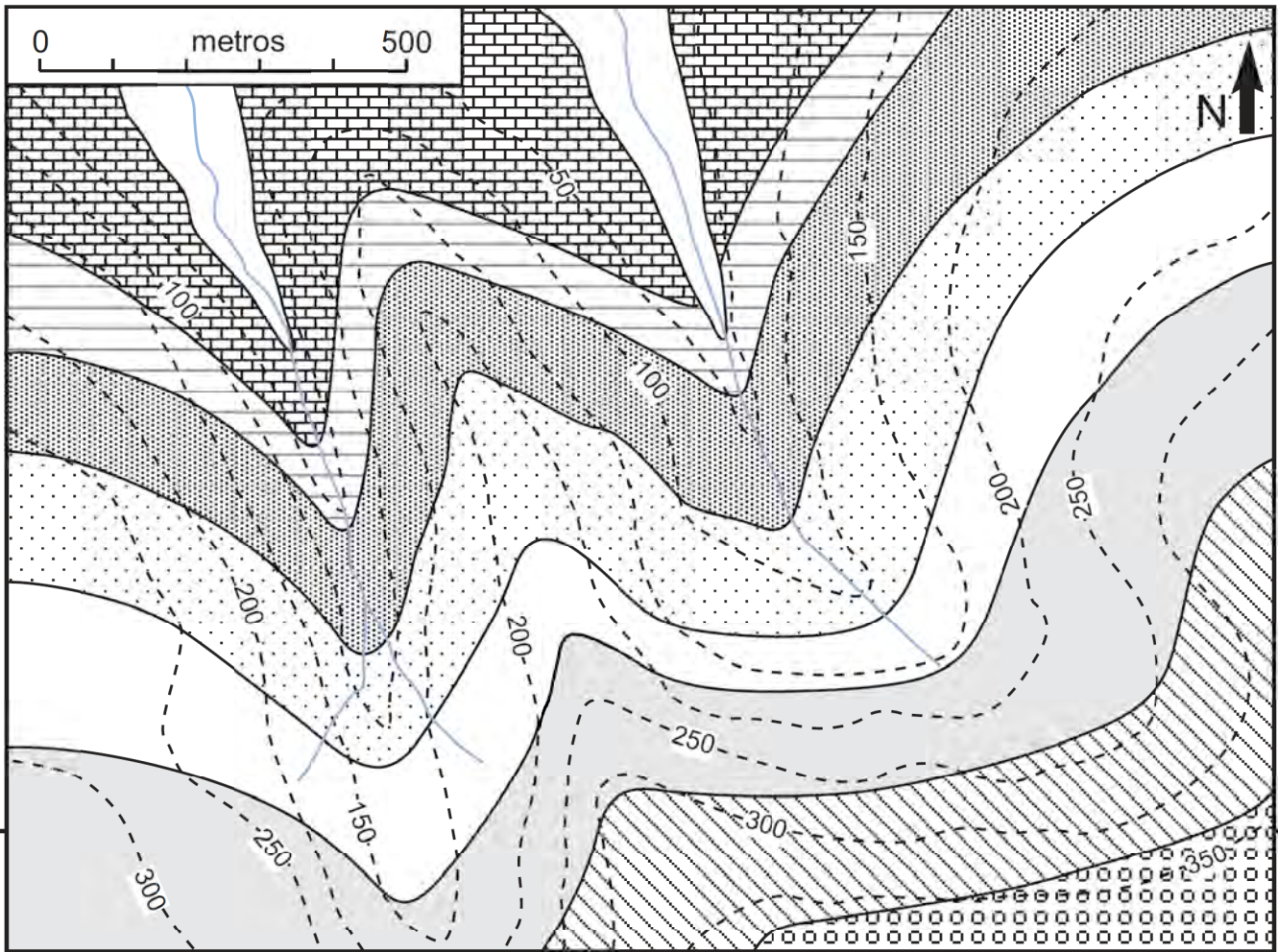
5. En el punto A se realizan dos sondeos, uno vertical y otro horizontal, éste con dirección N-S ¿A qué distancia encontrará cada uno de los sondeos la capa de carbón?

6. ¿A qué distancia se encuentra la capa debajo de B?

7. Sea una recta contenida en el capa y en un plano vertical que pasa por A y por B ¿qué dirección e inclinación tendrá?

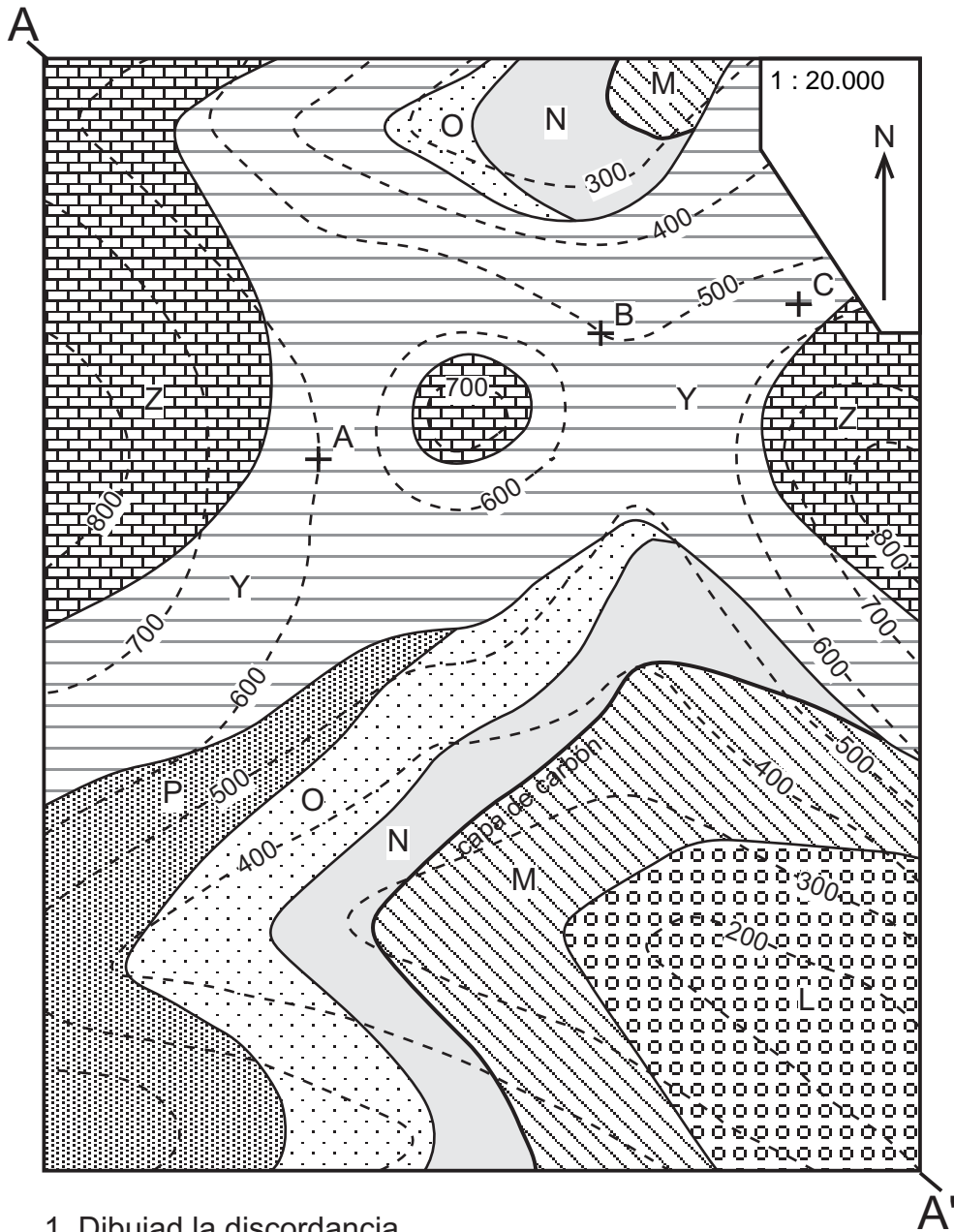
8. Dibujar el corte geológico que pasa por A y por B

9. Dibujar el corte geológico II-II'



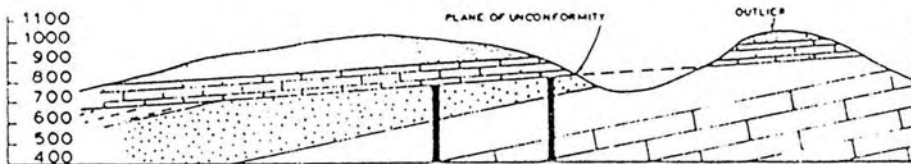
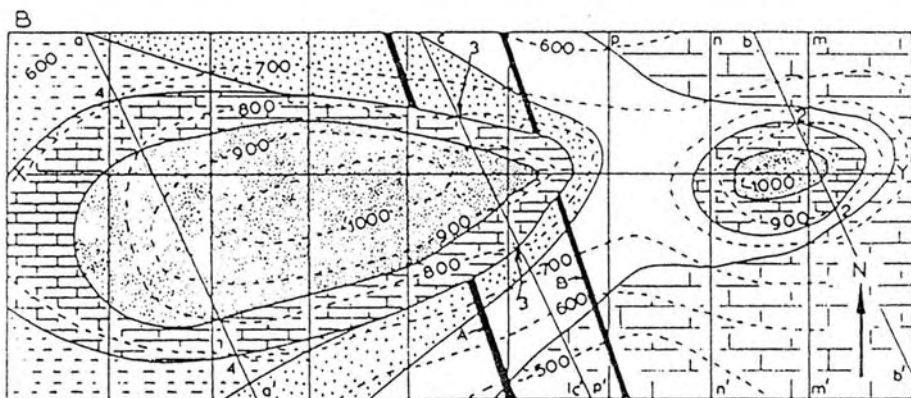
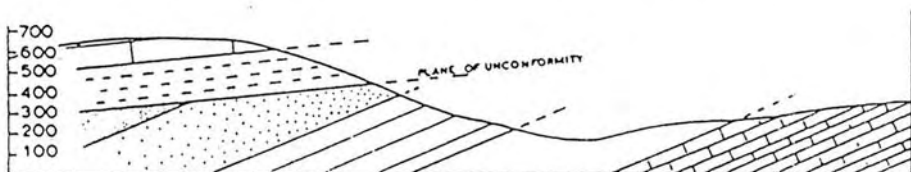
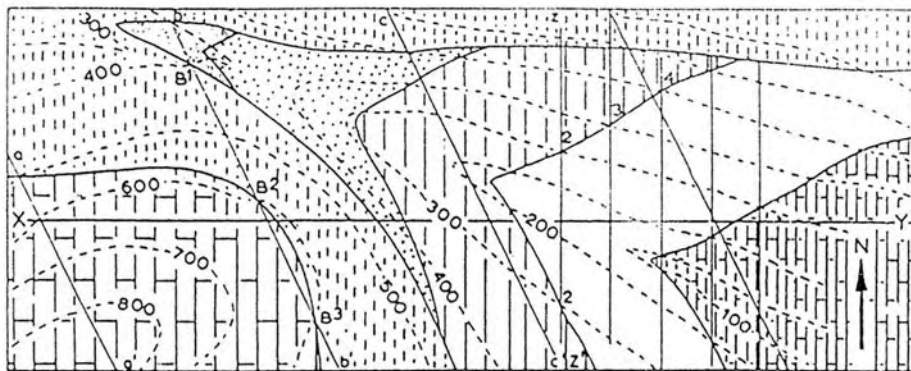
En el mapa aparecen representados materiales sedimentarios de edad silúrica correspondientes a un sector del País de Gales (Reino Unido)

1. Determinar la dirección y buzamiento de las capas
2. Levantar el corte geológico perpendicular a la dirección de las capas
3. Levantar un corte geológico E-O en la parte inferior del mapa
4. Indicar los espesores reales y verticales de cada conjunto de capas



1. Dibujad la discordancia.
2. Dirección y buzamiento de ambas series
3. Corte geológico A-A'
4. Se cortaría la capa de carbón en sondeos hechos en A, B y C?  
En caso afirmativo, ¿A qué profundidad?; en caso negativo sugerir una explicación.

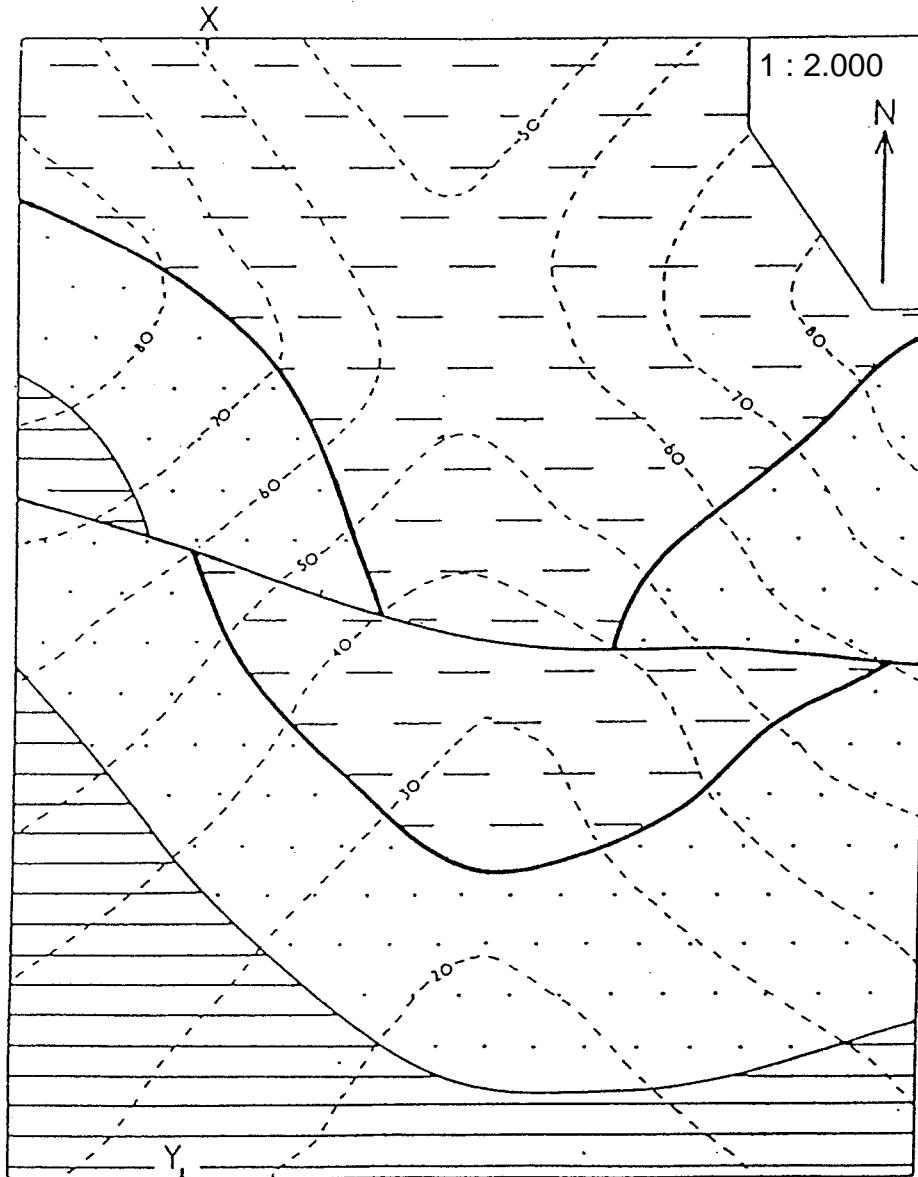
## 2 ejemplos de mapas y cortes con discordancias



VERTICAL AND HORIZONTAL SCALE

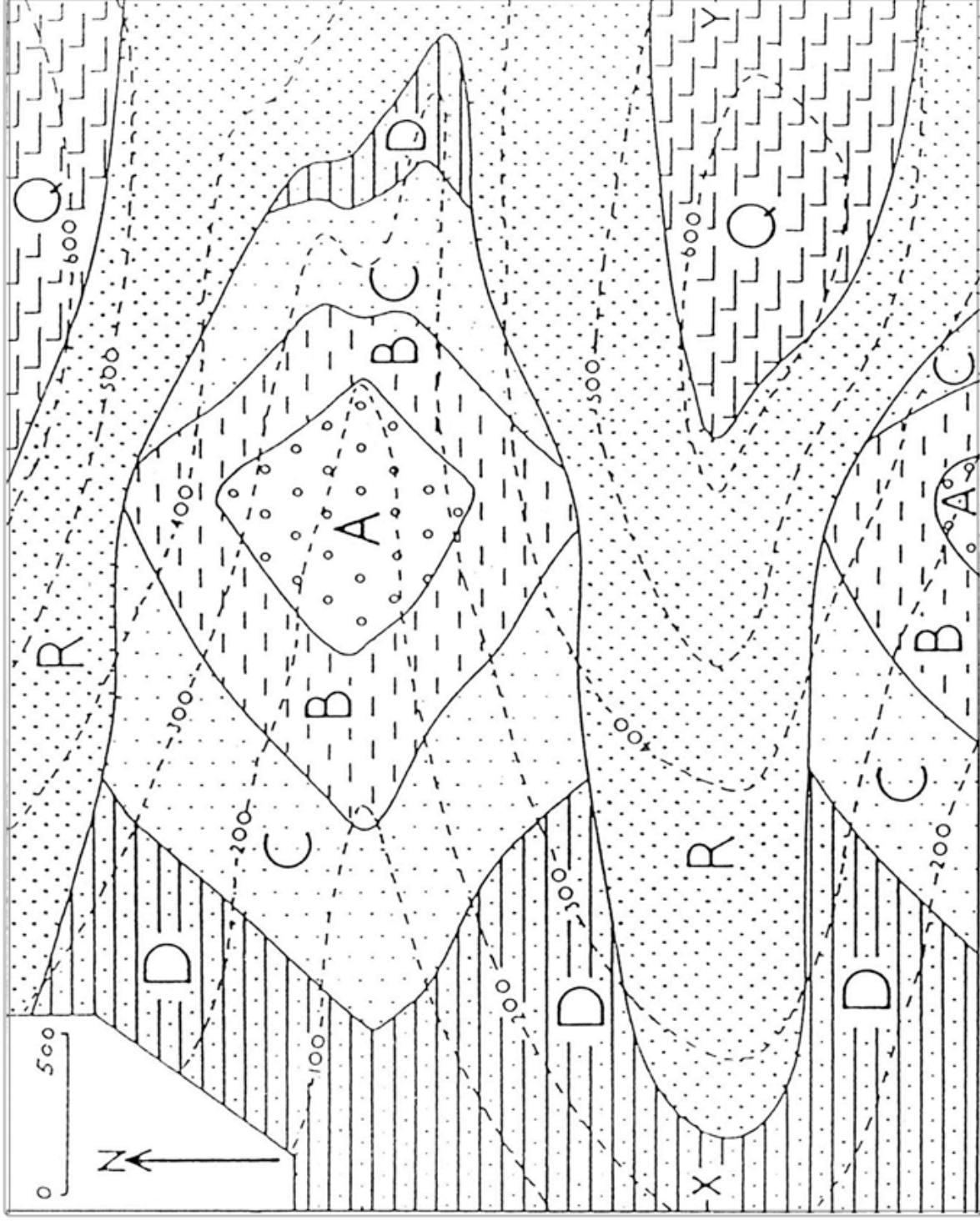
0 250 500 1000 m

1. Hacer el corte X-Y



CAPA FINA DE CARBÓN

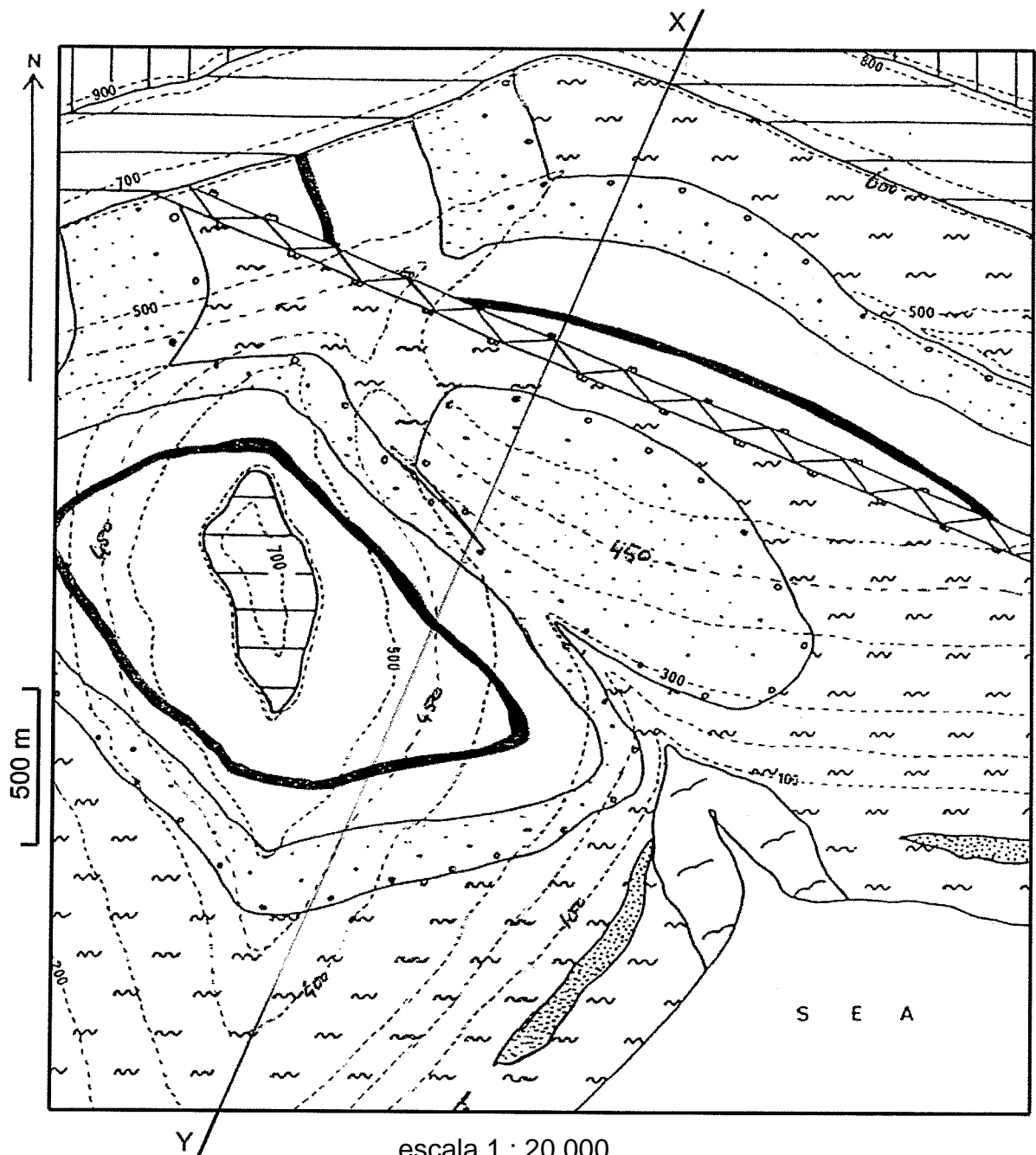
2. Colorear el área o áreas donde un sondeo vertical intersectará la capa de carbón 1 vez y 2 veces



escala 1 : 20.000

1. Realizar corte geológico X-Y.

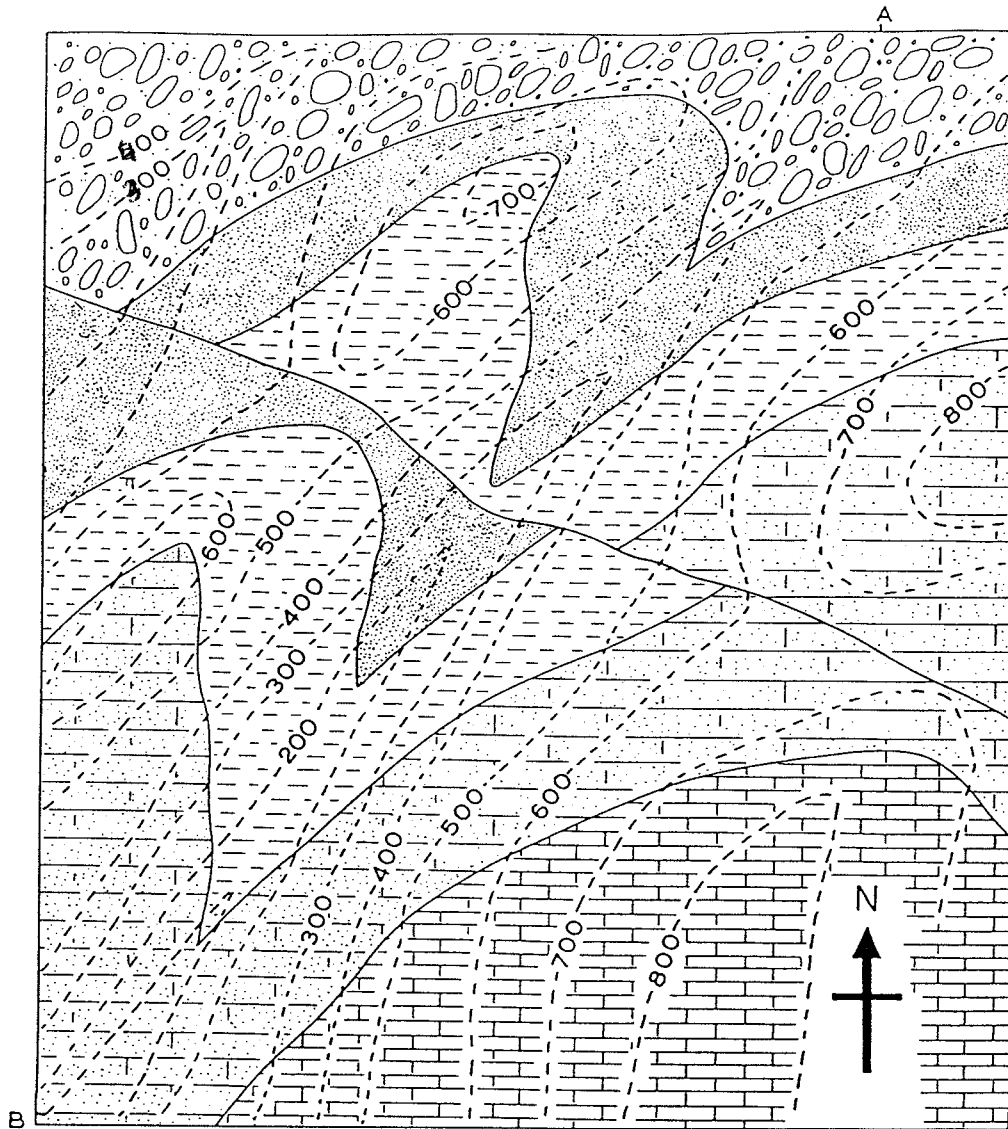
2. Dibujar la traza axial del pliegue en el mapa



escala 1 : 20.000

1. Dirección y buzamiento de las superficies representadas en el mapa
2. Realizar el corte geológico X-Y
3. ¿Hay alguna falla? En caso afirmativo describir las características de la misma
4. Resumir brevemente la historia geológica del área

<b>Igneas</b>		
	cenizas	
	andesita	
	aplita	
	basalto	
<b>Metamórficas</b>		
	esquistos	
	corneanas	
	cuarcitas	
<b>Sedimentarias</b>		
	lutitas	
	arenisca	



LIMESTONE



CALCAREOUS SANDSTONE



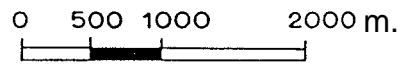
SHALE



SANDSTONE



CONGLOMERATE



1. DETERMINE THE DIP AND STRIKE OF THE BEDS.
2. COMMENT ON THE TYPE AND EFFECT OF THE FAULT.
3. DETERMINE THE THROW OF THE FAULT.
4. DRAW A SECTION FROM A TO B

FIG. 79



