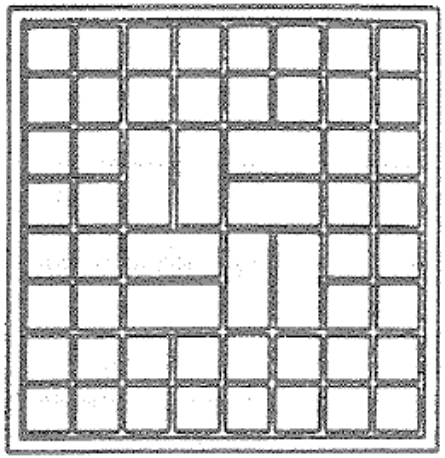
48-747 Shape Grammars

ICERRAY and HEPPLEWHITE CHAIRBACK DESIGNS

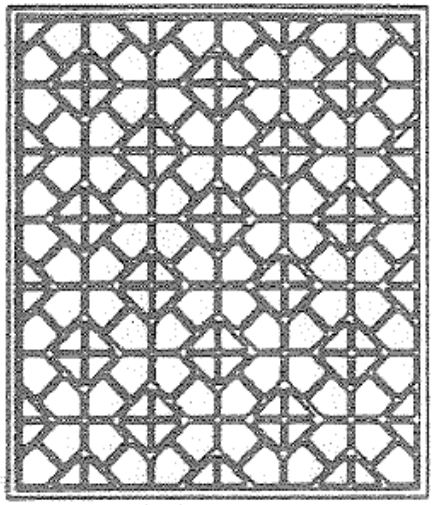
chinese lattice designs

george stiny

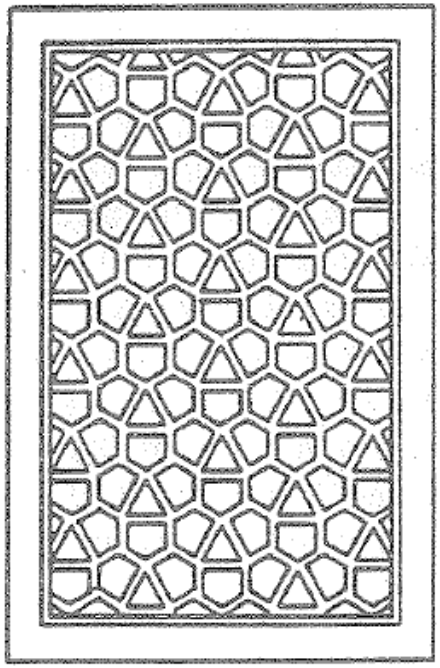
Ice-ray: a note on the generation of Chinese lattice designs



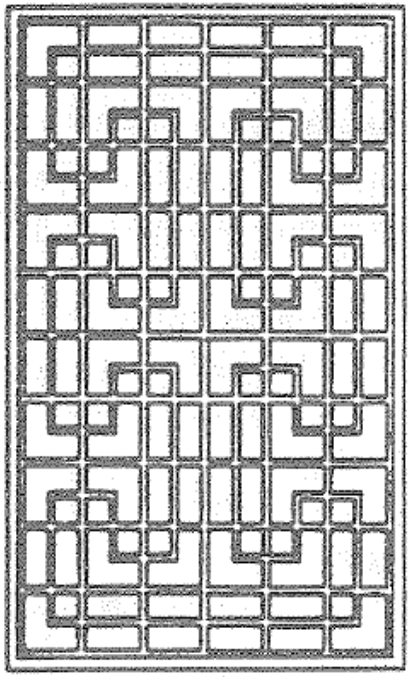
(a)



(b)



(c)



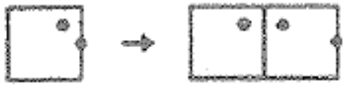
(d)

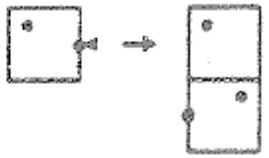
S: ——

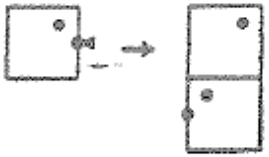
L: $\{(0, 0) : \bullet\}, \{(0, 0) : \blacktriangle\}$

R:

(1) 

(2) 

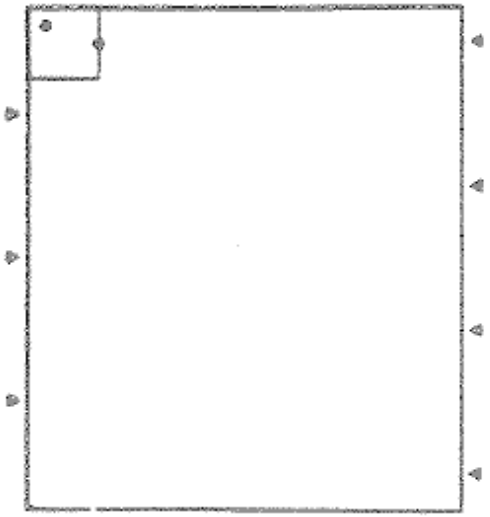
(3) 

(4) 

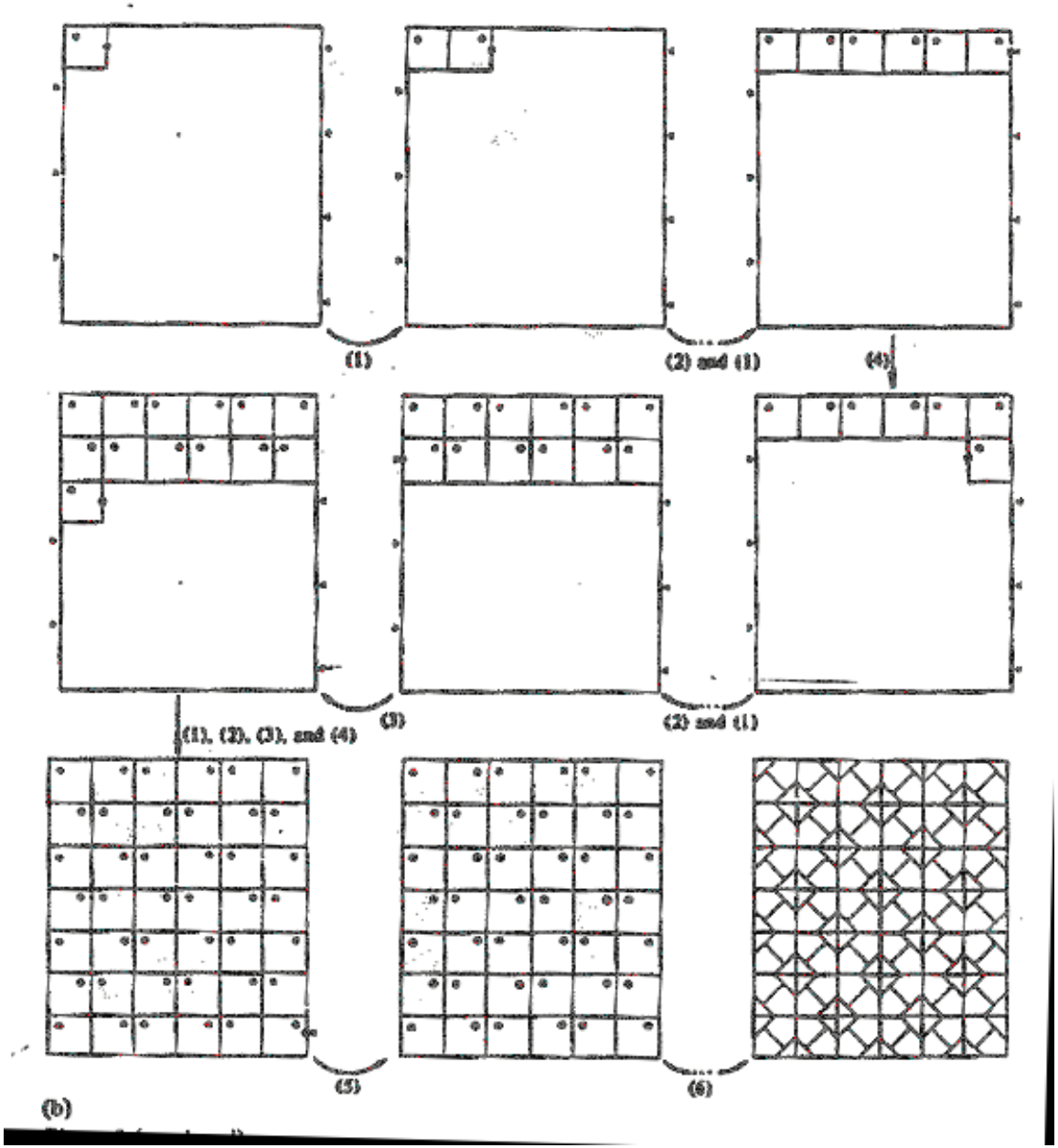
(5) $\langle s_{\oplus}, \{(0, 0) : \bullet, (0, 0) : \blacktriangle\}\rangle \rightarrow \langle s_{\oplus}, \oplus\rangle$

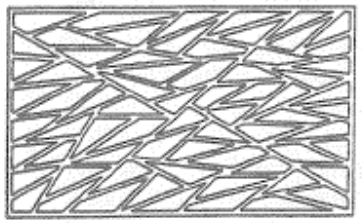
(6) 

I:

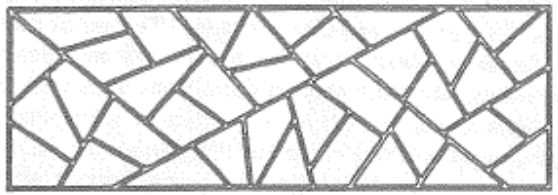


(a)

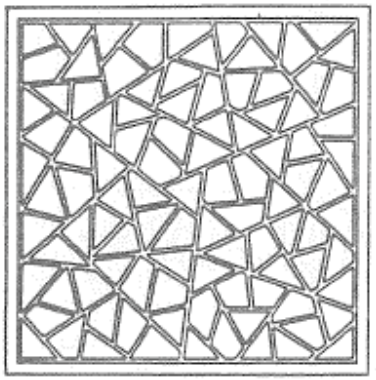

(1)
(2) and (1)
(4)
(3)
(2) and (1)
(1), (2), (3), and (4)
(5)
(6)
(b)



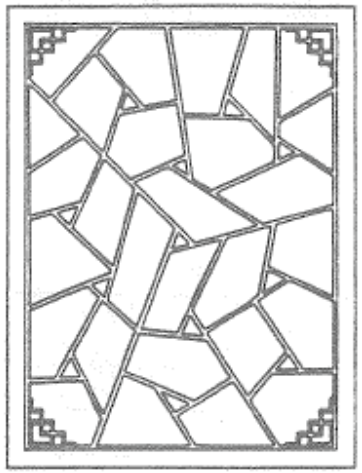
(a)



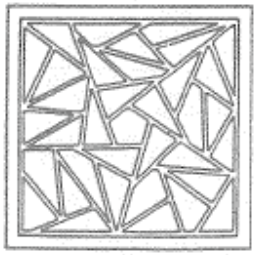
(b)



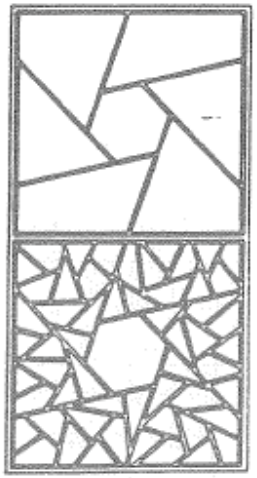
(c)



(d)



(e)



(f)

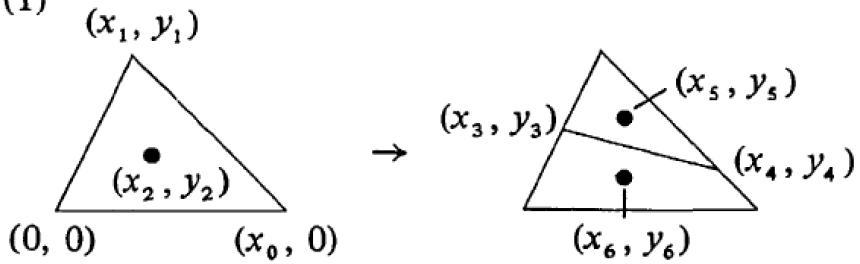
(g)

S: ———

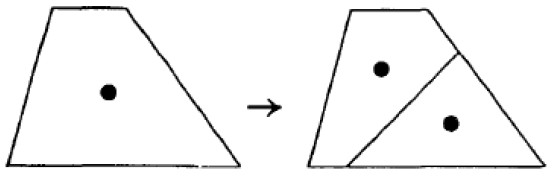
L: $\{(0, 0) : \bullet\}$

R:

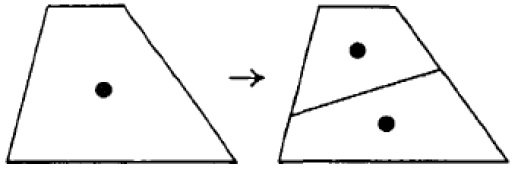
(1)



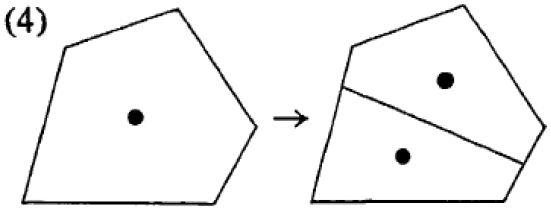
(2)



(3)



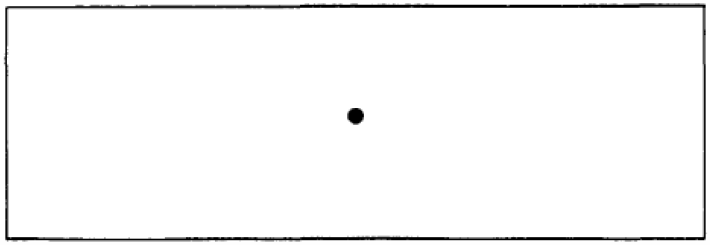
(4)



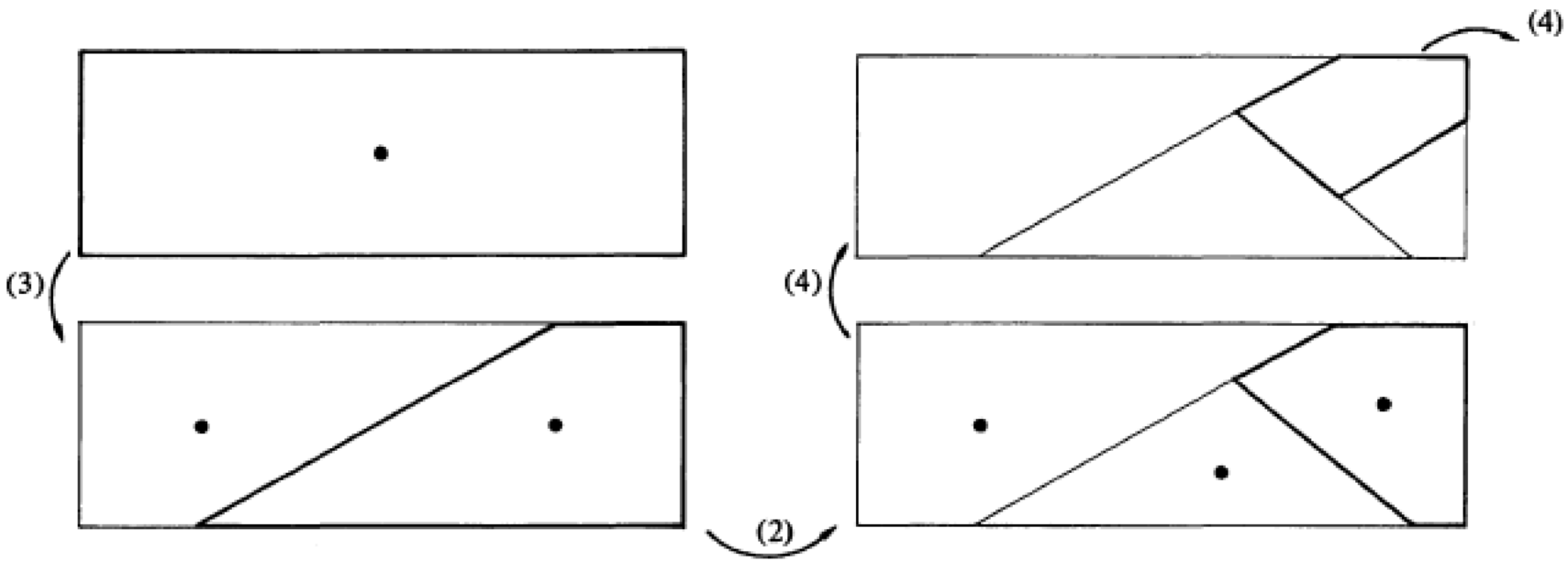
(5)

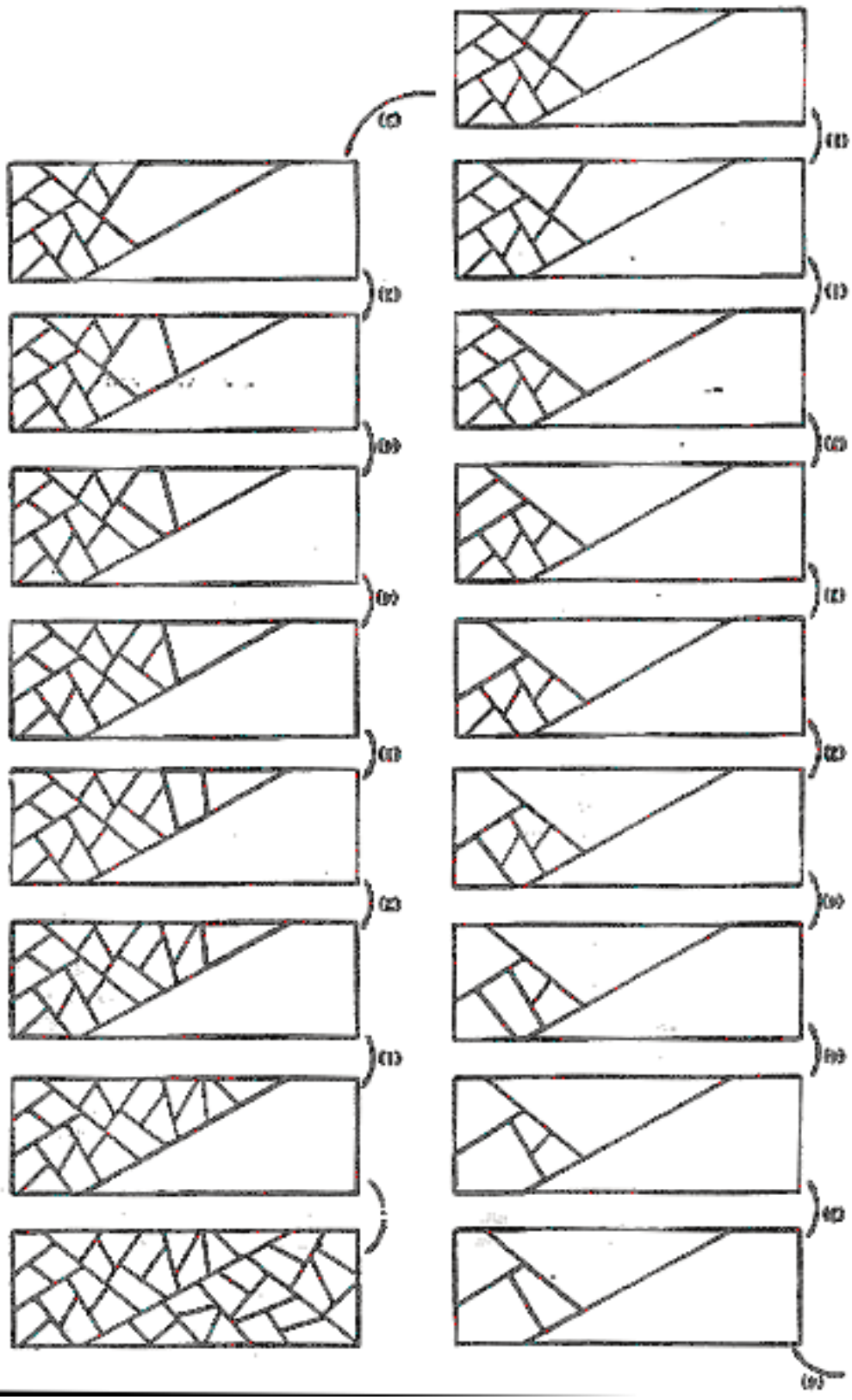
$\langle s_\phi, \{(0, 0) : \bullet\}\rangle \rightarrow \langle s_\phi, \phi\rangle$

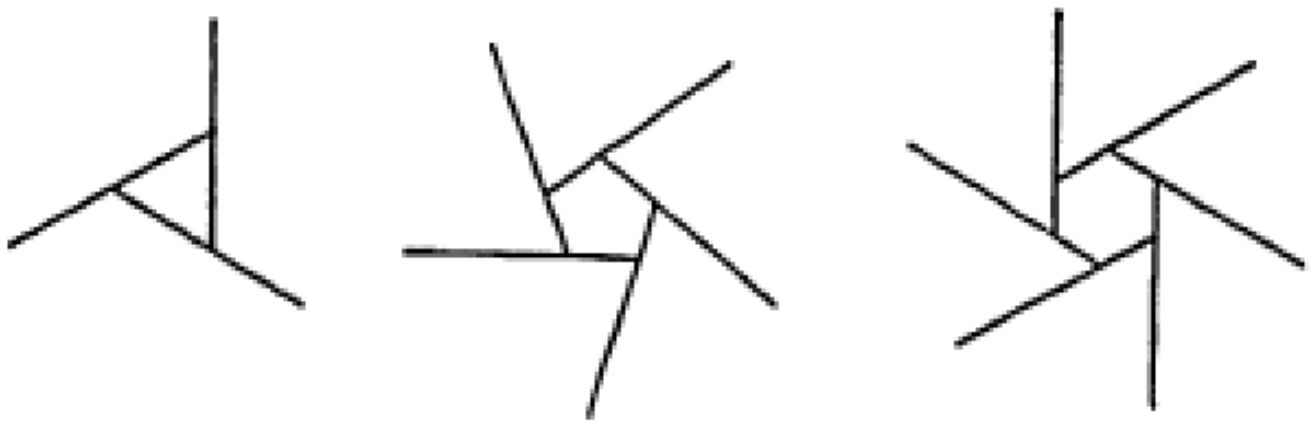
I:



T: translation, rotation, or finite compositions of these.


(4)
(3)
(4)
(2)



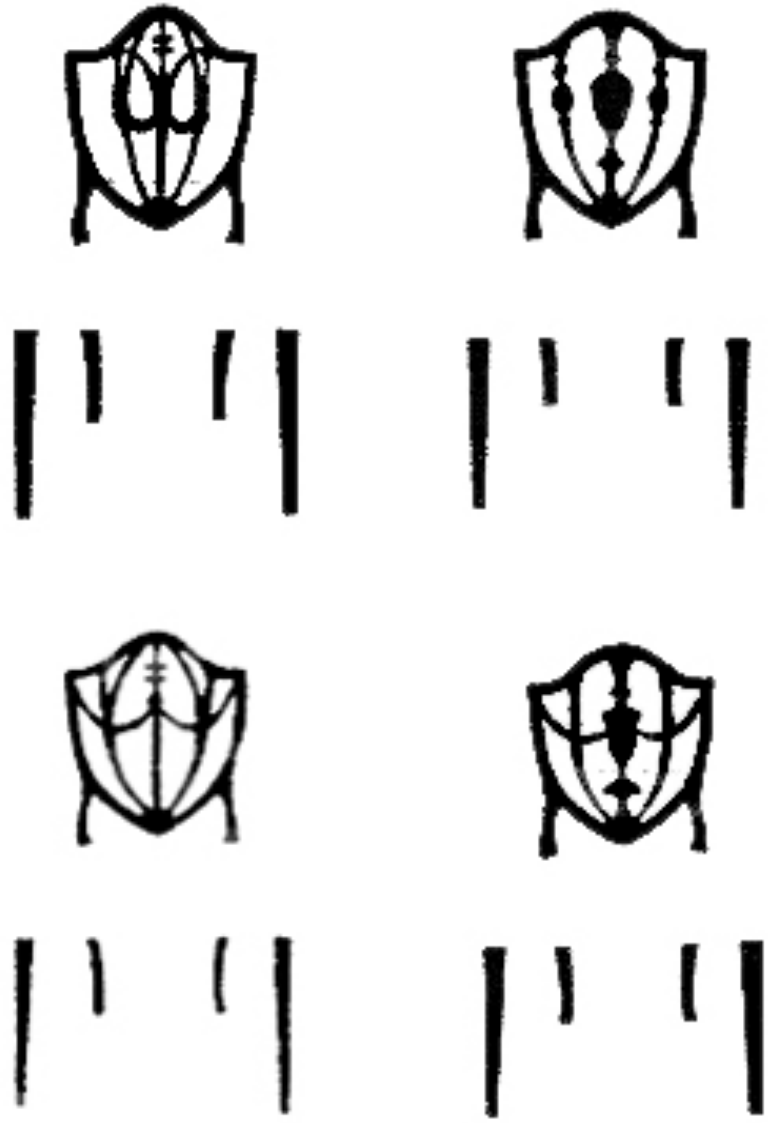


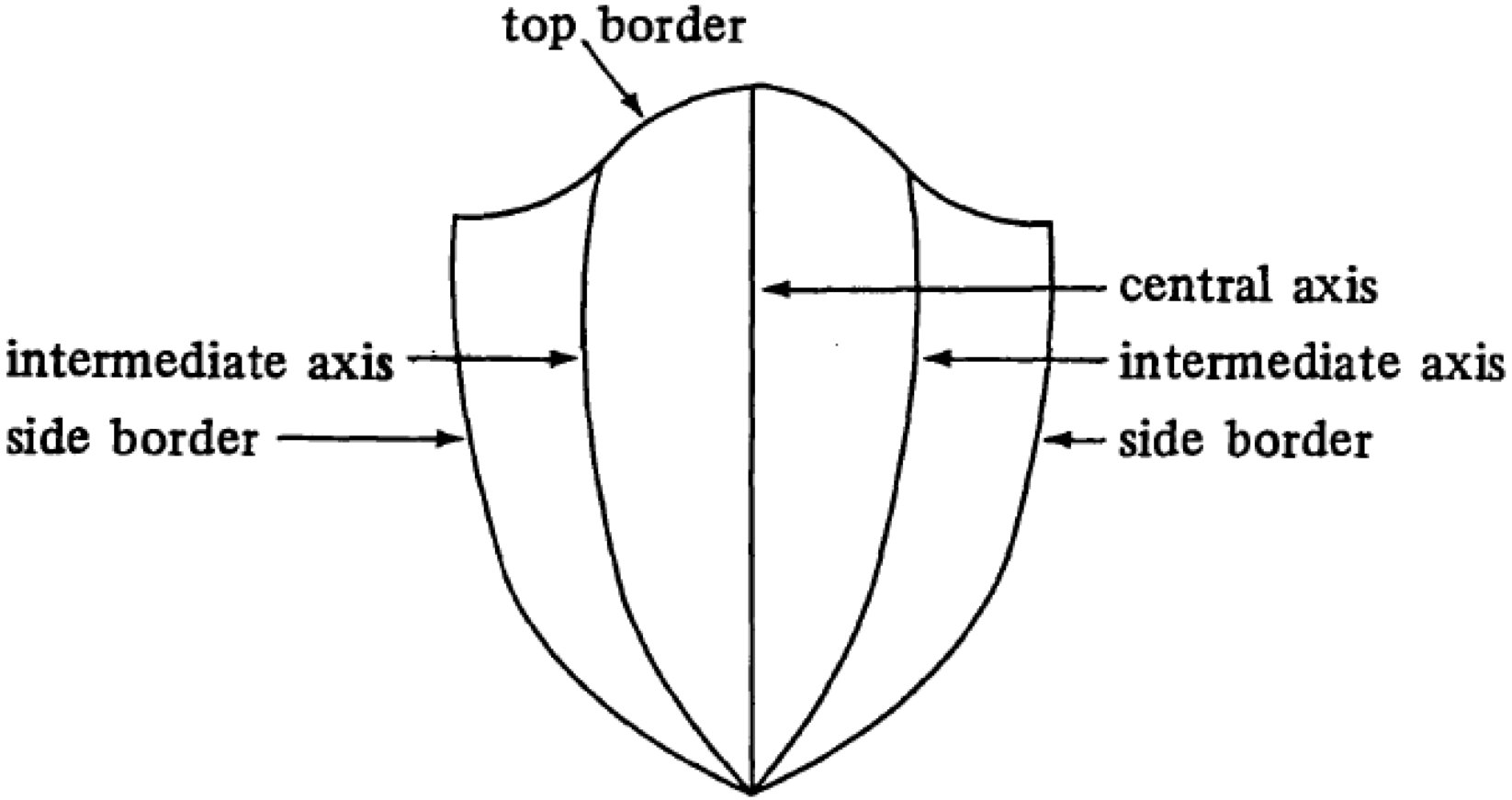
hepplewhite chairback designs

terry knight

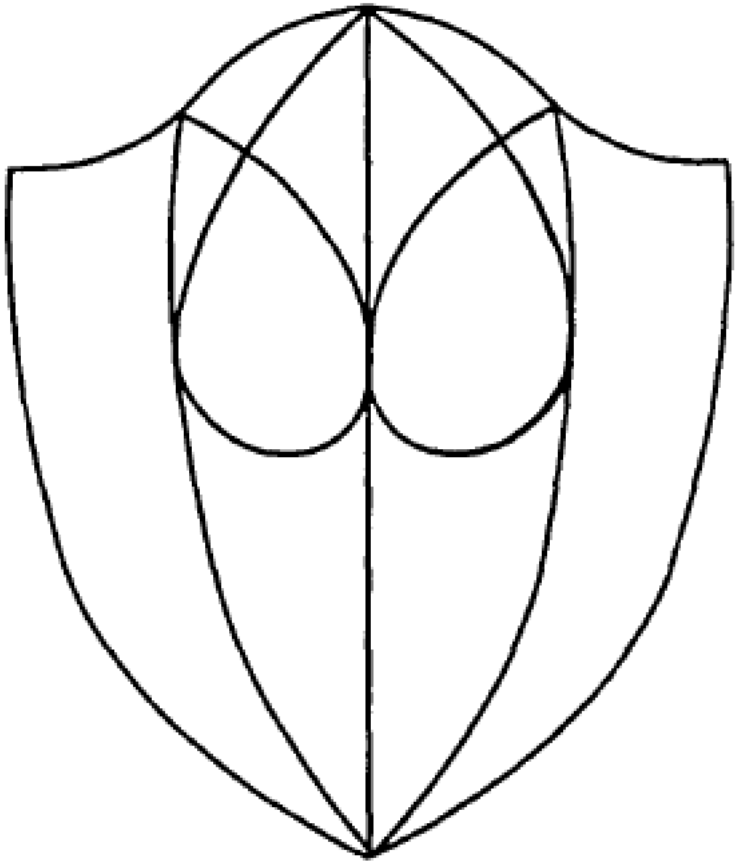
The generation of Hepplewhite-style chair-back designs

inspiration
hepplewhite chairback designs – brought to America by Samuel Macintyre



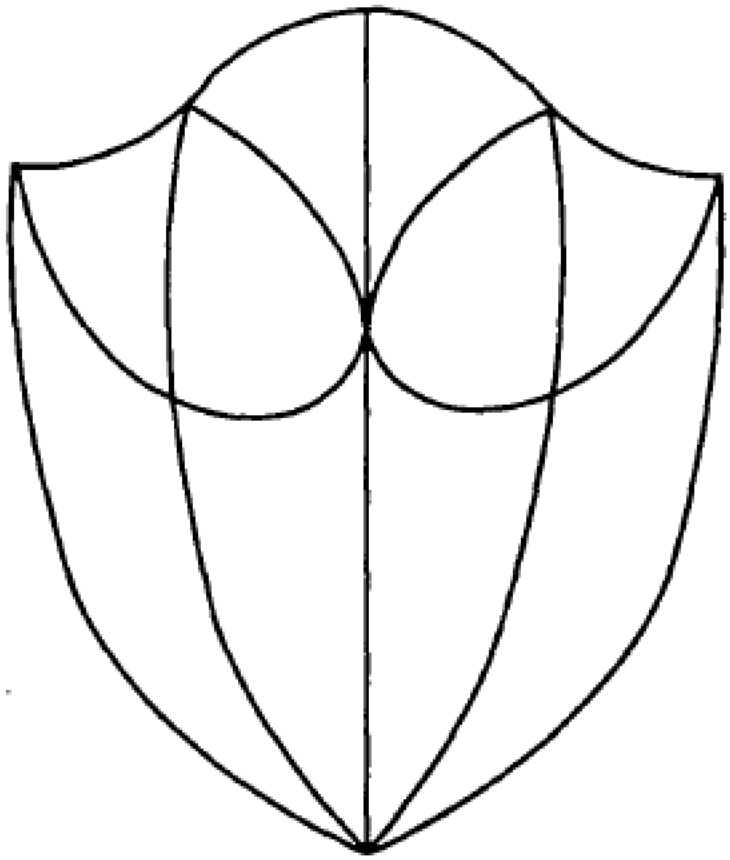


hepplewhite chairback designs - basic **forms**

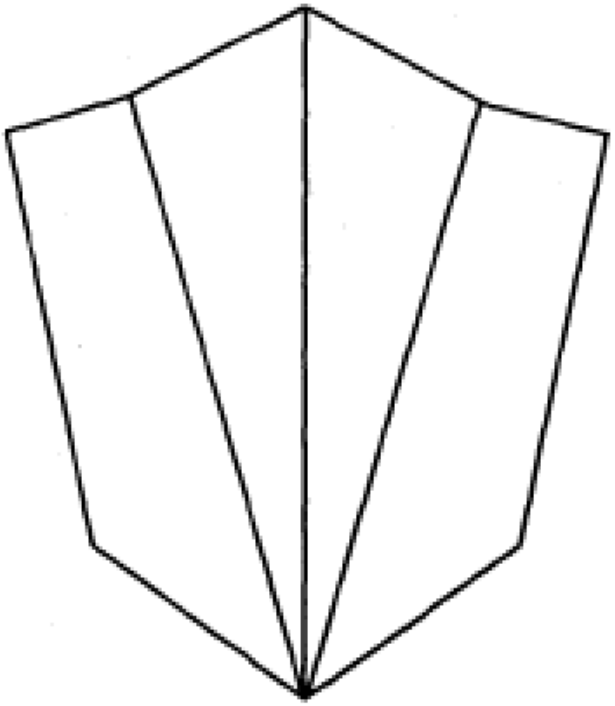


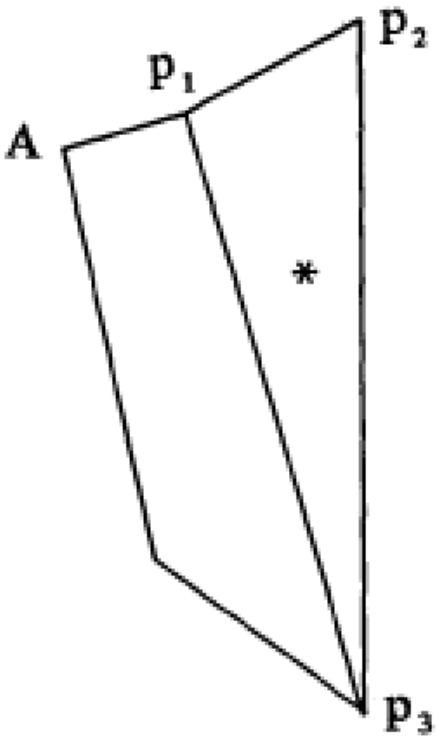
Three curves are added
between the
central and intermediate axes

hepplewhite chairback designs - basic **forms**



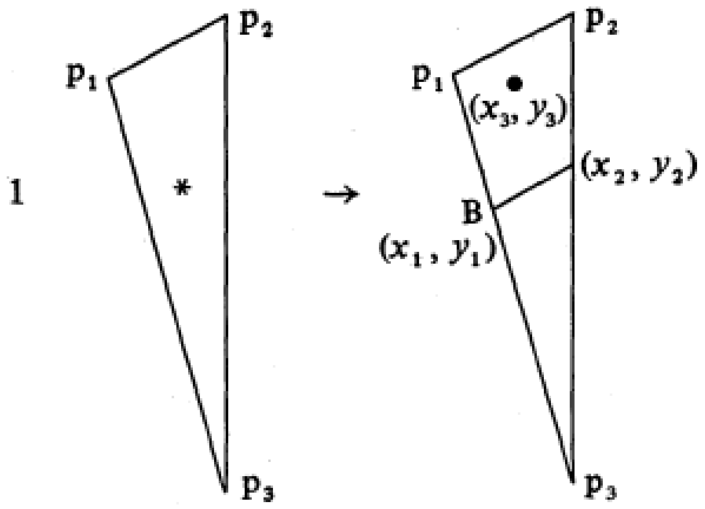
A curve is added between the intermediate axis and the side border

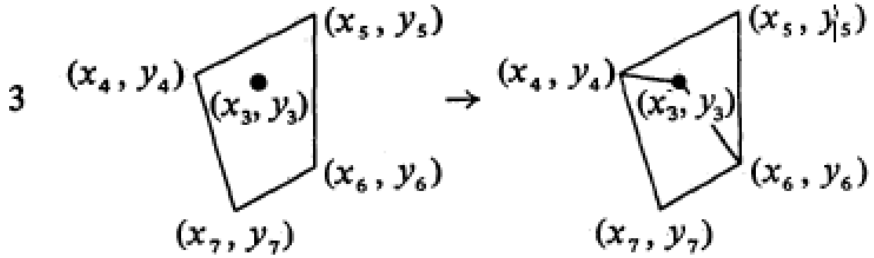


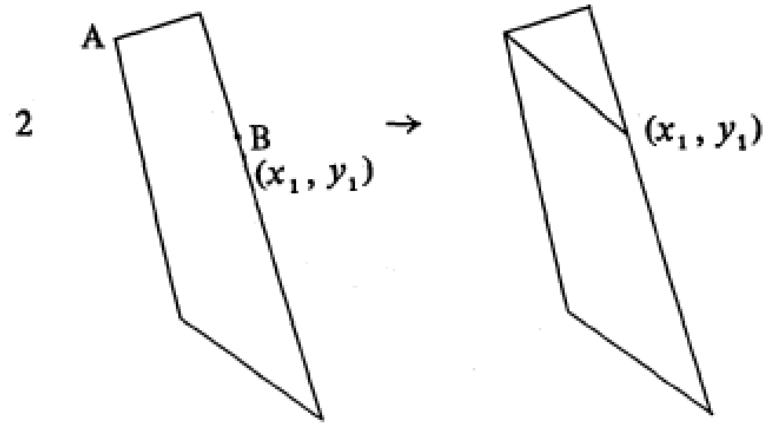


Initial shape

hepplewhite chairback designs - basic rectilinear form

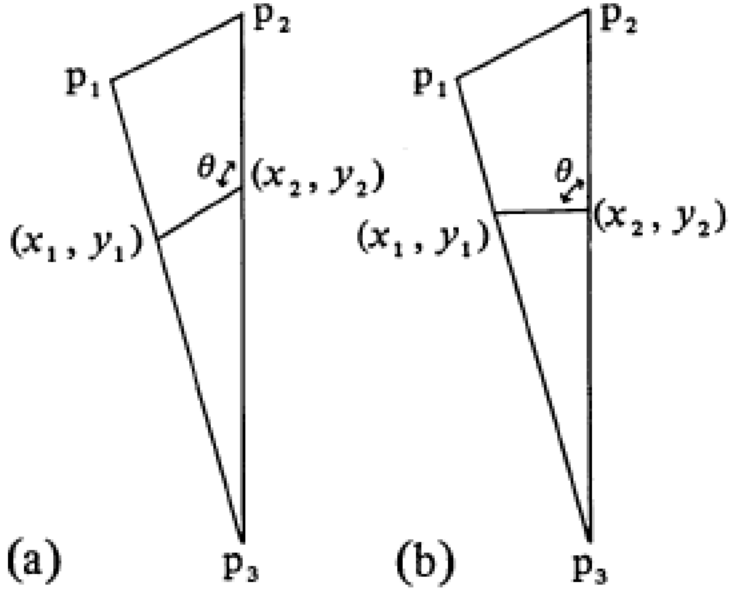






4a $\langle s_\phi, \{(0, 0): \text{A}\}\rangle \rightarrow \langle s_\phi, \emptyset\rangle$
4b $\langle s_\phi, \{(0, 0): \text{B}\}\rangle \rightarrow \langle s_\phi, \emptyset\rangle$
4c $\langle s_\phi, \{(0, 0): *\}\rangle \rightarrow \langle s_\phi, \emptyset\rangle$
4d $\langle s_\phi, \{(0, 0): \bullet\}\rangle \rightarrow \langle s_\phi, \emptyset\rangle$

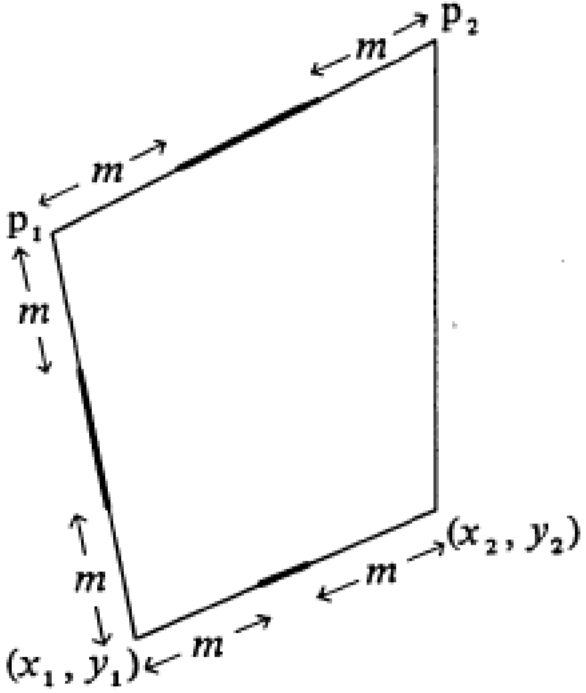
parametric shape grammar for **half** a hepplewhite chair back designs

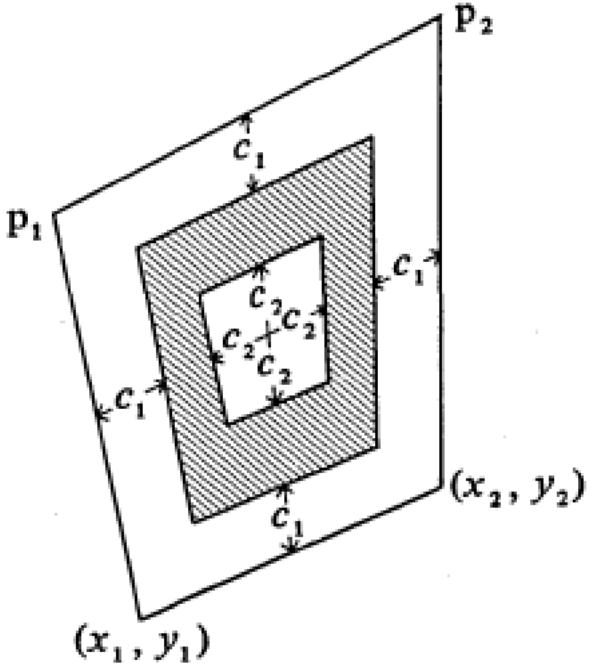


Points (x_1, y_1) and (x_2, y_2) is any point between 5/8-ths and 3/4-ths the distance from point p_3 to point p_1 and p_2 respectively.

Angle θ formed by drawing a line with endpoints (x_1, y_1) and $(x_2, y2)$ must be $\geq 90°$.

possible placements of the line with endpoints (x_1, y_1) and (x_2, y_2)

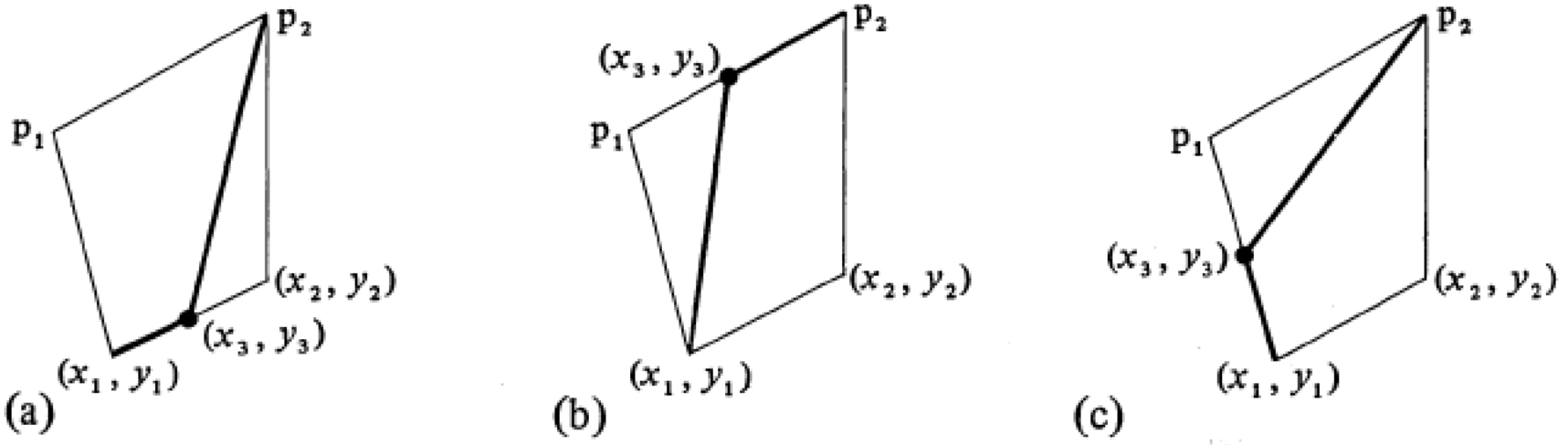




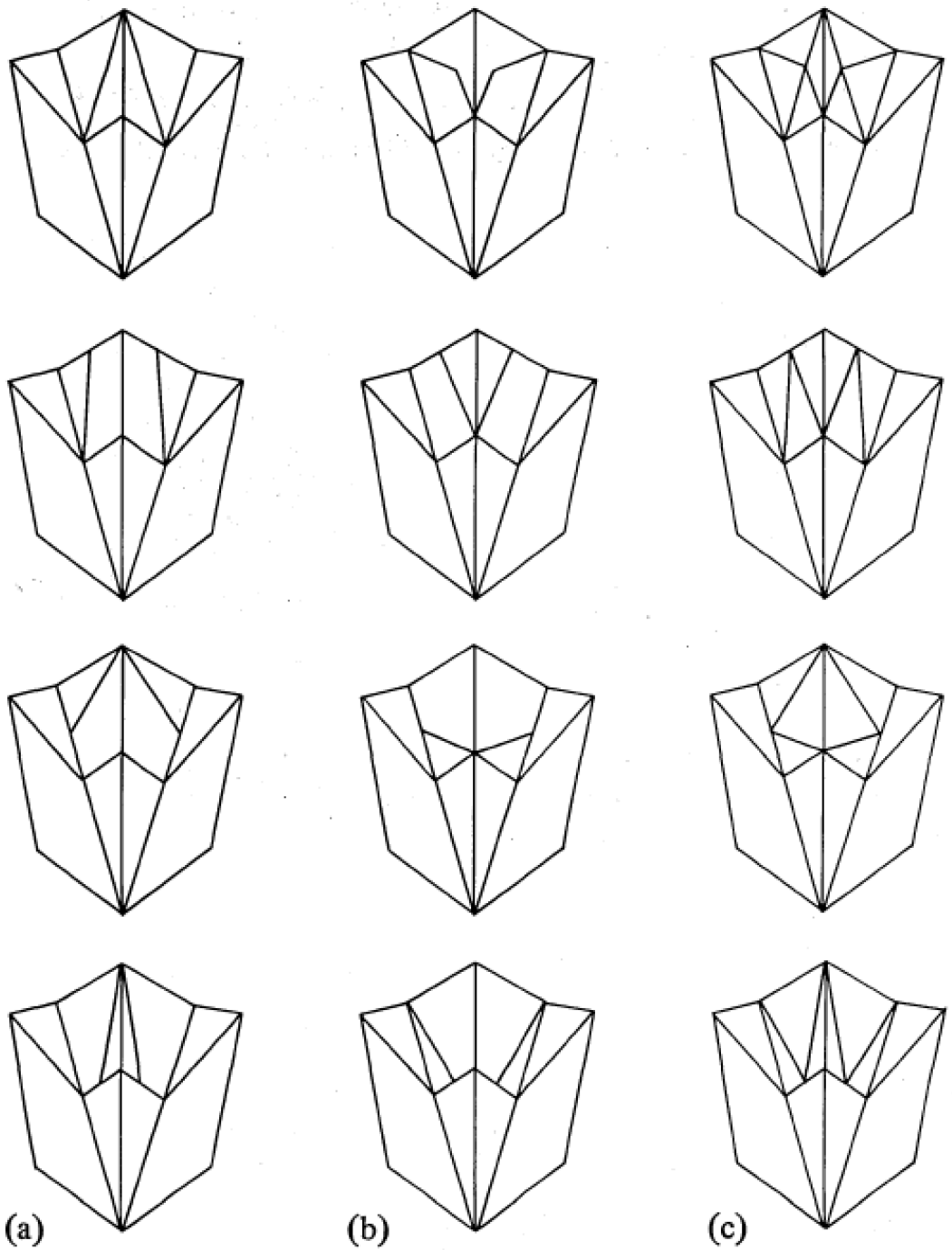
The point (x3 , y3) can be any point on the lines with endpoints p_1 and p_2 , or p_1 and and (x_1 , y_1), or (x_1 , y_1) and (x_2 , y_2) in the intervals *m* units away from the endpoints of these lines where *m* is a fixed constant

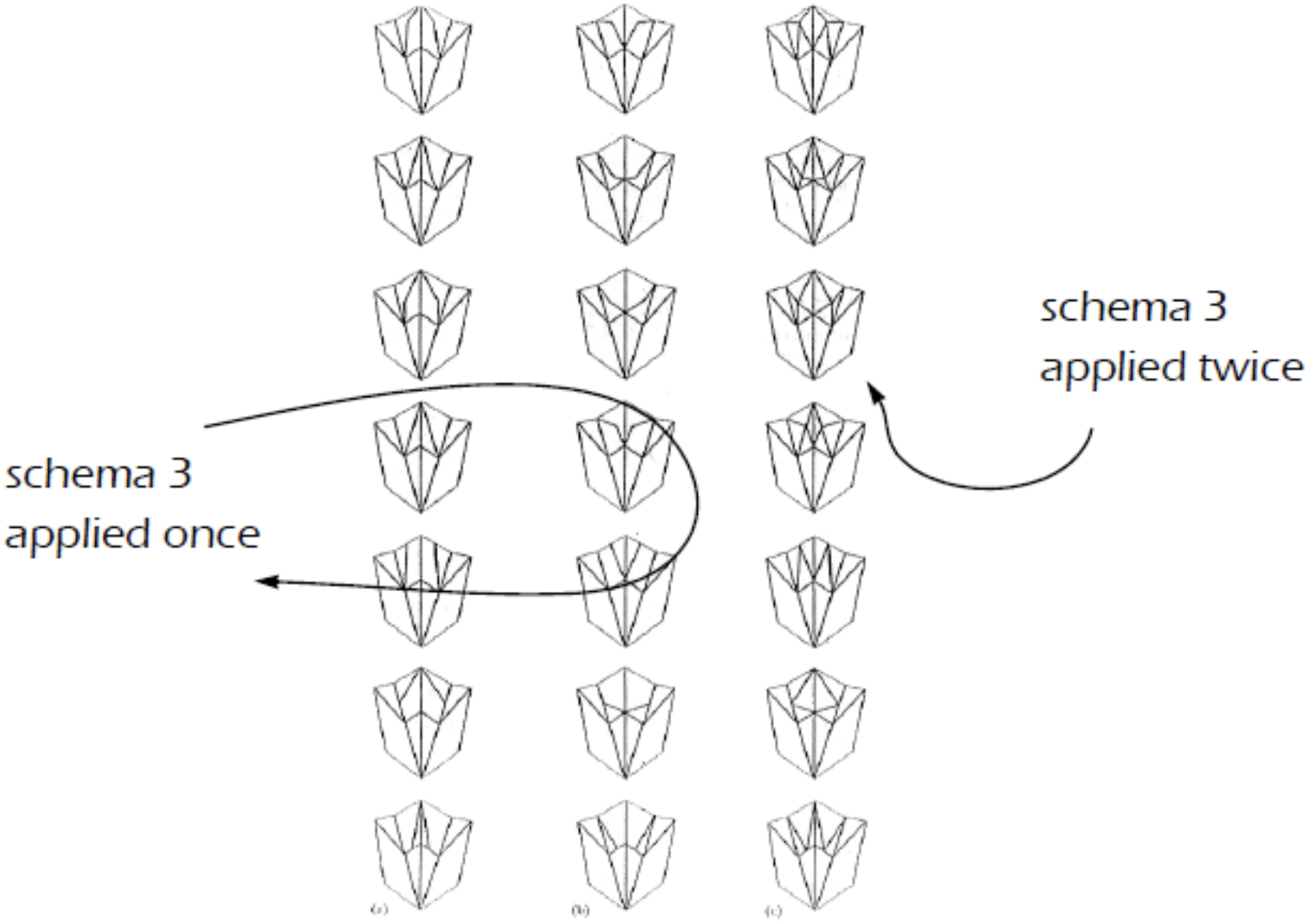
And can also be any point within the area defined by constants c_1 and c_2

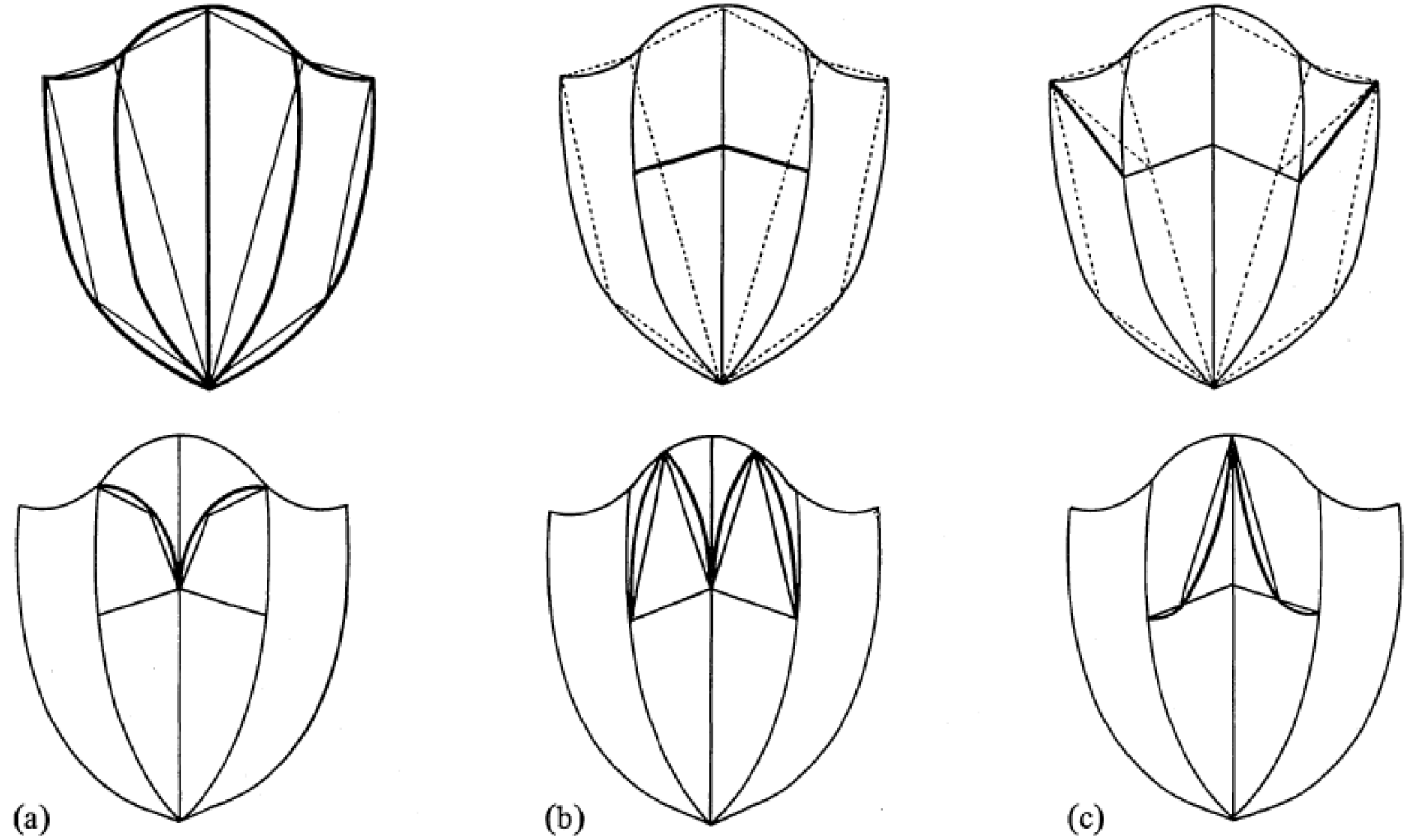
possible placements of point (x_3, y_3)



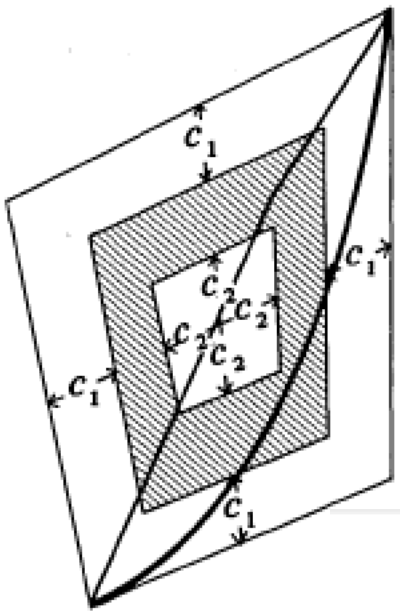
Lines may overlap a line previously generated as in (a) or a line in the initial shape as in (b) and (c)

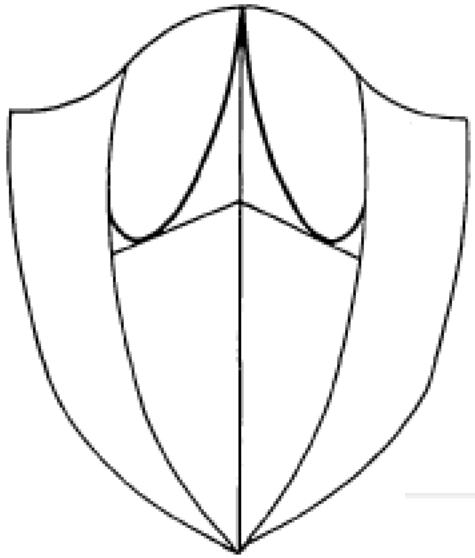

(a)
(b)
(c)

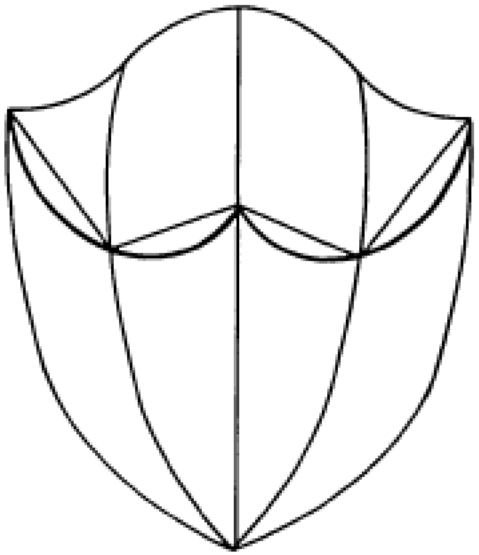

schema 3
applied twice
schema 3
applied once

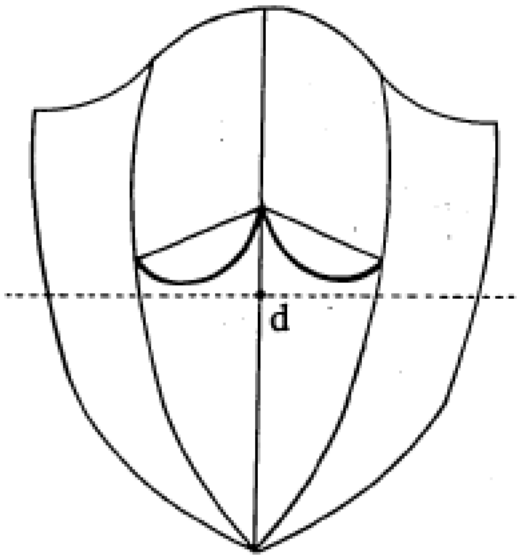


rectilinear shapes replaced by curved shapes

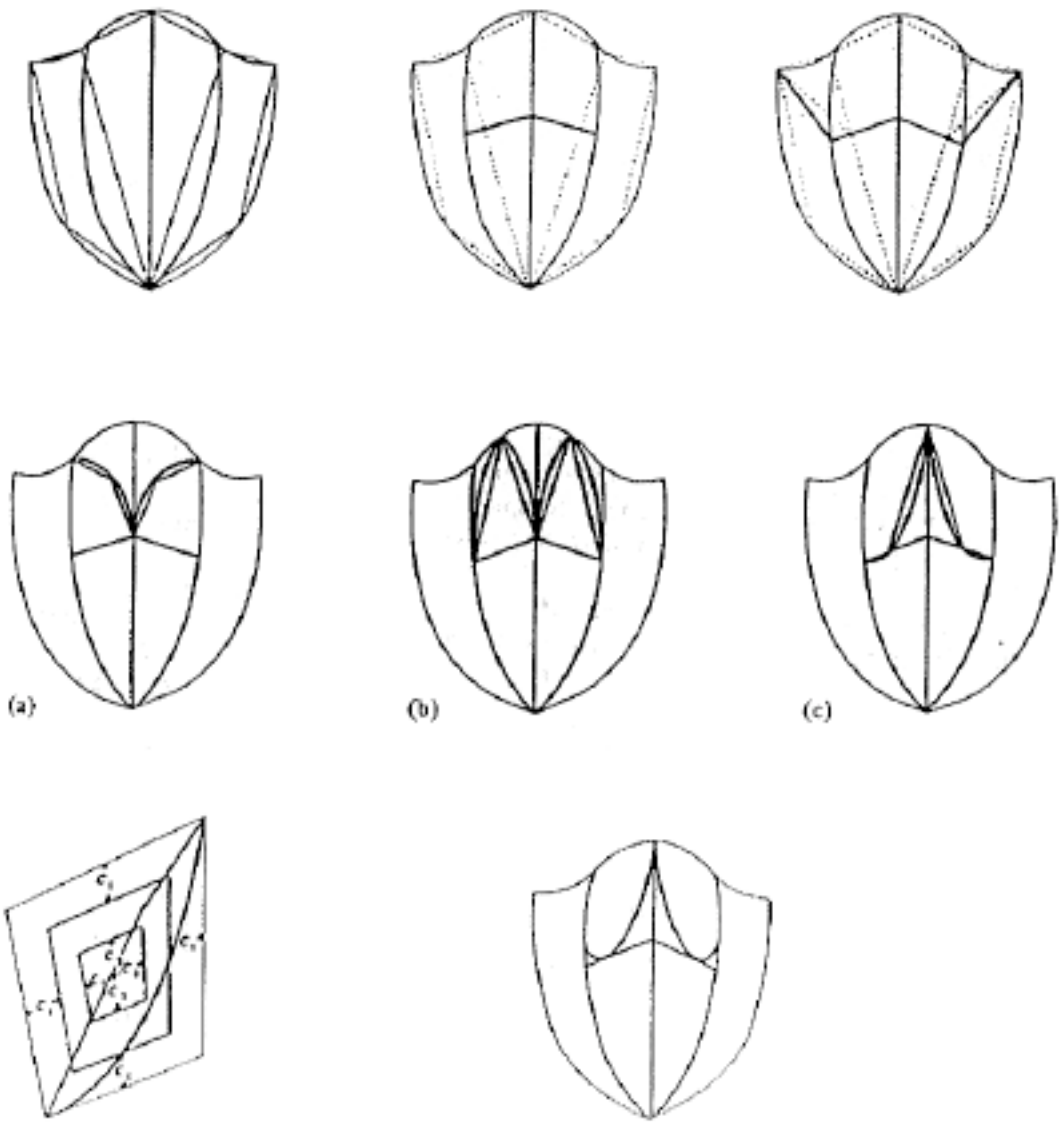








finer adjusting the curve

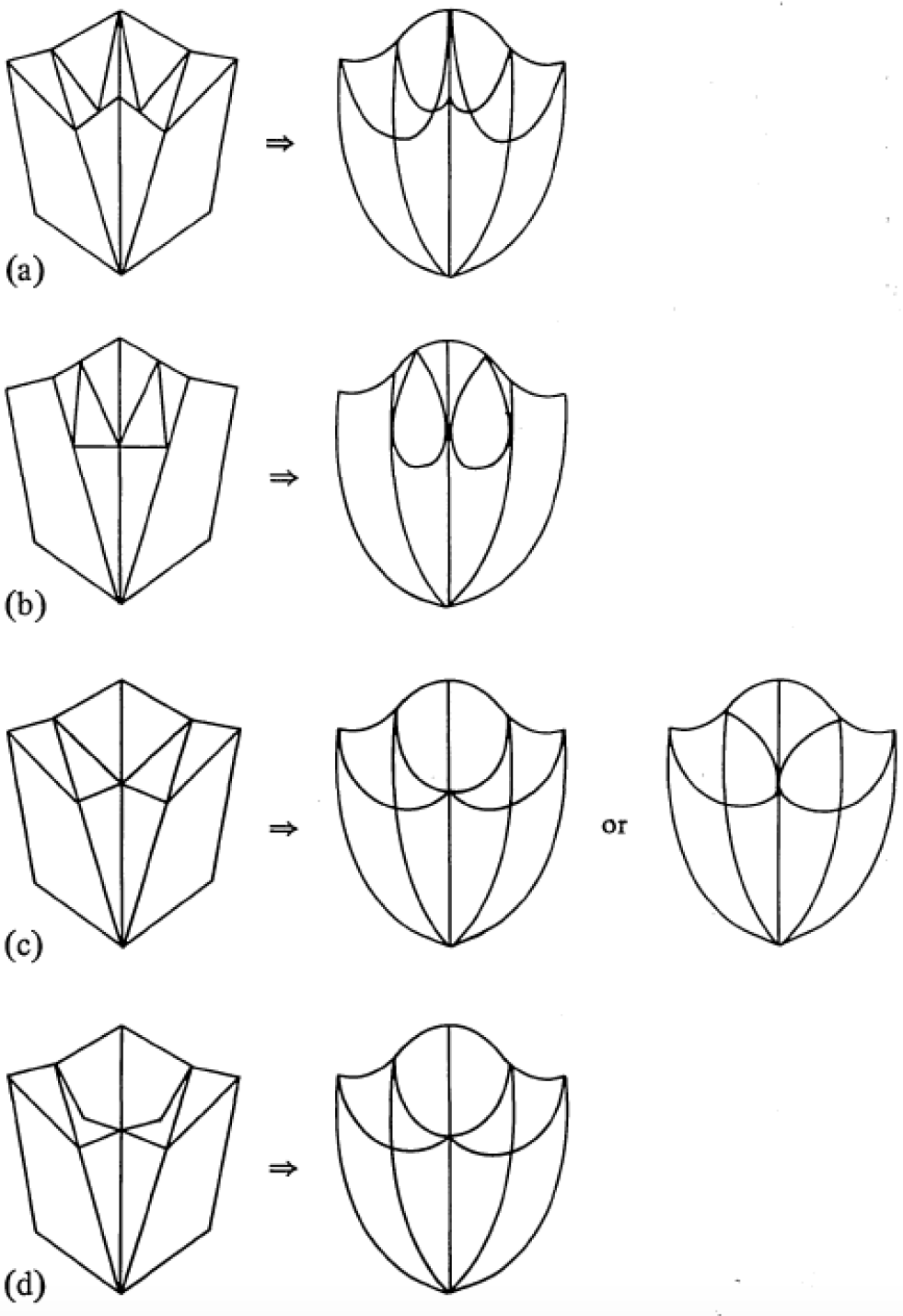

(a)
(b)
(c)

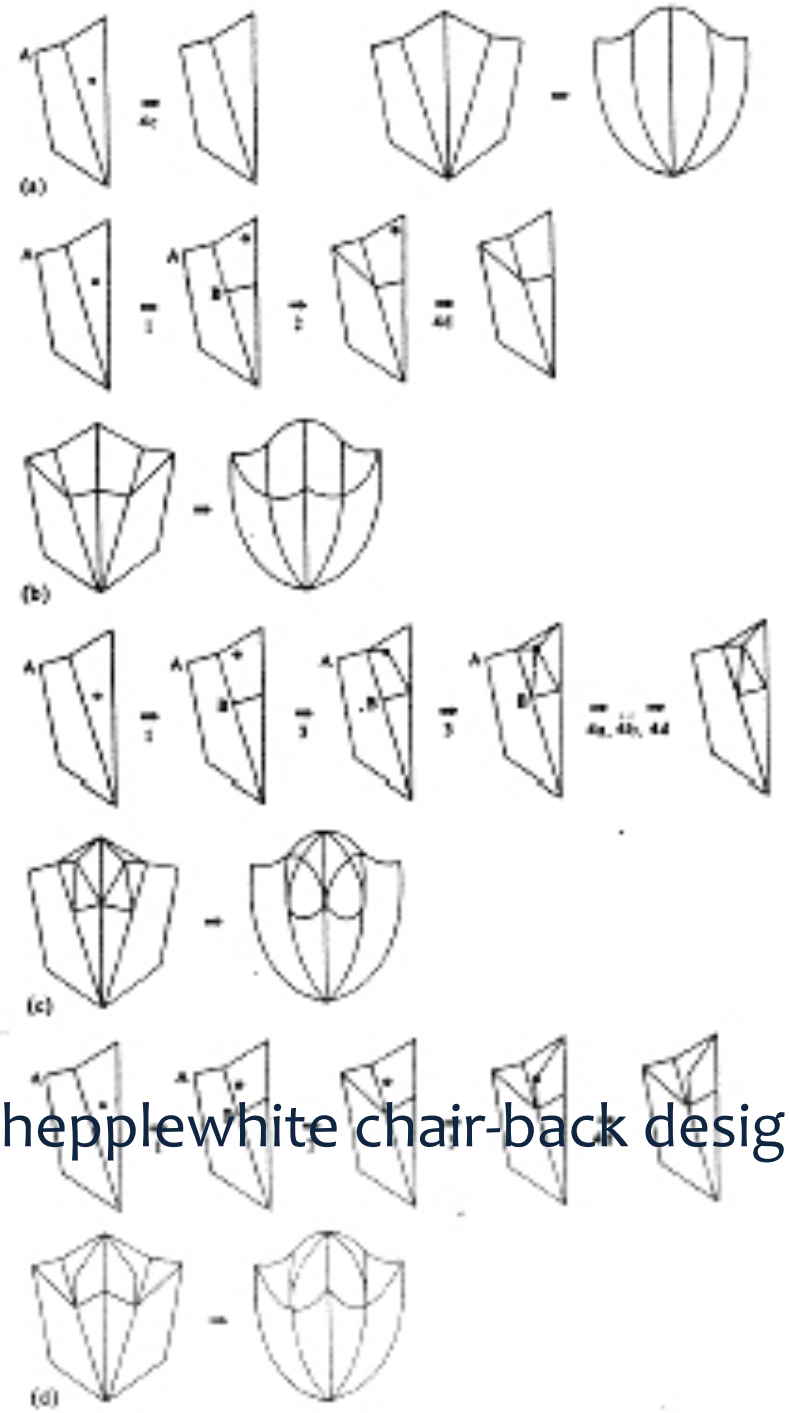
Basic shape converted into curves

Lines generated by rule 1 extended

Lines generated by rule 2 repositioned

Lines generated by rule 3 replaced by curves





hepplewhite chair-back designs

"… we designedly followed the latest or most prevailing fashion only, purposely omitting such articles, whose recommendation was mere novelty, and perhaps a violation of all established rule, the production of whim at instance of caprice, whose appetite must ever suffer disappointment if any familiar thing had been thought of; we say, having regularly avoided those fancies and steadily adhered to such articles only as are of general use and service, one principal hope for favour and encouragement will be, in having combined near three hundred different patterns for furniture in so small a space and at so small a price. In this instance we hope for reward; and though we lay no claim to extraordinary merit in our designs, we flatter ourselves they will be found serviceable to young workmen in general, and occasionally to more experienced ones."

Hepplewhite, *The Cabinet-Maker and Upholsterer's Guide*