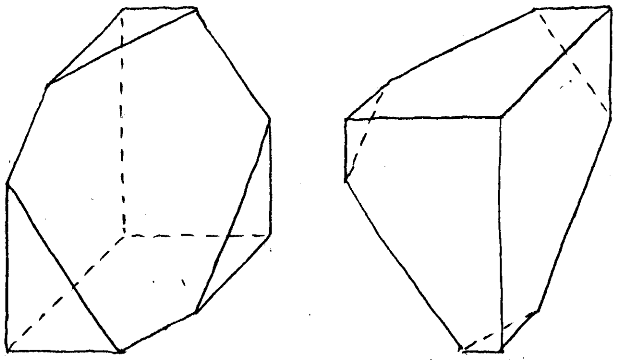
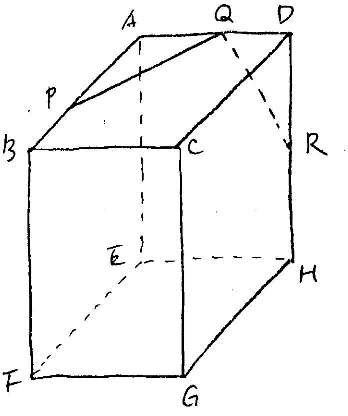
直方体を平面で切って得られる立体図形の展開図

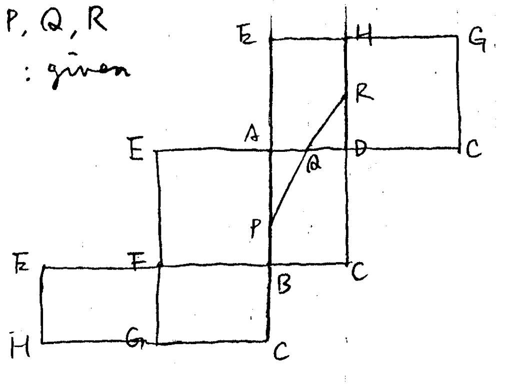
—— 定木とコンパスを使って作図する方法 ——



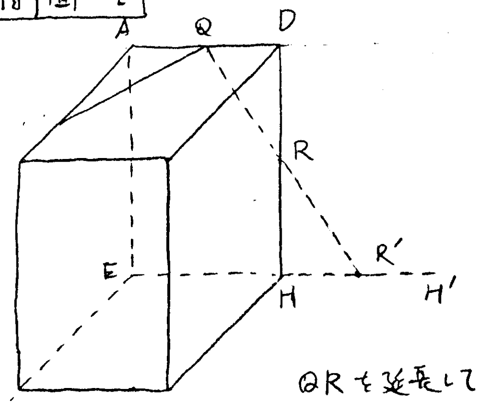
A

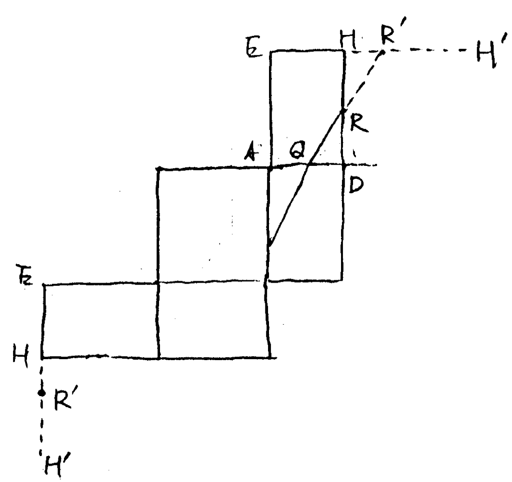


P, Q, R
: given



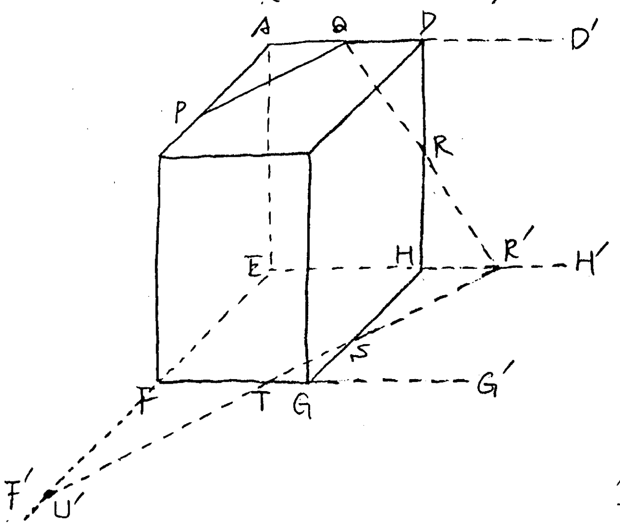
A側面-1

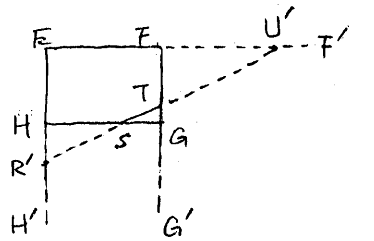




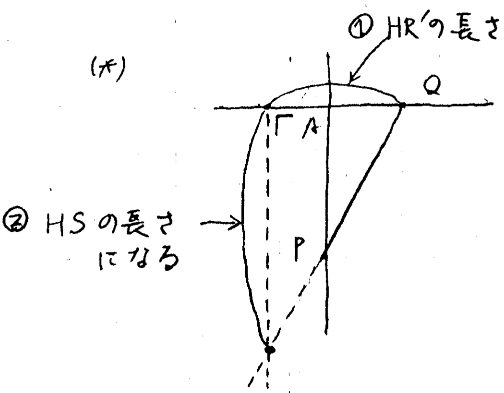
QRを延長して,
R'をとる.

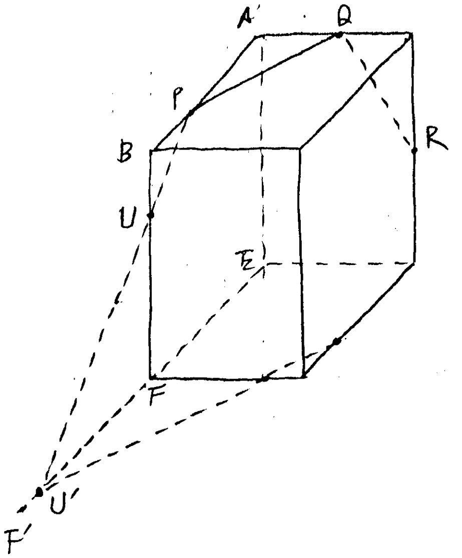
QP // R'S となる S をとる（△AQP∽△HR'S となる GH上の点 S）(*). 直線 R'S と直線 FG [EF] との交点を T [U'] とする.



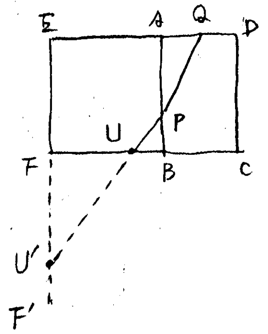


(オ)

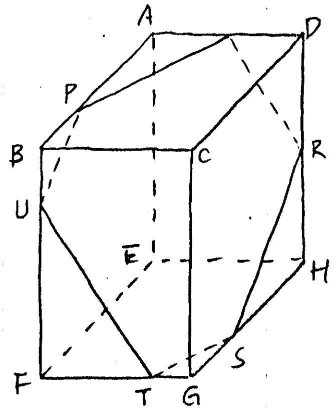


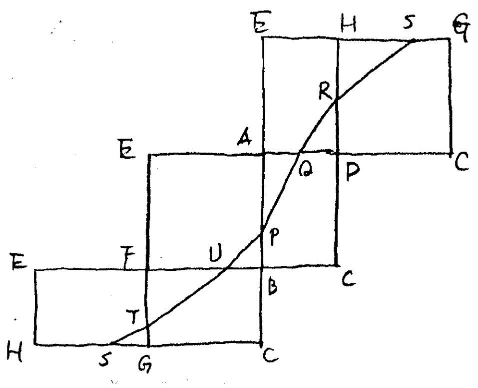


PU'とBFとの交点をUとする。

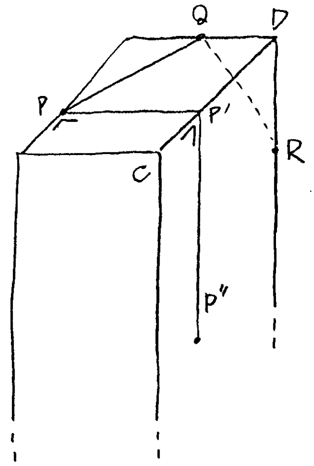


RとS, TとUを結ぶ。

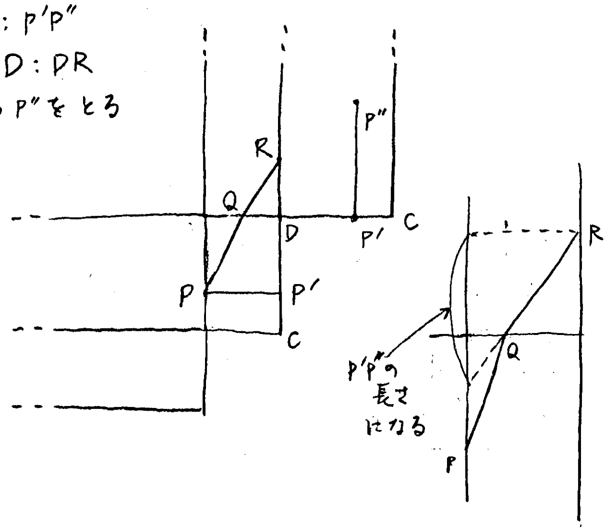


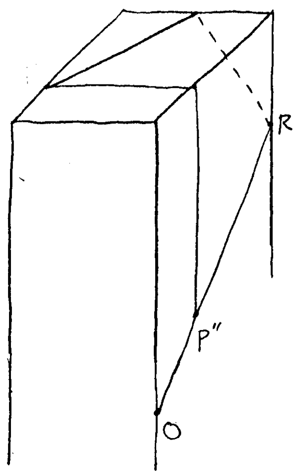


A側面-2

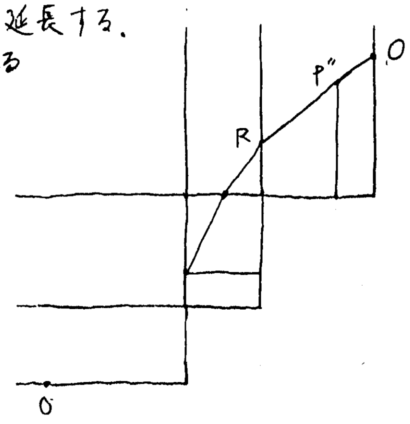


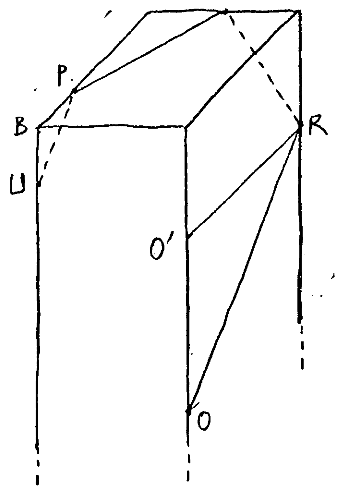
$PP' : P'P''$
$= QD : DR$
となる P'' をとる



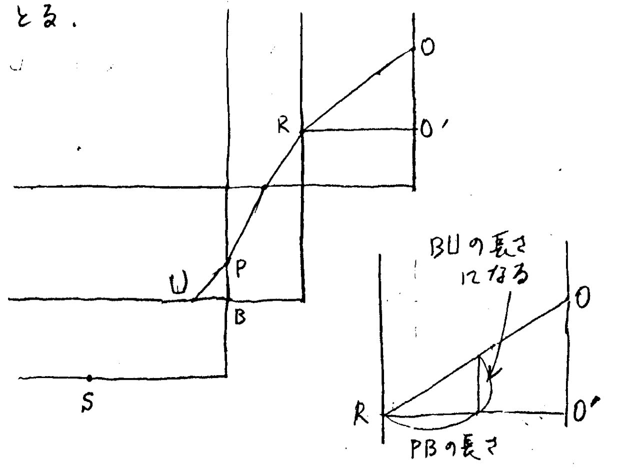


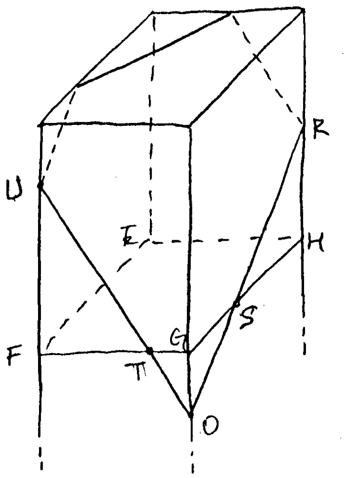
RP'' を延長する。
Oをとる



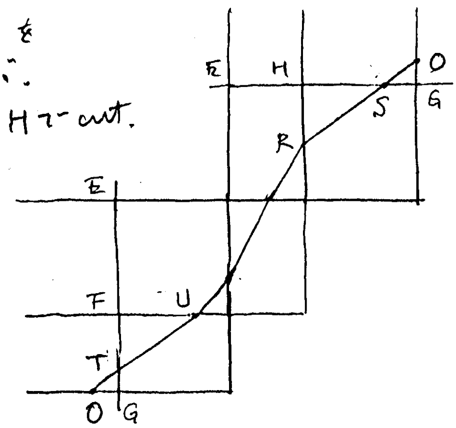


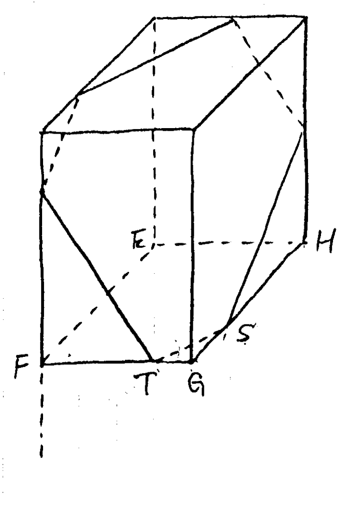
PU // RO となる
Uをとる.



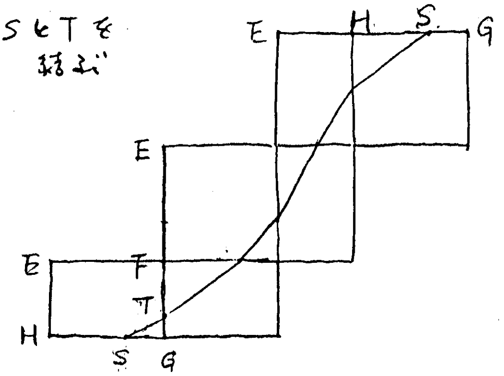


UとOを
結ぶ。
EFGHでcut.

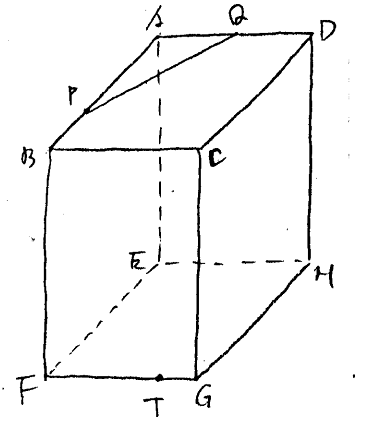




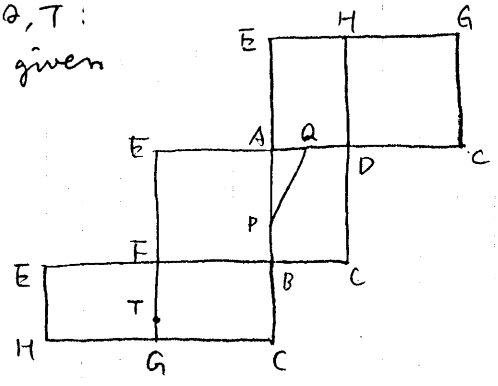
SとTを
結ぶ



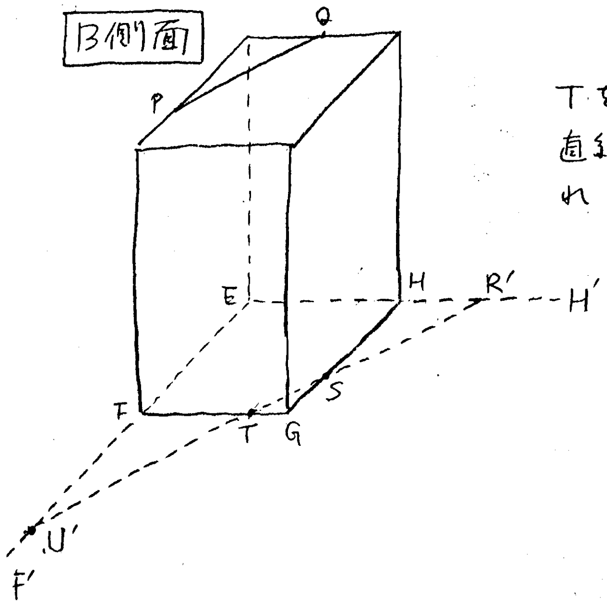
B



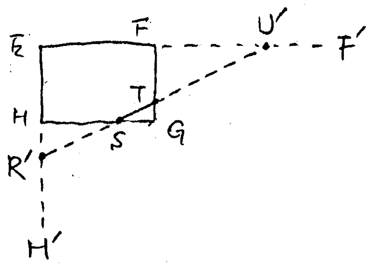
P, Q, T :
: given



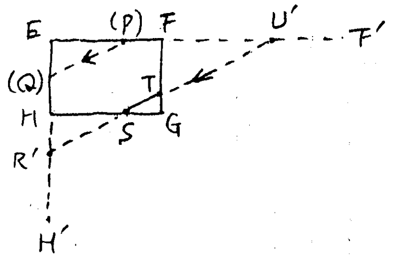
B側面

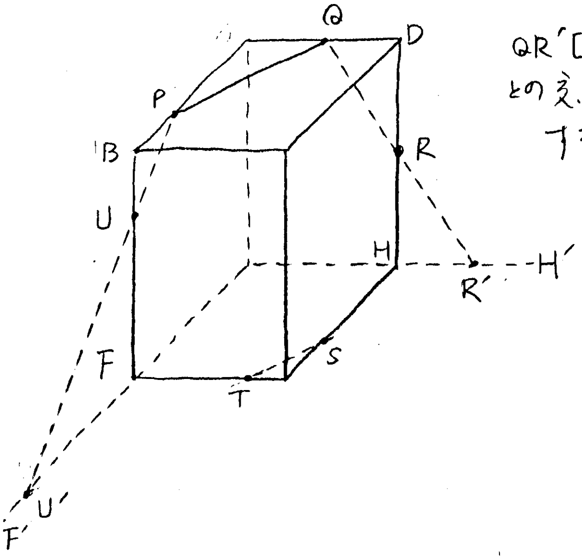


Tを通ってPQに平行な直線をひき、直線EH′, GH, EF′との交点をそれぞれR′, S, U′とする。

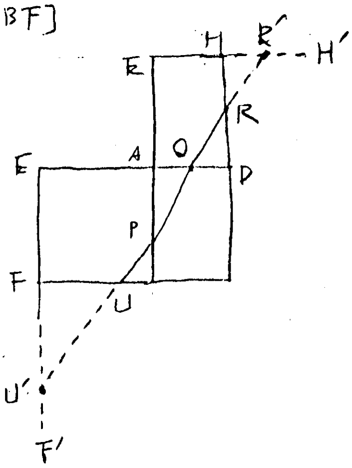


(*)

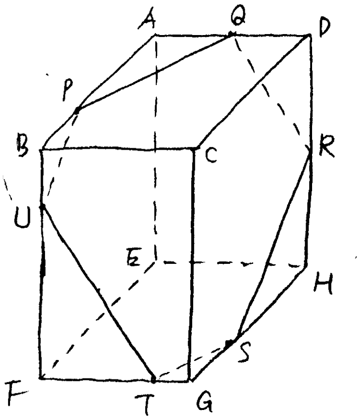


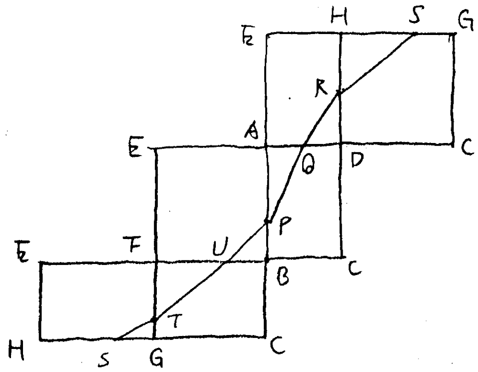


QR′[PU′]とDH[BF]
との交点をR[U]と
する

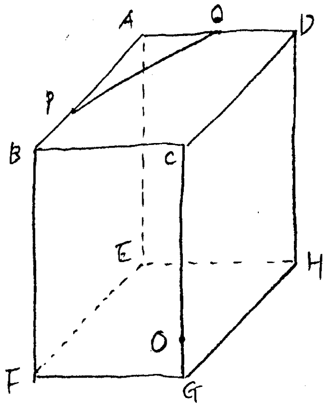


RとS、TとUを
結ぶ



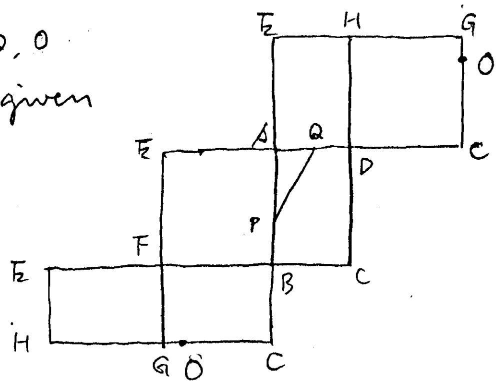


B′

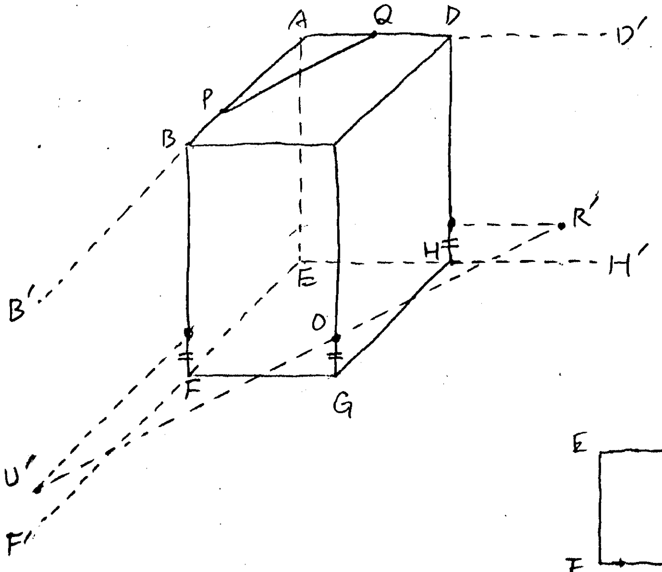


P, Q, O

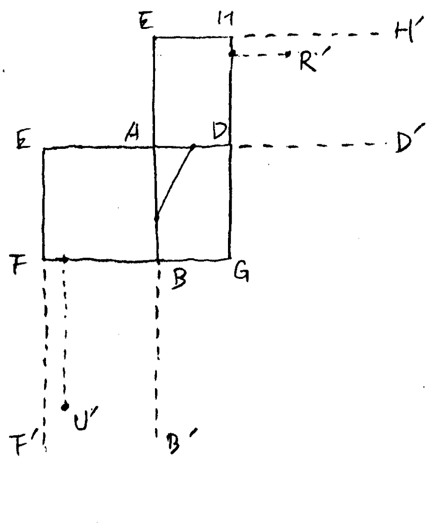
: given



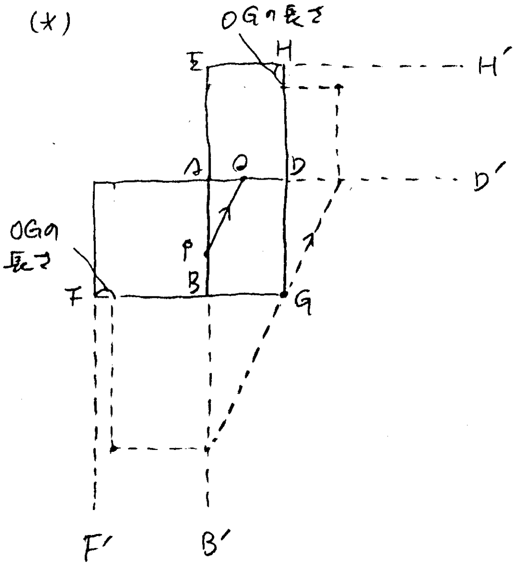
B′側面

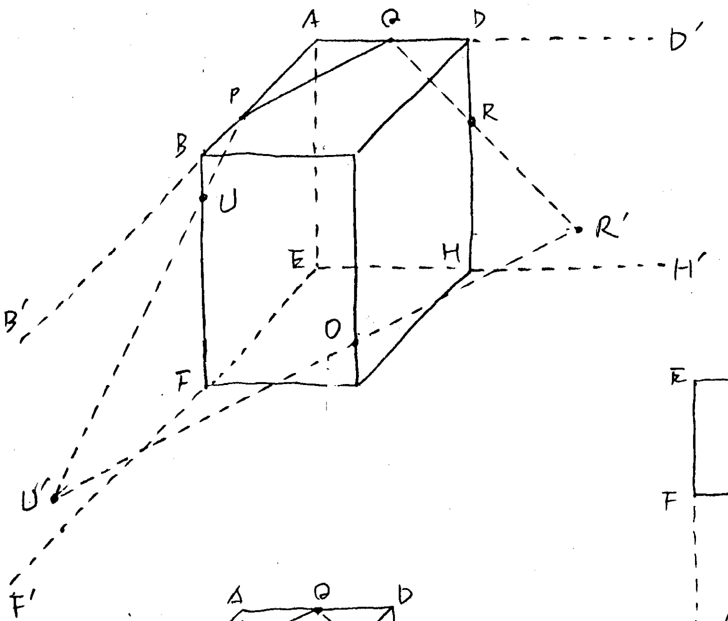


Oを通ってPQに平行な直線をひき，平面AEHD [ABFE] との交点をR′ [U′] とする。(*)

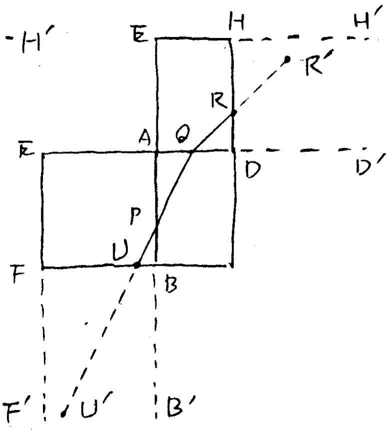


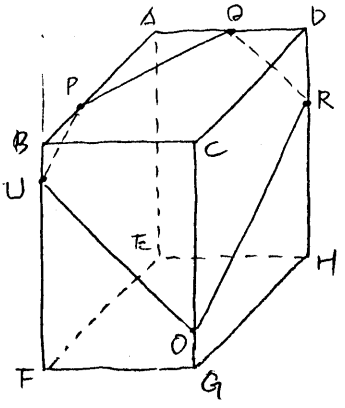
(*)



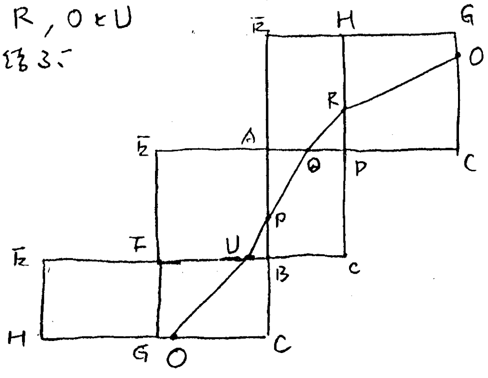


QR′[PU′]と DH [BF]との交点を R[U]とする

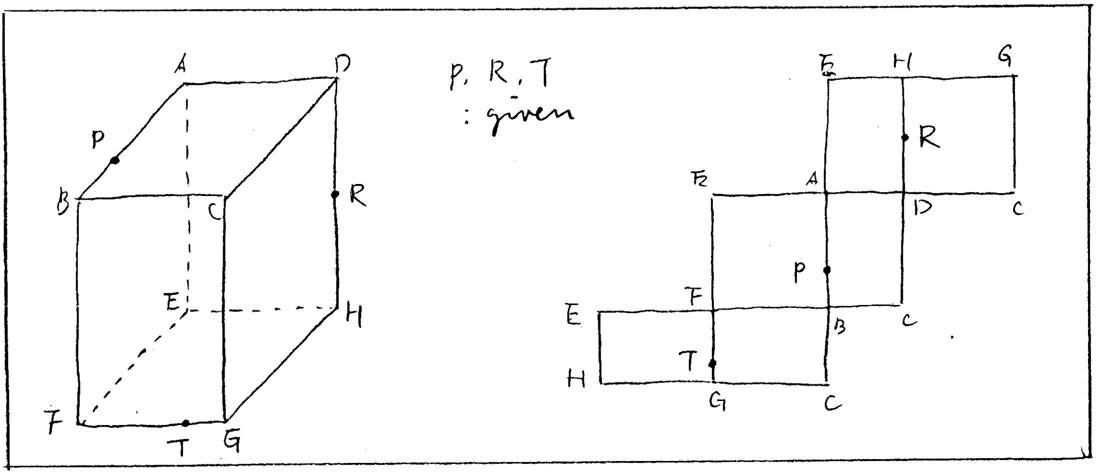




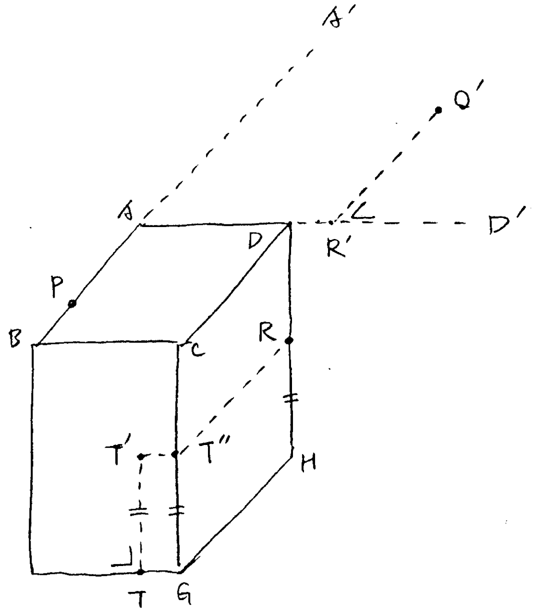
OとR，OとU を結ぶ



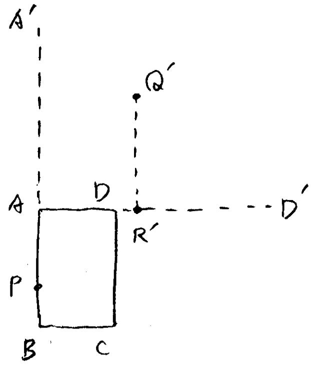
$\boxed{C}$



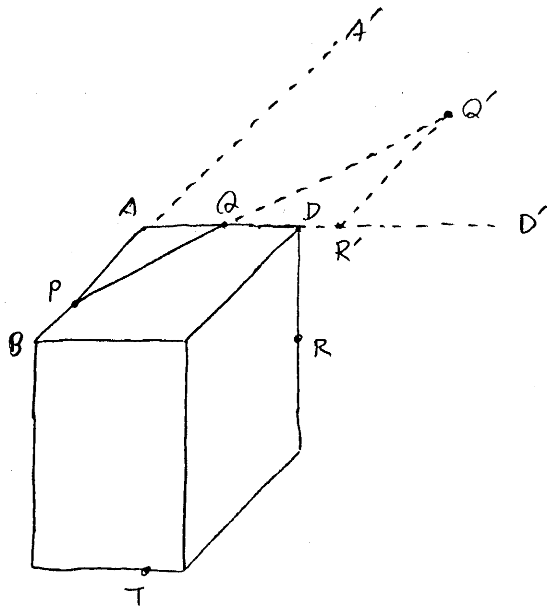
$\boxed{\text{C側面}}$



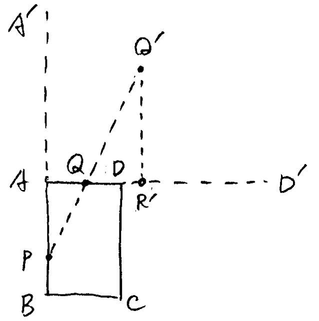
$TT' : T'T'' : T''R$
$= RD : DR' : R'Q'$
なる直線AD上の点R'と
平面ABCD上の点Q'を、
左図のようにとる。(*)



(*) DR'の長さ、R'Q'の長さは、
作図で求める。

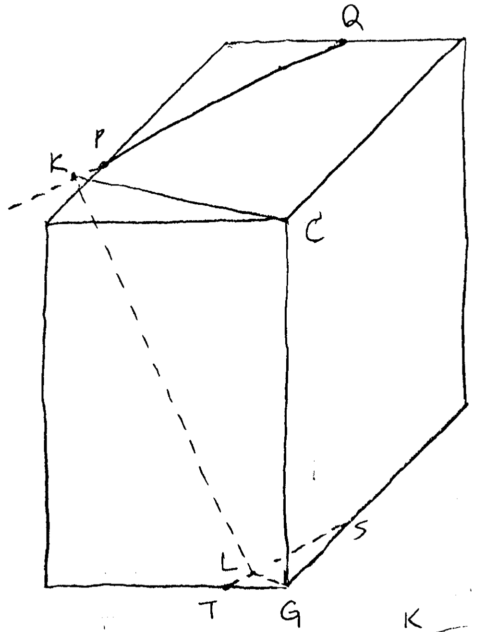


PQ′とADとの交点
をQとする.

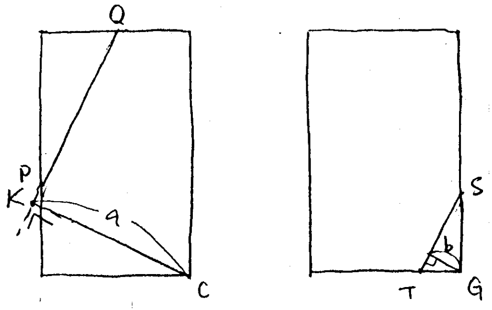


以下の作図は，$\boxed{A}$（あるいは$\boxed{B}$）に同じ.

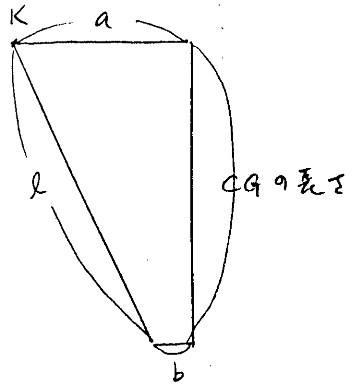
A断面-1, B断面, C断面



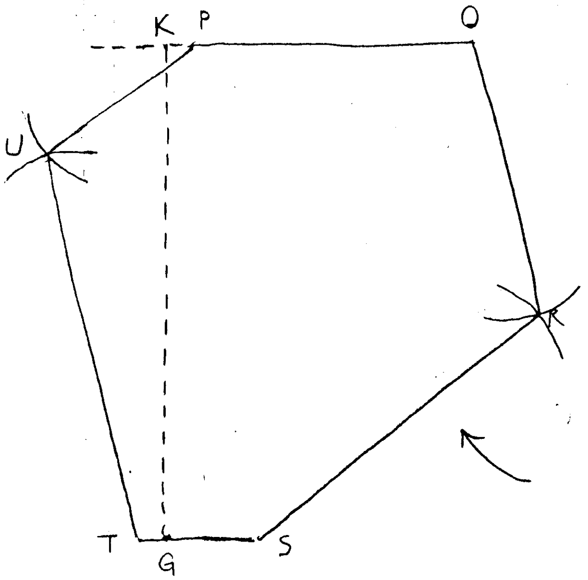
① 直線PQ [ST] に C [G] からおろした垂線の足を K [L] とする.

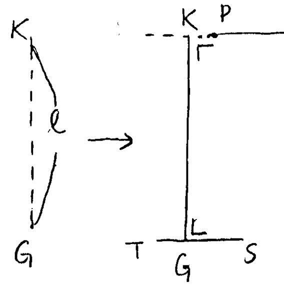


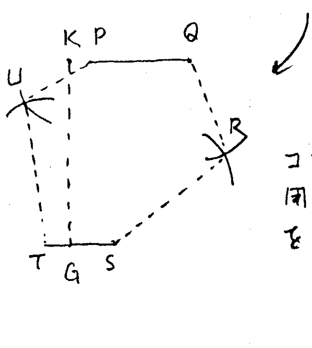
② KLの長さ l を作図で求める.



③ R, U を決める:

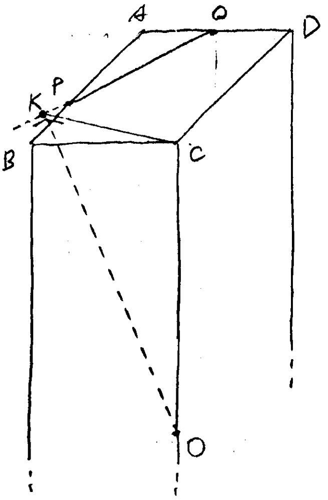


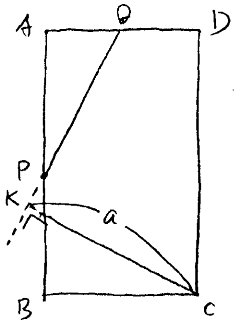


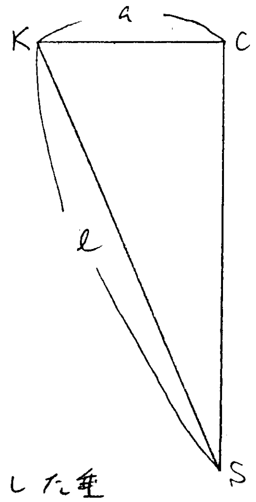


コンパスを用いて, R, U を求める

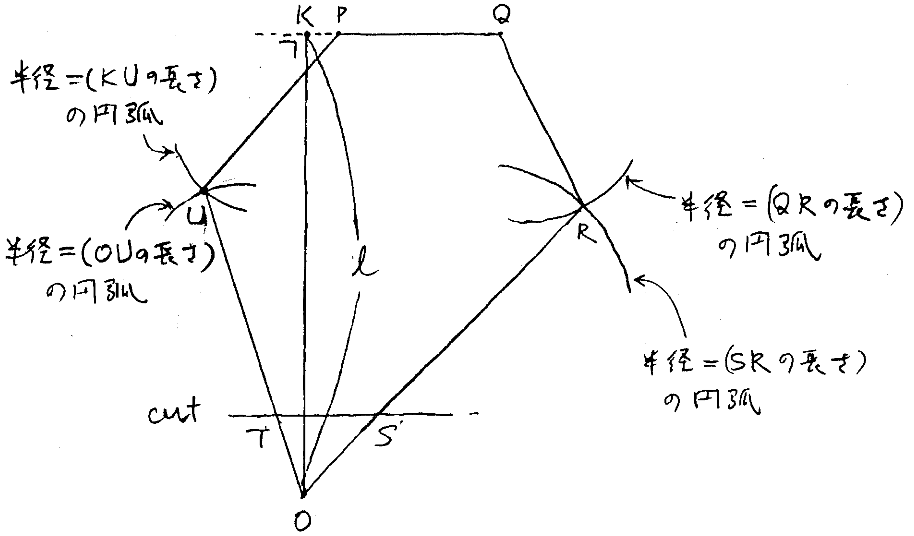
A断面-2, B断面





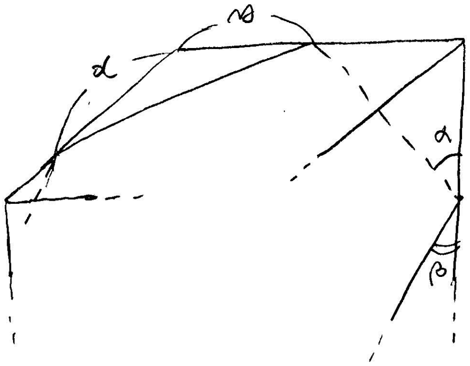


直線PQにCからおろした垂線の足をKとして、KSの長さlを作図で求める.



R, Uを上のように求める.

A断面-2の場合は, さらにS, Tを求めて（R[U]からRS[UT]の長さ分だけはなれている点がS[T]), 線分STでcut.



このとき、 $\dfrac{x}{y} = \dfrac{\tan\beta}{\tan\alpha}$ (exercise!).

よって $x > y \Leftrightarrow \alpha < \beta$,

特に $x = y \Leftrightarrow \alpha = \beta$.