The intersection is

$$\int^n (n+1)\,\mathbf{x} + \mathbf{y} + \mathbf{z},$$

representing two rows of points parallel to X.

EXAMPLE 2.—Find the intersection of the plane $\int\int (a\mathbf{x} + b\mathbf{y})$ with the solid cylinder

$$\int_0^1\int_0^c\int_0^m \left\{\overline{\mathbf{x}\mathbf{y}}^n\,\mathbf{C} + m\,(\mathbf{x}+\mathbf{u})\right\} = \int\int\int\big[c_x\mathbf{x} + c_y\mathbf{y} + (c_z \cos\theta - c_u \sin\theta)\mathbf{z} + (c_u \cos\theta + c_z \sin\theta)\,\mathbf{u}\big].$$

Equating coefficients of $\mathbf{x}$, $\mathbf{y}$,

$$a = c_x + m$$
$$b = c_y,$$

and the plane locus becomes the rectangle

$$\int_0^c\int_0^m \left\{(c_x + m)\,\mathbf{x} + c_y\mathbf{y}\right\}.$$

46. PROJECTIONS. To express any vector **K** in terms of any four vectors **A**, **B**, **C**, **D**, not in one 3-flat, write

$$l\mathbf{A} + m\mathbf{B} + n\mathbf{C} + r\mathbf{D} = \mathbf{K}.$$

Then

$$la_x + mb_x + nc_x + rd_x = k_x$$
$$la_y + mb_y + nc_y + rd_y = k_y$$
$$la_z + mb_z + nc_z + rd_z = k_z$$
$$la_u + mb_u + nc_u + rd_u = k_u$$

$$\therefore\quad l = \frac{|\,k_x\; b_y\; c_z\; d_u\,|}{|\,a_x\; b_y\; c_z\; d_u\,|},\qquad m = \frac{|\,a_x\; k_y\; c_z\; d_u\,|}{|\,a_x\; b_y\; c_z\; d_u\,|},$$

$$n = \frac{|\,a_x\; b_y\; k_z\; d_u\,|}{|\,a_x\; b_y\; c_z\; d_u\,|},\qquad r = \frac{|\,a_x\; b_y\; c_z\; k_u\,|}{|\,a_x\; b_y\; c_z\; d_u\,|}.$$

Writing either l, m, n or r equal to zero the remaining terms of **K** are the projection of **K** made parallel to the vanishing vector and upon the 3-flat of the remaining vectors. To project **K** normally upon the 3-flat of **A**, **B**, **C**, write $\mathbf{D} = \mathbf{W}_{abc}$, then make $r = 0$.

The sum of any two terms of **K** is the projection of **K** upon their plane, made parallel to the plane of the other two vectors.

Loci are projected in the same way.