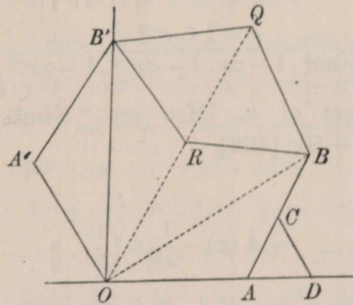


695.

A LINK-WORK FOR x^2 : EXTRACT FROM A LETTER TO
MR. SYLVESTER.

[From the *American Journal of Mathematics*, t. I. (1878), p. 386.]

I SUPPOSE the following is substantially your link-work for x^2 . I use a slot to make D move in the line OA ; but this could be replaced by proper link-work. Supposing O and A fixed; the line OB is movable, and I wanted to have the



distance OB measured in a fixed direction. This can be done by a hexagon $OABQB'A'$ with equal sides, and two other equal links $B'R$, BR : then of course, if O , R , Q are in line, the hexagon will be symmetrical as to OQ , and OB' will be equal to OB , and B' may be made to move in the fixed line OB' . If

$$BOA = \frac{1}{2}\theta, \quad OA = AB = a, \quad AC = CD = \frac{1}{2}a,$$

then

$$OB = 2a \cos \frac{1}{2}\theta, \quad OD = a(1 + \cos \theta) = 2a \cos^2 \frac{1}{2}\theta,$$

or

$$2a \cdot OD = (OB)^2.$$

November 30, 1877.