Let $CVC'$ be the intrados of any arch, whether semi-circular, elliptical, Gothic, or composite. Let $D$ be the crown of the extrados, or back of the arch, which is supposed to be filled up level with the haunches at $m$ and $m'$. If a weight be placed upon the crown too great for it to bear, it yields, and the arch-stones open beneath, at the crown, while the extrados is found to open at some point on each side; either at the spring, if it be a flat arc of a circle, or about 80 degrees of a semicircle, or at various other points if it be composed of arcs of circles, tangent to each other, and of various rises, whether $\frac{1}{4}$, or $\frac{1}{3}$ or $\frac{1}{2}$ of the span, and the arch only falls by pushing aside the abutments at $C$ and $C'$, the opening at $R$ extending itself up to the top at $m$ and $m'$. The parts of the arch comprehended between the joints of rupture are called acting, and the rest resisting. It has, moreover, been observed that when the abutment gives way, it leaves a portion of itself standing, viz., $XK$s; the line $XK$ being at an angle of 45° with the horizon, which only adheres by the strength of the mortar or cement made use of.

These facts being stated as above, we may now consider the manner in which the upper part acts to overturn the abutments, and how they resist that action.

Let the weight of the portion $CRmP$, on one side of the crown, be represented by $w$, this weight may be conceived as supported by two points $C$ and $D$ and pressing upon them in-