satisfactorily what condition gives the curve of greatest distortion and the greatest departure from the normal; and the amount of action under that condition, can be readily calculated with sufficient nearness, whence the proper width of web may be deduced.

LXXIV. The points of the equilibrated curve may be located by calculation, and perhaps with as much ease, and greater accuracy than by construction.

Suppose Fig. 22 to have a vertical depth, $Cf$, equal to one of ten equal sections of the chord $ak$. Having found the length of $fu$, in the manner already explained [LXXI], it is known that for a uniform load at each angle, the vertical reaches of the several segments, beginning at the centre, are as the odd numbers, 1, 3, 5, 7 and 9; and, if we conceive $Cf$ to be divided into 25 equal parts (25 being the sum of these numbers), each of these parts will be equal to $0.04 Cf$, or $0.4v$; and this factor, multiplied by the numbers 1, 3, 5, &c., give the vertical reaches of the respective straight segments, which vertical reaches being subtracted successively from $v$, and successive remainders, show the several verticals to be as follows: At the centre, $f$, vertical $= Cf = v$. At $e$, vertical $= v - 0.04v = .96v$. At $d$, vertical $= (0.96 - 0.12)v = .84v$; at $c$, vertical $= (0.84 - 0.2)v = .64v$, and at $b$, vertical $= (0.64 - 0.28)v = .36v$. This establishes the normal curve for uniform load.

Now, supposing the weight of structure to be equal to $1w$ at each of the angles of the arch, and also, that a movable load of a like weight, $w$, be acting at each of the five points $f, g, h, i, j$; the permanent weight of structure gives a bearing of $4.5w$ at $a$, and the movable weights at $f, g, h, &c.$, give respectively $0.5w, 0.4w, 0.3w$. 