generally, they may be determined with sufficient accuracy by geometrical construction, and are found to be $3w\frac{ao}{bo}=$ $6.53w$, and $3w\frac{ab}{bo}=5.83w$. Hence, making $ab=1$ we have $\frac{3w}{bo}=5.83w$ and $\frac{3}{bo}=5.83$. Then substituting this value of $\frac{3}{bo}$ in the expression $3w\frac{ao}{bo}$, we have the thrust of $ao=$ $5.83ao.w$.

The number 5.83 is peculiar to this particular proportion of truss, *i.e*, having 6 principal bearing points, and $md=$ $\frac{1}{7}ah$.

Now, it is manifest that *ah* throughout sustains the same tension as the part *ab*.

Then, drawing *np* parallel with *ao*, the three forces acting at *o*, will be as *ao* (=*pn*,) : *on* : *op*. But the thrust of $ao=3w\frac{ao}{bo}$. Therefore the thrust of $on=3w\frac{on}{ob}=\frac{3}{ob}$ $on.w=$ $5.83onw$.

In like manner we find the thrust of $nm=583nm.w$, and the thrust of $ml= 5.83w$.

Now we find by analysis that these quantities represent the maximum stress upon all the parts of this arch *a.o.h*, and the chord *ah*, in any of the conditions of the load supposed in relation to truss 7, and multiplying the length of each part by its maximum stress, the chord *a.h*, gives a product $7\times 5.83w=40{,}81w$.

For the arch we have $5.83w\times(ao^2+on^2+nm^2)2+5.83w$. But $ao=1.12$ (as determined by geometrical construction,) $on=1.05$ and $nm=1.01$, and substituting these values in the above expression, we have $5.83w\ (1.25+1.10+1.02)2$ $+5.83w,=45.13w=$the sum of the products of the lengths of the different portions of the arch, multiplied by the maximum thrust exerted by each respectively.

XIV. In order to ascertain the maximum stress upon the diagonals and verticals, (the former acting by tension