IX. AREAS OF SURFACES.

Let $A=$ area, $s=$ side, $d=$ diagonal, then

Square.—$A=s^2$ (71); $s=\sqrt{A}$ (72); $A=\frac{d^2}{2}$ (73); $d=\sqrt{2A}$ (74).

Rectangle.—Let $b=$ base, and $p=$ perpendicular, $A=bp$ (75); $b=\frac{A}{p}$ (76); $p=\frac{A}{b}$ (77); also $A=b\sqrt{(d+b)(d-b)}$ (78). *Parallelogram.*—$A=bp$ (79).

Triangle.—$A=\frac{bp}{2}$ (80); $b=\frac{2A}{p}$ (81); $p=\frac{2A}{p}$ (82).

Let $a, b, c,$ be the three sides of any triangle and let $s=\frac{a+b+c}{2}$, $A=\sqrt{s(s-a)(s-b)(s-c)}$ (83); when the triangle is equalateral $A=\frac{b^2\sqrt{3}}{4}$ (84).

Quadrulateral in a circle or whose *opposite* angles $=$ two right angles.—$A=\sqrt{(s-a)(s-b)(s-c)(s-d)}$ (85), where $s=$ half the sum of the four sides.

Regular Polygon.—Let $s=$ side, $n=$ number of sides, $p=$ apothem or perpendicular from the centre. $A=\frac{nsp}{2}$ (86).

Circle.—Let $c=$ circumferance, $r=$ radius, $d=$ diameter, $\pi=3{\cdot}1416$. $c=2r\pi$ (87); $r=\frac{c}{2\pi}$ (88); $A=\pi r^2$ (89); $A=\frac{cr}{2}$ (90); $A=mc^2$ (91); where $m=\cdot0796$.

Sector.—$A=\frac{rl}{2}$ (92); where $l=$ length of circular arc $A=\frac{\pi nr^2}{360^\circ}$ (93); where $n=$ number of degrees in the arc.

Circular Annulus.—$A=m(c+c')(c-c')$ (94); where c' $=$ circumference of inner circle; and $A=\frac{\pi(d+d')(d-d')}{4}$ (65); where $d'=$ the diameter of the inner circle.