which have been developed mainly under the form of substitution groups.

It may be well to add that the symbol $sts^{-1}t^{-1}$ has been used in substitution groups for a long time, but its use has been very limited. As far as we know its practical application to determine important properties of a group was first explained in the recent article in the *Quarterly Journal* to which we referred above.

GÖTTINGEN,
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NUMERICALLY REGULAR RETICULATIONS UPON SURFACES OF DEFICIENCY HIGHER THAN 1.

BY PROFESSOR HENRY S. WHITE.

By the term *reticulation* I shall designate for present purposes any system of lines lying upon a closed surface, together with all the points in which these lines intersect one another. Further I shall assume that they divide the surface into portions, of which each by itself is simply connected, *i. e.*, has deficiency zero. These portions of the closed surface may be termed *faces*, and their intersection points *vertices*, while each boundary line terminated by two consecutive vertices is an *edge*. If F, V and E denote the numbers of faces, vertices and edges, respectively, in a reticulation, and p the deficiency of the supporting surface, then Euler's relation for convex polyedra, generalized, will be
$$E = V + F + 2p - 2.$$

A reticulation is clearly entitled to be called *numerically regular* when it has:

1. In every vertex a constant number of termini of edges; call this number $\rho + 2 = r$.

2. In every circuit bounding a face a constant number of edges, call this number $\sigma + 2 = s$.

We may for the present regard these two numbers ρ and σ alone as characteristics of a regular reticulation; there will remain for subsequent inquiry the determination of the number of essentially different types having any given set of characteristics ρ, σ, and p. From these three the values of F, V, and E can be computed, as will be seen below. Counting then as one class all regular reticulations characterized by the same values of ρ and σ, it can be shown that *on a surface of given deficiency p, there can exist only a finite number of classes of numerically regular reticulations.*