

ticulation is special. Thus for  $F = 1$  or  $2$  it can never happen that there shall be a positive  $K$  without a negative one.

Similarly, if  $F = 3$  there is no special reticulation for  $p = 3s + 1$  while for  $p = 3s$  or  $3s - 1$  there is always one with a negative  $K$ .

When  $F = 4$  we can have  $K_1 = -p - 3$  belonging to a special reticulation when  $p$  is even, while for  $p$  odd there is no special reticulation.

When  $F = 5$  we finally get exceptional reticulations provided  $p = 5s - 1$  or  $5s + 2$  and the  $s$  is rightly chosen. The simplest is that in Professor White's table,  $5_{14}$ ,  $14_5$ .

Again, when  $F = 6$  there are sometimes exceptional reticulations for  $p = 6s + 3$ . The simplest is again one given in Professor White's tables  $6_{11}$ ,  $11_6$ .

Other special reticulations occur for  $F = 7$ . The simplest is  $7_{10}$ ,  $10_7$  for  $p = 10$ .

In all attempts to realize these exceptional reticulations by construction I have failed. Nor do I see any way of proving that they cannot be constructed. This last once done would show Professor White's method to be exhaustive.

LINCOLN NEB.,  
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## LIMITATIONS OF GREEK ARITHMETIC.

BY MR. H. E. HAWKES.

(Read before the American Mathematical Society at the Meeting of April 30, 1898.)

I PROPOSE to discuss in the present paper the number system of the Greeks, and to show how their arithmetical notions were limited by their geometrical symbolism. My argument is based chiefly on Euclid's Elements. This is not a serious limitation, for, firstly, the Elements give us practically all that Greek mathematicians knew on the subject, prior to 300 B. C., and, secondly, little was accomplished in this direction during the following three or four centuries. We may, therefore, consider Euclid's theory of number as representative.

I shall first attempt to show that Euclid naturally ex-