sequences remove the first $r-1$ of the $e_1$'s occurring in the left-hand end position and place this truncated sequence on the same horizontal line with the other and to its right. The resulting sequence of the $e$'s obviously contains each of the $n^r$ permutations exactly twice.

The case of an arbitrary $k$ is then readily disposed of by successive applications of this process.

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# CRITERIA FOR THE IRREDUCIBILITY OF POLYNOMIALS*

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1. *Introduction.* If a polynomial with integral coefficients is reducible in the field of rational numbers, the task of decomposing it into the product of irreducible polynomials may be expected to involve a great deal of numerical work, commensurate with the degree and coefficients of the polynomial, such as is required by Kronecker's method. But when it is merely required to know whether or not the polynomial is reducible, the amount of labor required by Kronecker's method is altogether too great. As a polynomial is completely determined by a sufficiently extended table of values, these values should suffice to determine the reducibility or irreducibility of the polynomial. We can hardly expect to establish the *reducibility* of a polynomial of degree $n$, with fewer than $n+1$ entries in its table of values. For this reason criteria establishing the reducibility of a polynomial are unknown. No such criteria are established in the present paper. On the other hand, *one* entry in the table of values of a polynomial may be sufficient to establish its *irreducibility*. The present paper is concerned with criteria of this sort.

One such criterion is available:† if for a sufficiently large integer $h, f(h)$ is a prime, where $f(x)$ is a polynomial with inte-

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† See P. Stäckel, Journal für Mathematik, vol. 148 (1918), p. 109; Pólya and Szegö, *Aufgaben und Lehrsätze*, vol. 2, p. 137, Ex. 127.