

# NATIONAL BUREAU OF STANDARDS REPORT

NBS PROJECT

NBS REPORT

1103-40-5118

1 January 1956

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Progress Report for October--December 1956

on

Research in Applications of Mathematical Statistics to  
Problems of the Chemical Corps

(NBS Project 1103-40-5118)



U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS

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Progress Report for ~~July-September~~ 1955

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Research in Applications of Mathematical Statistics to  
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This report contains a summary of the work done during the quarter. Results of this work are briefly stated. Technical reports written in connection with this project are mentioned but are transmitted separately.

I. Fractional Replication Designs

The catalogue of fractional replicated designs of the  $2^n$  series has been extended to  $n = 13, 14, 15, 16$  factors, and to fractional replicates of  $1/64, 1/128, 1/256$  of a full factorial. These results are being combined with those of NBS Report 3481 for publication in the NBS Applied Mathematics Series. These latest results are contained in NBS Report 4412 "Fractional Factorial Designs for the  $1/2^s \times 2^n$  series for  $n = 12(1)16$  and  $s = 6, 7, 8$ " by R.C. Burton, F. L. Miller, and H.M. Pettigrew dated 17 July 1955.

II. Combining Statistical Tests of Significance

A manuscript on "Exact Tests of Significance for Combining Intra- and Inter-block Information" has been written for submission to a technical journal. The SEAC code for computing





the power of these tests is completed and computation of the power points is underway.

### III. Computation Methods for the Analysis of Variance.

A<sup>1</sup>  
A first draft of a manuscript on "Some Examples of the Use of High Speed Computers in Statistics" by J.M. Cameron has been prepared for inclusion in the proceedings of the "Conference on the design of experiments in Army Research Development and Testing", *is now in the hands of the NBS Editorial Committee*

### IV. Bio-Assay Tables

A code for computing  $U(\alpha, \beta, h)$  has been written for SEAC and the code checked. A note describing the features of the code has been written and will be submitted during January.

### IV V. Programming the Calculation of Probabilities Associated with Observed Values of Common Statistical Tests

The usual formulas for computing  $p\{T > T_o\}$ , where  $T_o$  is an observed value of some statistic such as  $t$ ,  $F$ ,  $\chi^2$ , etc., are not in the best form for computation. Some work has been done on seeking an alternate formula for the mechanization of such computations. A note giving a number of alternate formulas has been prepared and will be submitted in January.

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It is a very common mistake to suppose that the  
only way to get a good result is to work hard.

### THE SECRET OF SUCCESS

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hard work, perseverance, and a good plan. It is not  
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