

**NEW TABLES FOR THE COMPLETE  
SOLUTION OF GANUILLET AND  
KUTTER'S FORMULA: FOR THE FLOW OF  
LIQUID IN OPEN CHANNELS, PIPES,  
SEWERS AND CONDUITS, IN TWO PARTS**

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New Tables for the Complete Solution of Ganguillet and Kutter's Formula: For the Flow of Liquid in Open Channels, Pipes, Sewers and Conduits, in Two Parts by E. C. S. Moore

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**E. C. S. MOORE**

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NEW TABLES  
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FOR THE  
FLOW OF LIQUID IN OPEN CHANNELS,  
PIPES, SEWERS AND CONDUITS.

IN TWO PARTS.

PART I.

ARRANGED FOR 1,080 INCLINATIONS FROM 1 OVER 1, TO  
1 OVER 21,120 FOR 15 DIFFERENT VALUES OF  $(n)$ .

PART II.

FOR USE WITH ALL OTHER VALUES OF  $(n)$ .

BY

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AUTHOR OF "SANITARY ENGINEERING," ETC.



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1901.

2012

## PREFACE.

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GANGUILLET AND KUTTER'S formula for calculating the "Flow of Liquid in Open Channels, Pipes, Sewers, and Conduits," is universally admitted by all hydraulic engineers of experience to be pre-eminently the most accurate and reliable for the purpose that has yet been elaborated. The recognition of this fact has created a demand for simple means for its solution, and one of such a nature as to afford precisely the same results as the original formula in its integrity, so as to reduce as far as possible the tax upon the time and labour of the busy professional man.

A description of the formula referred to is given in my book "Sanitary Engineering";\* also a "modified form" of the formula suggested by me.

The use of this "modified form" was found to lessen very considerably the work of the computers when preparing the tables of velocity and discharge included in that book; this suggested the desirability of compiling a complete set of tables which should practically cover all cases of roughness and inclination likely to occur in practice, and has resulted in the production of the present volume.

The tables have for convenience been divided into two parts, and include the labour-saving tables from "Sanitary Engineering," which have been made still more "labour-saving" by supplying in each case the original logarithmic values of the various quantities where at any time they might be required.

The author's "modified form" of Ganguillet and Kutter's formula is "abbreviated" for use with the tables to

$$v = \frac{NR}{\sqrt{R + D}}$$

where ( $v$ ) and ( $R$ ) have the usual significance, and ( $N$ ) and ( $D$ ) comprehend all the other quantities which figure in the numerator and denominator respectively of the "modified form."

The tables give for each of the values of ( $n$ ) and the particular inclination chosen, the values of the ( $N$ ) in the numerator and the

\* B. T. Batsford, Publisher, London, 1898.



portion of the denominator (D). It is evident that each pair of values (N) and (D) is applicable to an infinite number of values of (R) and ( $\sqrt{R}$ ).

Part I. includes the values of (N), log. N and (D), as already described, and which form the great feature of the work, as well as all the improved labour-saving tables for use with it.

Part II. has been added for use in special cases which are not covered by the preceding. It includes all the necessary data and tables for the solution of the "modified form," the tables of values of  $\left(\frac{l}{n}\right)$  and of  $\sqrt{S}$ ,  $\log. \sqrt{S}$  and  $\left(a + \frac{m}{S}\right)$ , from "Sanitary Engineering," having been extended and improved; a diagram for the graphic solution is also included. Thus a complete solution for Ganguillet and Kutter's Formula is presented.

The tables now offered to the engineering profession thus reduce the process of calculation to the lowest possible limits, and are of very wide application. As their object is simply to save labour, it does not appear that any apology for their production is required, and it is trusted that a labour-saving work of this magnitude will meet with appreciation by all engineers who require at any time to utilize the important formula of Ganguillet and Kutter.

E. C. S. MOORE, COLONEL, R.E.

September, 1900.

## ERRATA.

A careful examination of the pages of this book after printing has led to the discovery of the following misprints:—

*Page 66 (column 3).*—The decimal points to values of  $\log. N$  for sines of inclinations 1355 to 1425 inclusive, should be shifted one place to the right, viz. after the 0, not before as at present.

*Page 166.* *Depth on invert '40*—log. R. should read " $\bar{1}8308782$ ," log. A should read " $\bar{1}4674157$ ."

*Page 168.* *Depth on invert '40*—log. R. should read " $\bar{2}7288132$ ,"  $\sqrt{R}$  should read " $\cdot 2314$ ," log. A should read " $\bar{2}2682957$ ."

*Page 169.* *Depth on invert '95*—log. R. should read " $\bar{2}8549912$ ."

*Page 170.* *Depth on invert '40*—log. R. should read " $\bar{2}8537419$ ," log. A should read " $\bar{2}5131732$ ."

*Page 172.* *Depth on invert '05*—log. R. should read " $\bar{2}1323428$ ."

*Page 174.* *Depth on invert '40*—log. A. should read " $\bar{2}8653557$ ."

*Page 178.* *Depth on invert '40*—log. A. should read " $\bar{1}1152331$ ."

*Page 180.* *Depth on invert '40*—log. A. should read " $\bar{1}2175383$ ."

*Page 182.* *Depth on invert '40*—log. A. should read " $\bar{1}3090531$ ."

*Page 185.* *Depth on invert '78*—A decimal point should be placed in front of the value of  $\sqrt{R}$ , reading " $\cdot 52708$ ."

*Page 186.* *Depth on invert '40*—log. A. should read " $\bar{1}4674157$ ."

*Page 187.* *Depth on invert '95*—R. should read " $\cdot 28516$ ."

*Page 188.* *Depth on invert '40*—log. A. should read " $\bar{1}6612357$ ."

*Page 190.* *Depth on invert '40*—log. A. should read " $\bar{1}8195993$ ."

*Page 193.*

*Depth on invert '69*—H.M.D. should read " $\cdot 51592$ ."

" " " '77—log. R. should read " $\bar{1}7245793$ ," log. A. should read " $\bar{0}2982759$ ."

" " " '78—log. R. should read " $\bar{1}7253027$ ," log. A. should read " $\bar{0}3038290$ ."

" " " '79—log. R. should read " $\bar{1}7258338$ ," A. should read " $\bar{2}038909$ ," log. A. should read " $\bar{0}3092241$ ."

" " " '80—log. R. should read " $\bar{1}7261795$ ," log. A. should read " $\bar{0}3144613$ ."

" " " '81—H.M.D. should read " $\cdot 53259$ ."

" " " '82—value of  $\sqrt{R}$  should read " $\cdot 72970$ ."

" " " '83—value of  $\sqrt{R}$  should read " $\cdot 72949$ ."

*Page 194.*

*Depth on invert '16*—H.M.D. should read " $\cdot 19710$ ."

" " " '40—log. A. should read " $\bar{0}0694757$ ."

*Page 195.*

*Depth on invert '52*—H.M.D. should read " $\cdot 51240$ ."

" " " '68—H.M.D. should read " $\cdot 58964$ ."

" " " '90—H.M.D. should read " $\cdot 59607$ ."

" " " '92—H.M.D. should read " $\cdot 52959$ ."

*Page 198.* *Depth on invert '05*— $\sqrt{R}$  should read " $\cdot 28526$ ."

*Page 202.* *Depth on invert '40*—log. A. should read " $\bar{0}4216583$ ."

E. C. S. MOORE,  
Colonel R.E. (Ret.)

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