

SCIENCE

A Weekly Journal devoted to the Advancement of Science, publishing the official notices and proceedings of the American Association for the Advancement of Science, edited by J. McKeen Cattell and published every Friday by

THE SCIENCE PRESS

11 Liberty St., Utica, N. Y. Garrison, N. Y.

New York City: Grand Central Terminal

Single Copies, 15 Cts.

Annual Subscription, \$6.00

Entered as second-class matter January 21, 1922, at the Post Office at Utica, N. Y., under the Act of March 3, 1879.

VOL. LV FEBRUARY 24, 1922 No. 1417

The American Association for the Advancement of Science:

<i>A Mechanical Analogy in the Theory of Equations:</i> PROFESSOR D. R. CURTISS.....	189
<i>William Bateson on Darwinism:</i> DR. HENRY FAIRFIELD OSBORN	194
<i>Science in the Philippines:</i> DR. J. C. WITT....	197
<i>Charles Henry Davis 2nd</i>	200
<i>Scientific Events:</i>	
<i>British Scientific Instruments; An English Journal of Scientific Instruments; Journal of the Optical Society of America and Review of Scientific Instruments; Gift of Proceeds of Research for Research; Professor J. W. Toumey and the Yale School of Forestry</i>	200
<i>Scientific Notes and News</i>	203
<i>University and Educational Notes</i>	206
<i>Discussion and Correspondence:</i>	
<i>Kilobar, Kilocal, Kilograd:</i> PROFESSOR ALEXANDER McADIE. <i>The Geology of Western Vermont:</i> DR. C. E. GORDON. <i>Acute Sense of Sound Location in Birds:</i> JOSEPH MAILLAIRD.....	207
<i>Scientific Books:</i>	
<i>Lacroix on Déodat Dolomieu:</i> DR. GEORGE F. KUNZ.....	209
<i>Special Articles:</i>	
<i>Dissociation of Hydrogen in a Tungsten Furnace and Low Voltage Arcs in the Monatomic Gas:</i> DR. O. S. DUFFENBACK. <i>A Simple Method of Dealing with Electrified Microsections:</i> DR. S. W. GEISER.....	210
<i>The American Chemical Society:</i> DR. CHARLES S. PARSONS.....	212

A MECHANICAL ANALOGY IN THE THEORY OF EQUATIONS¹

To the mathematician the solution of a problem is the more interesting if it utilizes methods and principles from fields that at first glance seem foreign to the one in which the problem lies. The question of whether a linear differential equation has algebraic solutions is sufficiently important to attract attention of itself, but its answer by reference to the properties of regular polyhedrons has become a mathematical classic. Such analogies are not, however, to be regarded as mere *tours de force* whose purpose is only to astonish, or to appeal to a certain esthetic sense; the instance just mentioned shows that the new point of view may disclose wide vistas hitherto undiscerned. If there is a choice of terms in which the analogy may be stated, the formulation which is most concrete and most striking may also be the most illuminating.

Such considerations as these, doubtless, have led to the description of what are essentially vector methods with complex variables in terms of mechanical systems. I propose here to discuss the progress that has been made by the aid of such an interpretation in studying the distribution in the complex plane of the roots of algebraic equations in one variable.

On the algebraic side the chief purpose of the investigations to be considered has been to obtain what may be called *theorems of separation, i. e.*, theorems which state whether roots of an equation do or do not lie in specified regions of the complex plane. Such theorems may also state how many roots lie in the specified regions, or may give limits, inferior or superior, for the number of roots thus situated. These regions may be defined in terms

¹ Address of the vice-president and chairman of Section A—Mathematics, American Association for the Advancement of Science, Toronto, 1921.

Science

55 (1417)

Science **55** (1417), 189-218.

ARTICLE TOOLS

<http://science.sciencemag.org/content/55/1417.citation>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 1922 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.