

**THE PRINCETON COLLOQUIUM; LECTURES ON
MATHEMATICS, DELIVERED SEPTEMBER 15 TO
17, 1909, BEFORE MEMBERS OF THE
AMERICAN MATHEMATICAL SOCIETY IN
CONNECTION WITH THE
SUMMER MEETING HELD AT PRINCETON
UNIVERSITY, PRINCETON, N. J**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649005307

The Princeton colloquium; lectures on mathematics, delivered September 15 to 17, 1909, before members of the American Mathematical Society in connection with the summer meeting held at Princeton University, Princeton, N. J by Gilbert Ames Bliss & Edward Kasner

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Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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GILBERT AMES BLISS & EDWARD KASNER

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LECTURES ON MATHEMATICS

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MEMBERS OF THE AMERICAN MATHEMATICAL
SOCIETY IN CONNECTION WITH THE SUMMER
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GILBERT AMES BLISS

AND

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NEW YORK
PUBLISHED BY THE
AMERICAN MATHEMATICAL SOCIETY
501 WEST 116TH STREET
1913

PRESS OF
THE NEW ERA PRINTING COMPANY
LANCASTER, PA

PREFACE.

Soon after its expansion in 1894 into a national organization, the American Mathematical Society inaugurated the series of Colloquia which have been held in connection with its summer meetings since 1896, at intervals of two or three years. These Colloquia consist of courses of lectures delivered by specialists on selected chapters of their fields of work. Their purpose is to enable the members of the Society to keep in touch with the most recent advances of mathematical science and to stimulate a wide interest in its development.

The list of Colloquia thus far held is as follows:

I. THE BUFFALO COLLOQUIUM, 1896.

- (a) Professor MAXIME BÔCHER, of Harvard University: "Linear Differential Equations, and Their Applications."

This Colloquium has not been published, but several papers appeared at about the time of the Colloquium, in which the author dealt with topics treated in the lectures.*

- (b) Professor JAMES PIERPONT, of Yale University: "Galois's Theory of Equations."

Published in the *Annals of Mathematics*, series 2, volumes 1 and 2 (1900).

II. THE CAMBRIDGE COLLOQUIUM, 1898.

- (a) Professor WILLIAM F. OSGOOD, of Harvard University: "Selected Topics in the Theory of Functions."

Published in the *Bulletin of the American Mathematical Society*, volume 5 (1898), pages 59-87.

* Two of these papers were: "Regular points of linear differential equations of the second order," Harvard University, 1896; "Notes on some points in the theory of linear differential equations," *Annals of Mathematics*, vol. 12 (1898).

- (b) Professor ARTHUR G. WEBSTER, of Clark University: "The Partial Differential Equations of Wave Propagation."

III. THE ITHACA COLLOQUIUM, 1901.

- (a) Professor OSKAR BOLZA, of the University of Chicago: "The Simplest Type of Problems in the Calculus of Variations."
Published in amplified form under the title: *Lectures on the Calculus of Variations*, Chicago, 1904.
- (b) Professor ERNEST W. BROWN, of Haverford College: "Modern Methods of Treating Dynamical Problems, and in Particular the Problem of Three Bodies."

IV. THE BOSTON COLLOQUIUM, 1903.

- (a) Professor HENRY S. WHITE, of Northwestern University: "Linear Systems of Curves on Algebraic Surfaces."
- (b) Professor FREDERICK S. WOODS, of the Massachusetts Institute of Technology: "Forms of Non-Euclidean Space."
- (c) Professor EDWARD B. VAN VLECK, of Wesleyan University: "Selected Topics in the Theory of Divergent Series and Continued Fractions."

This Colloquium was published for the Society in the volume: *The Boston Colloquium Lectures on Mathematics*, New York, Macmillan, 1905.

V. THE NEW HAVEN COLLOQUIUM, 1906.

- (a) Professor ELIAKIM H. MOORE, of the University of Chicago: "On the Theory of Bilinear Functional Operations."
- (b) Professor ERNEST J. WILCZYNSKI, of the University of California: "Projective Differential Geometry."
- (c) Professor MAX MASON, of Yale University: "Selected Topics in the Theory of Boundary Value Problems of Differential Equations."

Published by Yale University in the volume: *The New Haven Mathematical Colloquium*, New Haven, Yale University Press, 1910.

VI. THE PRINCETON COLLOQUIUM, 1909.

- (a) Professor GILBERT A. BLISS, of the University of Chicago: "Fundamental Existence Theorems."
- (b) Professor EDWARD KASNER, of Columbia University: "Differential-Geometric Aspects of Dynamics."

This Colloquium is published here in full.

The Colloquia of the Society are to an extent comparable with the reports regularly presented to Section A of the British Association for the Advancement of Science and to the Deutsche Mathematiker-Vereinigung, and in so far play a rôle complementary to those of the *Bulletin* and *Transactions*. The Society will doubtless adopt the custom of publishing the lectures of each Colloquium in a corresponding volume.

The Seventh Colloquium will be held in connection with the twentieth summer meeting of the Society at Madison, Wisconsin during the week September 8-13, 1913. Courses of lectures will be given by Professor LEONARD E. DICKSON, of the University of Chicago, and Professor WILLIAM F. OSGOOD, of Harvard University. Thus for the first time an interval of four years has elapsed between successive Colloquia. As a suitable reflection and desirable stimulation of the mathematical activity of this country, it would seem desirable that the Colloquia should be held oftener. To avoid collision with the meetings of the International Congress of Mathematicians, the Colloquia might perhaps be arranged for every odd numbered year.

E. H. MOORE.

FUNDAMENTAL EXISTENCE
THEOREMS

BY

GILBERT AMES BLISS