Parts II and III are to cover the general theory of algebraic curves, the curves of the third order and the third class, the geometry of an algebraic curve and its relation to the theory of abelian integrals, and a study of the connex.

Dr. Lindemann has done and is doing a monumental work which deserves to rank among the highest in works on geometry; let us hope for its early completion.

<div align="right">JOSEPH LIPKA.</div>

Die Idee der Riemannschen Fläche. Mathematische Vorlesungen an der Universität Göttingen, no. V. By HERMANN WEYL. Leipzig, Teubner, 1913. x + 166 pp. 8 M.

THE volume under review is the fifth of the series of Göttingen Lectures on mathematics, the first four of which were given respectively by Klein, Minkowski, Voigt, and Poincaré. It is announced that four more are under preparation by Runge, Schwarzschild, Toeplitz, and Wiechert.

Before speaking specifically of the work of Weyl, I should like to express my great appreciation of the plan of publishing lectures of this sort, in which the lecturer gives a limited subject mature thought, brings it thoroughly up to date, and perhaps adds contributions of his own. This is a period of what might be called "frenzied" research, in which there is a tendency to rush into print every time a new result is reached. While the intense activity is altogether praiseworthy, it results in a congestion of material in the mathematical journals, and a flood of papers so great that it is impossible for an individual to discover what is important and of interest to him. If the basic ideas of mathematics were shifting as fast as those of some other sciences, the editors of mathematical journals might find themselves in the position of an editor who recently said that his journal was so far behind the material offered it for publication that the authors changed their ideas and wished to withdraw their papers before they could appear in print. Even if we grant that, on the whole, it is for the best that fragmentary investigations in almost unlimited number should continue to be published, the more formal discussions, in which the center of interest is in the subject and not alone in the greater or lesser part which may be new, are of great value and should be encouraged. In this connection it is gratifying that the American Mathematical Society has adopted the policy of publishing the Colloquium Lectures.

They should become a strong factor in the development of mathematics in this country.

The lectures by Weyl aim at two things, viz., laying with complete rigor the foundations for the construction of Riemann surfaces, and then showing their usefulness by considering on them various integrals, the Riemann-Roch theorem, Abel's theorem, and the problem of uniformizing functions. These lectures owe much to Klein (they are dedicated to him) both because of the fundamental work he has done on the subject and also because they were given where his influence is so great; but Weyl does not shine only by reflected light, for there is evidence in the plan, the choice of material, and the exposition that he is a master of the subject on which he writes, and his task is splendidly carried out.

There is probably no other part of the theory of functions where on the whole the logic is so much slurred over as in the theory of Riemann surfaces. Simple examples are given, and then the simplicity and intuitional character of the ideas make it natural to abandon the arithmetic character of the proofs which ordinarily prevail elsewhere. It is interesting to find Weyl starting out at the very beginning with the Weierstrass definition of an analytic function, defining then an "analytisches Gebilde" by means of a parametric representation of the functional relation in question, and then defining a surface by ascribing appropriate properties to a two-dimensional manifold and showing it may be considered as an analytisches Gebilde. This prepares the way for the definition of a Riemann surface by means of analysis situs considerations. Then follow the definitions of properties and quantities (e. g., the genus) associated with Riemann surfaces, the method of construction of a Riemann surface of canonical form, and the proof of a series of theorems such as that every Riemann surface has two sides. In this discussion interesting connection is made with some recent general results of Brouwer. The whole first part seems to be exceptionally well done both in mathematical quality and in method of presentation.

The second part of Weyl's lectures contains various applications to functions on Riemann surfaces. The distinctive features of this part are less conspicuous than in the first part, but the standard important problems are well treated. Especially interesting is the discussion of uniformizing functions, a subject whose development is rather recent and which com-

pletes in a sense the conception of Weierstrass of the analytisches Gebilde by employing a suitable parameter of position on the whole Riemann surface.

F. R. MOULTON.

NOTES.

AT the meeting of the London mathematical society held February 12 the following papers were read. By G. T. BENNETT, " Exhibition and explanation of some models illustrating kinematics"; by H. M. MACDONALD, " Formulae for the spherical harmonic $P_n - m(\mu)$, when $1 - \mu$ is a small quantity "; by E. W. HOBSON, " The representation of the symmetrical nucleus of a linear integral equation "; by W. F. SHEPPARD, " Fitting of polynomials by the method of least squares " (second paper); by H. BATEMAN, " The differential geometry of point transformations between two planes "; by M. McKENDRICK, " Studies in the theory of continuous probabilities."

THE thirtieth anniversary of the foundation of the Circolo matematico di Palermo will be celebrated with appropriate ceremonies on Tuesday, April 14, in the aula of the University of Palermo.   On this occasion a gold medal, provided by members' subscription, will be presented to Professor G. B. GUCCIA in recognition of his services as founder of the society and director of the *Rendiconti*. The Circolo has now nearly one thousand members, of whom it may be noted that one hundred and fifty are Americans. Thirty-seven volumes of the *Rendiconti* have been published.

THE tenth annual meeting of the Association of Ohio teachers of mathematics and science was held at Ohio State University on April 3–4. The programme included addresses by Mr. J. F. BARKER on technical training in the schools and by Professor H. E. SLAUGHT on the final report of the committee of fifteen on a geometry syllabus.

CAMBRIDGE UNIVERSITY.—The following mathematical courses are announced for the Easter term:—By Professor E. W. HOBSON: History of the invention of the calculus, three