tions, and elimination by Sylvester's dialytic method. In this connection we could wish that the author should have suggested to the student the application of elimination to the rationalization of algebraic equations, thus showing that the equation treated in the second part actually represents the most general algebraic equation possible. The second part contains forty pages. After explaining the graphical representation of imaginaries, it gives the demonstration that every equation has a root by the method of Gauss. Then follow symmetric functions, the proof that they can be expressed by means of the coefficients, and their application to the formation of resultants and discriminants. Here Sylvester's method reappears for the purpose of shedding a sidelight on the last mentioned subject. Twenty four pages suffice for the third part. They contain Descartes' rule of signs, Rolle's theorem, the method of freeing an equation from equal roots, Sturm's theorem, and Horner's method. One section gives a rule for finding the superior limit of the real roots, but, strange to say, neglects to mention the obvious modification for finding their inferior limit.

It will be seen that the contents of the work are amply sufficient for the undergraduate curriculum of any college or scientific school, although they are made to occupy only ninety pages. At the end of the book is found a note on rectangular arrays, but it is not easy to see how this note, appearing alone, can have any significance to the students in whose hands the book may be placed.

THOMAS S. FISKE.

## NOTES.

THE officers of Section A at the Rochester Meeting of the American Association for the Advancement of Science were: Vice-President, J. R. Eastman of Washington; Secretary, Winslow Upton of Providence. The following papers were read : The neglected field of fundamental astronomy, by J. R. Eastman ; On the conflict of observation with theory as to the earth's rotation, by S. C. Chandler ; Meteorological observations made in April, 1890, 1891, 1892 in the totality path of the eclipse of April 16, 1893, by David P. Todd ; Latitude of the Sayre Observatory, by C. L. Doolittle ; The secular motion of a free magnetic needle, by L. A. Bauer ; On the discriminators of the discriminant of an algebraic equation, by Mansfield Merriman ; The spectroheliograph of the Kenwood Astro-Physical Observatory, Chicago, and results obtained in the study of the sun, by G. E. Hale ; Least square fallacies, by T.

H. Safford ; Models and machines for showing curves of the third degree, by A. W. Phillips ; On the imaginary of algebra, by Alexander Macfarlane ; Differential formulæ for orbit corrections, by T. H. Safford ; The iced-bar base apparatus of the U. S. Coast and Geodetic Survey, by R. S. Woodward ; On the construction of a prime vertical transit instrument for the determination of the latitude of Harvard College Observatory, by W. A. Rogers ; Lineo-linear vector functions, by A. S. Hathaway ; Thermal absorption in the solar atmosphere, by E. B. Frost ; Electric lights for astronomical instruments, by J. E. Kershner ; Forms of solar faculæ, by G. E. Hale ; European observatories, by J. A. Brashear ; List of 30 new proper motion stars, by C. L. Doolittle ; Proper motions of 89 stars within 10° of the North Pole with remarks on the present state of the problem of solar motion, by T. H. Safford ; Concerning a congruence-group of order 360 contained in the group of linear fractional substitutions, by E. H. Moore ; On the intersection of an equilateral hyperbola and the sides of a plane triangle (a question in trilinears), by William Hoover ; Practical rules for testing whether a number is divisible by 7, or any other small prime ; and if not divisible, to ascertain the remainder ; also Increase in constant for addition in testing for integral values in the equation of quarter squares, by James D. Warner ; On the general problem of least squares, by R. S. Woodward. The next general meeting will be held in Madison, Wis. The officers are : President, William Harkness of Washington ; Vice-President of Section A, C. L. Doolittle of South Bethlehem, Pa.; Secretary of Section A, A. W. Phillips of New Haven.

A SCIENTIFIC CONGRESS is being arranged in connection with the World's Fair at Chicago in 1893. The general committee on mathematics and astronomy has issued a preliminary address inviting the cooperation of all persons and societies interested. The members of this committee are : George W. Hough (Chairman, and in special charge of *astronomy*), Elias Colbert (Vice-Chairman), E. H. Moore (in special charge of *pure mathematics*), G. E. Hale (in special charge of *astrophysics*), G. A. Douglas, Malcolm McNeill, R. W. Pike, G. C. Comstock, and W. W. Payne. Partial lists of the advisory councils contain the names of several members of the NEW YORK MATHEMATICAL SOCIETY, viz.: Arthur Cayley, Thomas Craig, H. A. Howe, Simon Newcomb, J. K. Rees, T. H. Safford, G. M. Searle, Ormond Stone, R. S. Woodward and C. A. Young.

THE Columbia College Library has purchased from Otto Struve, former director of the Pulkowa Observatory, his

entire collection of astronomical and physical works, containing 4,361 books and 3,056 pamphlets. The astronomical department hopes to publish in the near future a catalogue of its library for the use of investigators.

DR. ARTEMAS MARTIN submits the following correction of an error in the Royal Society Catalogue of Scientific Papers, vol. IX., 1874–1883:

" Of the papers accredited on p. 790 to Ezekiel Brown Elliott only Nos. 4, 12 and 13 are by him; the others, Nos. 5–11, 14–17, are by Edwin Bailey Elliott, Queens College, Oxford, England, as may be seen by consulting the references.

" Ezekiel Brown Elliott died May 24, 1888. He was in the employ of the U. S. Government in various capacities for many years, and at the time of his death occupied the position of Government Actuary in the U. S. Treasury, to which position he was appointed in July, 1881. It seems remarkable that so well-known a mathematician as Edwin Bailey Elliott should be confounded with Ezekiel Brown Elliott, and all of the former's papers credited to the latter by the compiler of the Royal Society Catalogue, Edwin Bailey Elliott not appearing in the Catalogue at all."

ARRANGEMENTS are being made at Göttingen for the purpose of carrying out a plan which was adopted shortly after the death of Wilhelm Weber, and which has in view the erection of a joint memorial to Gauss and Weber in recognition of their contributions to physical science.

THE meeting of the *Deutsche Mathematiker - Vereinigung* which was to have been held this year at Nuremberg, has been given up on account of the cholera epidemic in Germany.

F. TISSERAND has been appointed director of the Observatory of Paris to succeed the late Admiral Mouchez.

THE French Academy of Sciences has elected Professor von Helmholtz foreign member to succeed the late Emperor Dom Pedro of Brazil, and Professor Sophus Lie corresponding member in the place of the late Professor Kronecker.

ON May 29 last Professor Carl Heinrich Schellbach died at Berlin in his eighty-eighth year; and on June 22 at Paris, Professor Pierre Ossian Bonnet, member of the French Institute, in his sixty-third year.

PROFESSOR E. H. MOORE of Northwestern University has been called to the University of Chicago as Professor of Mathe-

matics. He will have associated with him as Associate Professor, Dr. Oskar Bolza, recently of Clark University, who is to begin active work on January 1st, and as Assistant Professor Dr. Heinrich Maschke, recently of the Weston Electrical Company. Mr. J. W. A. Young will be a tutor in the same department.

DR. H. S. WHITE, of Clark University, has been appointed Associate Professor of Mathematics at Northwestern University, Evanston, Ill.

DR. L. S. HULBURT has been appointed Instructor in Mathematics at Johns Hopkins University.

T. S. F.

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# NEW PUBLICATIONS.

COMPILED BY B. WESTERMANN & CO., NEW YORK.

APPELL (P.). Leçons sur l'attraction et la fonction potentielle, professées à la Sorbonne en 1890–1891, par M. Appell, rédigées par M. Charliat. gr. in-8. G. Carré. 2 fr.

BACHMANN (P.). Vorlesungen über die Natur der Irrationalzahlen. Leipzig 1892. gr. 8. 10 u. 151 pg. M. 4.00

BALL (R. S.). In Starry Realms. London 1892. 8. 10 a. 374 pg. w. 1 plate a. 21 illustrations. cloth. M. 7.80

BALL (W. W. R.). History of the Study of Mathematics at Cambridge. Cambridge 1892. 8. M. 6.30

BERGBOHM (J.). Neue Rechnungsmethoden der höheren Mathematik. Wien 1891. gr. 8. 7 u. 30 pg. M. 0.60

—— Neue Integrationsmethoden auf Grund der Potential-, Logarithmal- und Numeralrechnung. Wein 1892. gr. 8. 3. u. 58 pg. M. 0.80

BREUER (A.). Die einfachste Lösung des Apollonischen Tactionsproblems. Eine Anwendung der neuen Theorie des Imaginären. Erfurt 1892. gr. 8. 16 pg. m. 2 Tafeln. M. 1.50

—— Ueber Conographie. Ein Beitrag zur constructiven Geometrie der Kegelschnitte. Erfurt 1892. gr. 8. 10 pg. m. 2 Tafeln. M. 1.00

—— Die goniometrischen Functionen complexer Winkel. Eine Ergänzug zur algebraischen Analysis. Erfurt 1892. gr. 8. 14 pg. m. 1 Tafel. M. 1.00

—— Imaginäre Kegelschnitte. Eine geometrische Studie über das Wesen und die katoptrische Deutung des Imaginären. Erfurt 1892. gr. 8. 16 pg. m. 1 Tafel. M. 1.00