1. Record Nr. UNISA996466559703316

Autore	Marchisotto Elena
Titolo	The legacy of Mario Pieri in foundations and philosophy of mathematics / / Elena Anne Corie Marchisotto, Francisco Rodriguez-Consuegra, James T. Smith
Pubbl/distr/stampa	New York, New York : , : Birkhauser, , [2021] ©2021
ISBN	0-8176-4823-2
Descrizione fisica	1 online resource (xxii, 603 pages) : illustrations
Disciplina	510.9
Soggetti	Mathematics - History Història de la matemàtica Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Foreword -- Preface -- Style and Translation -- Evolution of the Project and Acknowledgments -- Contents -- Illustrations -- 1 Pieri's Contributions to Foundations and Philosophy of Mathematics -- 1.1 Pieri, the Man, the Scholar, the Teacher -- 1.2 Philosophy of Mathematics and Mathematical Logic -- 1.3 Foundations of Geometry -- 2 Pieri's Philosophy of Deductive Sciences -- 2.1 Primitive Concepts -- 2.2 Definitions -- 2.3 Definitions by Abstraction -- 2.4 Postulates, or Primitive Propositions -- 2.5 Proofs -- 2.6 Abstract Deductive Science -- 2.7 Logic and Mathematics -- 2.8 Pieri's Letter to Russell -- 2.9 Metamathematics -- 2.10 Semantics and Model Theory -- 2.11 Nominalism -- 3 Two Paths to Logical Consequence: Pieri and the Peano School -- 3.1 Tarski's Definition of Consequence -- 3.2 Aristotle's Counterexample Method -- 3.3 Independence of the Parallel Postulate -- 3.4 Logical Consequence in a Model-Theoretic Context: The Peano School -- 3.4.1 Peano -- 3.4.2 Pieri -- 3.4.3 Padoa -- 4 Pieri's 1900 Paris Paper -- ON GEOMETRY ENVISAGED AS A PURELY LOGICAL SYSTEM -- I -- II -- III -- IV -- V -- VI -- VII -- 5 Pieri and Projective Geometry -- 5.1 Pieri's Studies, Research, and Teaching -- 5.2 Evolution of Projective Ideas and Methods -- 5.3 Synthetic Projective Geometry as an Autonomous Field -- 5.4 Geometry as a

Logical System -- 5.5 The Transformational Approach -- 5.6 Multidimensional Projective Geometry -- 5.7 From Duality to Plurality -- 6 Pieri's 1898 Geometry of Position Memoir -- THE PRINCIPLES OF THE GEOMETRY OF POSITION -- LIST OF ABBREVIATIONS -- 1 The Primitive Entities -- POSTULATE I -- POSTULATE II -- POSTULATE III -- POSTULATES IV AND V -- POSTULATE VI -- POSTULATE VII -- POSTULATE VIII -- POSTULATE IX -- POSTULATE X -- 2 The Alignment Relation and the Projective Line -- POSTULATE XI.
3 The Visual of a Form and Projective Planes -- POSTULATE XII -- 4 The Plane Quadrangle and the Harmonic Relation -- POSTULATE XIII. -- POSTULATE XIV -- 5 The Projective Segment -- POSTULATE XV -- POSTULATE XVI -- POSTULATE XVII -- 6 Further Properties of Segments -- 7 Natural Orderings and Senses of a Projective Line -- 8 The Projective Triangle -- 9 Segmental Transformations -- POSTULATE XVIII -- 10 Harmonic Correspondences and STAUDT's Theorem -- 11 Projective Hyperplanes of the Third Species and Ordinary Space -- POSTULATE XIX -- 12 Projective Hyperplanes of the nth Species and Absolute Projective Space -- POSTULATE XIX' -- POSTULATE XX' -- APPENDIX -- 7 Transformational Geometry -- 7.1 Motions and Transformations -- 7.2 Isometries and Similarities -- 7.3 Transformations as Tools -- 7.4 Transformations in Foundational Studies -- 7.5 Postlude -- 8 Pieri's 1900 Point and Motion Memoir -- ON ELEMENTARY GEOMETRY -- LIST OF ABBREVIATIONS -- 1 Generalities about point and about motion. The relation of collinearity among points. Line, plane, and sphere are introduced. -- POSTULATE I -- POSTULATES II and III -- POSTULATE IV -- POSTULATE V -- POSTULATE VI -- POSTULATE VII -- POSTULATE VIII -- POSTULATE IX -- 2 Rotating a line onto itself. Midpoint of a pair of points. Rotating a plane onto itself. Orthogonality relation among three points or between two intersecting lines -- POSTULATE X -- POSTULATE XI -- POSTULATE XII -- POSTULATE XIII -- POSTULATE XIV -- 3 Rotating one plane onto another. Orthogonality of lines and planes. Various properties relating to lines, planes, and spheres. -- POSTULATE XV -- POSTULATE XVI -- 4 Points internal or external to a sphere. Segments, rays, half-planes, angles, and so on. -- POSTULATE XVII -- POSTULATE XVIII -- POSTULATE XIX.
5 Relation less than or greater than between two segments or between two angles. Triangle is introduced. Congruence of triangles and other propositions of the first and third books of Euclid. -- 6 Sum of two segments. Other properties of triangles, circles, and so on. Continuity of a line. -- POSTULATE XX -- 9 Pieri's Works on Foundations and Philosophy of Mathematics -- 9.1 Course Materials and a Translation -- 9.1.1 Higher Geometry Lectures by Riccardo De Paolis -- 1882-1883 -- 1883-1884 -- 9.1.2 Geometry of Position by G. K. C. von Staudt -- Pieri's Treatment of the Fundamental Theorem -- Pieri's Handwritten Notations -- 9.1.3 Projective Geometry: Lectures at the Military Academy -- 9.1.4 Course Records from Catania University Archives -- 9.1.5 Projective Geometry: Lectures at Parma -- Pieri 1910 -- Pieri 1911c -- 9.1.6 Descriptive Geometry: Lectures at Parma -- 9.2 Foundations of Projective Geometry -- 9.2.1 Principles That Support the Geometry of Position -- 9.2.2 Postulates for Abstract Projective Geometry of Hyperspaces -- 9.2.3 Primitive Entities of Abstract Projective Geometry -- 9.2.4 Intermezzo (1897b) -- 9.2.5 Principles of the Geometry of Position Composed into a Deductive Logical System -- 9.2.6 New Method for Developing Projective Geometry Deductively -- 9.2.7 Principles That Support the Geometry of Lines -- 9.2.8 Staudt's Fundamental Theorem and the Principles of Projective Geometry -- Introduction (1) -- Proof of the Fundamental Theorem (2) -- Results

Not Dependent on Continuity Principles (3-6) -- Continuity and Archimedean Principles -- Pieri's Archimedean Postulate XVIII' (1, 7-9) -- Pieri's Postulate XVIII'' (9) -- Real Projective Geometry of Degree &lt -- 2 (10-11) -- Conclusion -- 9.2.9 New Principles of Complex Projective Geometry -- Background -- Axiomatic Framework -- Incidence Postulates and Dependence (1).
Chains (2-4) -- Coordinates and Cross Ratios (7) -- Further Topics, from 4-7 and 1906a -- Conclusion -- 9.2.10 On the Staudtian Definition of Homography -- 9.3 Foundations of Elementary and Inversive Geometry -- 9.3.1 On Elementary Geometry as a Hypothetical Deductive System: Monograph on Point and Motion -- 9.3.2 Elementary Geometry Based on the Notions of Point and Sphere -- 9.3.3 New Principles of the Geometry of Inversions -- 9.4 Arithmetic, Logic, and Philosophy of Science -- 9.4.1 Geometry Envisioned as a Purely Logical System -- 9.4.2 On an Arithmetical Definition of the Irrationals -- 9.4.3 A Look at the New Logico-Mathematical Direction of the Deductive Sciences -- 9.4.4 On the Consistency of the Axioms of Arithmetic -- 9.4.5 On the Axioms of Arithmetic -- 10 Central Themes and Impact of Pieri's Work -- 10.1 Philosophical Themes in Pieri's Research -- 10.2 Themes in Foundations of Geometry -- Pieri's Views on Abstract Mathematics -- 10.2.1 Geometry as an Abstract Science -- 10.2.2 Geometry from a Synthetic Perspective -- 10.2.3 Geometry from a Transformational Point of View -- 10.2.4 Geometries Constructed as Autonomous Disciplines -- 10.2.5 Continuity and Archimedean Principles -- 10.2.6 Minimizing the Number of Primitive Notions -- 10.3 Pedagogical Themes -- Projective Geometry -- Inversive and Elementary Geometry -- 10.4 Pieri's Impact -- 10.4.1 Philosophy -- 10.4.2 Foundations of Geometry -- Projective Geometry -- Inversive Geometry -- Elementary Geometry -- 10.4.3 Pedagogy -- 10.5 Opportunities for Future Research -- Foundations of Geometry -- Pedagogy -- Logic and Philosophy -- Appendix -- A.1 Errata and Addenda for Marchisotto and Smith 2007 -- A.1.1 Errors and Corrections -- A.1.2 New Items for Chapter 6: Pieri's Works -- A.2 Two Letters from Louis Couturat -- A.3 Russell's Annotations on Principles of the Geometry of Position.
A.4 Pieri's 1905b letter to Oswald Veblen -- Bibliography -- Permissions and Credits -- Index of Persons -- Index of Subjects.