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Preliminary title :

The fusion of plane and solid geometry. The textbook by Lazzeri and Bassani.

Abstract :

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The idea of the fusion of plane and solid geometry originated from projective and descriptive geometry, which worked with projections in space and sections. Different textbooks (starting from Bretschneider in 1844 to Méray in 1874/1903; de Paolis in 1884; Lazzeri & Bassani in 1891, also translated into German by Treutlein in 1911) adopted this idea, mixing plane and solid considerations. For instance, the chapter on the properties of incidence also referred to the mutual position of a plane and a straight line, while homothety was defined in space and then on the plane. Pupils were supposed to have a better intuition of spatial relations when passing from space to plane, and to reason by analogy. Moreover, proofs could be presented of plane theorems using projections in space of simple known configurations (Barbin & Menghini, 2013) The question was also considered at the ICMI Congress of 1911—within the more general theme of the fusion of different branches of mathematics—by giving examples of successful textbooks (Fehr, 1911).. In his “Foundations of Geometry” Hilbert showed that the proof of the theorem of Desargues could be obtained by substituting the incidence axioms for the space to the plane congruence axiom III.5. But already in the textbook of Lazzeri and Bassani we see that one of their aims is to prove plane theorems with the help of considerations in space that allow to avoid part of the congruence axioms and the theory of proportions. The presentation will

discuss the methodological question of the fusion of plane and solid geometry
binging examples taken mainly from the book of Lazzeri and Bassani. Barbin E.,
Menghini M. (2013). History of teaching geometry. Chapter XXVII in A. Karp & G.
Schubring (eds), International Handbook on History of Mathematics Education.
Springer Fehr H. (1911): . Compte rendu du congrès de Milan. l'Enseignement
Mathématique, 13, 437-511. Lazzeri G. and Bassani A., (1891). Elementi di
geometria. Livorno.