SOURCE

Livia Giacardi

Department of Mathematics, University of Turin, Turin, Italy

The Manuscript Section of the "G. Peano" Library of the Department of Mathematics of the University of Turin has in its keeping an important collection of manuscripts by Corrado Segre[1] (Saluzzo 1863–Turin 1924), the founder of the Italian school of algebraic geometry, in whose ranks are numbered such distinguished mathematicians as Guido Castelnuovo, Francesco Severi, Federigo Enriques, and Gino Fano. The most important part of this collection is in the form of forty books of lecture notes, together with Segre's degree dissertation, memoirs, articles, and notes and a card index, containing a valuable collection of bibliographical indications divided according to topic [Giacardi and Varetto 1996].

In particular, the notebooks in which, every summer, Segre made a careful record of his lectures for the courses he was to teach in the following autumn are not only extraordinary evidence of his gifts as a teacher, but also important historical documentation on his research activity, of which, as Alessandro Terracini remarks, they are sometimes "a preliminary stage," sometimes "a reflection" [Terracini 1953, 261].

His students bear copious witness to this. Castelnuovo, who spent four years of fertile academic activity in Turin, writes "He devoted himself to teaching with the fervour of an apostle" [Castelnuovo 1924, 460], and Fano, who was lucky enough to follow his university courses, stresses his great gifts as a teacher in the following words: "He considered it a true mission to direct his students towards the upper levels of mathematics, and especially of geometry, encouraging them whenever possible to produce original work ... He lavished infinite care and treasures of knowledge on his 36 courses of advanced geometry, the subjects of which he himself expounded in writing, in his clear, distinct hand, in little books which his old and recent students were very familiar with, always very precisely worded and with numerous bibliographical quotations, with complements which gradually occurred to him, often with original ideas and opinions, with indications of topics for further research, from which he drew the subjects he suggested for degree dissertations" [Fano 1924–1925, 225–226]. "He was one of the most careful in the preparation of his Lectures, that I have ever known," writes Severi. "In fact they were written in advance word for word and in definitive form in little booklets, which he took with him to his lectures, so that he could give

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[1] Further scientific papers by Segre have been found in Ancona, in the house where he generally spent the summer; on these, see Gario 1989. Many letters are held in various archives and libraries in Italy and elsewhere (see Giacardi 1999).

bibliographical indications from them, always exact and exhaustive" [Severi 1957, XII]. "Corrado Segre's lectures were rather serious," recalls Terracini. "He came into the lecture room very punctually carrying one of those famous little books or notebooks which he used to write, in a perfect hand with no erasures, during the preceding summer ... Segre taught standing sideways, in his typical position with his hands clasped behind his back. He referred to his booklet only to copy a formula, or to give some bibliographical information" [Terracini 1968, 10–13].

The notebooks begin in 1888–1989, the year in which Segre took possession of the Chair of Advanced Geometry at the University of Turin, and end in 1923–1924, covering 36 years during which he dealt with different subjects each year. Thirty-four of the notebooks deal with topics of advanced geometry, three are on mathematical physics and correspond to the years 1895–1897, during which Segre was also responsible for the teaching of this subject, and the remaining two deal respectively with an overall picture of various problems of analysis and geometry and the lectures he gave at the Scuola di Magistero (teacher training school), where, starting from a number of interesting considerations on the nature of mathematics, on method, on the importance of intuition, and on "rigor," he gave future teachers valuable suggestions which were the fruit of his own teaching experience. A final notebook includes, among other material, a list of the students who attended Segre's courses from 1883 to 1892, with the marks they obtained.

From the historical point of view the most significant is the notebook for 1890–1891, *Introduzione alla geometria sugli enti algebrici semplicemente infiniti*, because it is the first to be devoted to the geometry of the algebraic curve, and because a substantial part of it merged with the fundamental memoir of 1894 [Segre 1894]. In addition, Segre here puts forward some ideas regarding the possibility of defining a system of independent postulates for hyperspatial projective geometry, ideas which were to be taken up by his student Fano in a text of 1892 [Fano 1892], of particular interest for certain developments which are linked to those *finite geometries* which were to attract the attention of mathematicians many years later. The geometry of the algebraic curve is also the main subject of the 1898–1899 notebook, *Lezioni sulle curve algebriche dei vari spazî*. Geometry on a surface, which was developing through the research of Castelnuovo and Enriques, constitutes a considerable part of the 1901–1902 notebook, *Introduzione alla geometria sopra una superficie algebrica*. A particularly important notebook is that dated 1909–1910, on cubic surfaces, *Superficie del 3° ordine e curve piane del 4° ordine*, both because it is a systematic, elegant exposition of the subject, and because, as Segre himself remarks in the introduction, "F_3s have had considerable influence on the development of modern algebraic geometry. They are very well suited to illustrate its methods."

Clearly and simply written, Segre's notebooks are rich in bibliographical indications which show marked attention to sources, including the most recent. There are interesting quotations and short historical notes, born of his conviction "that one arrives at complete, general knowledge of the fact or of the exact result, not in a single stroke or through a single individual's work, but by means of several people working together or separately, going through various degrees of both generalisation and exactness!" [Segre 1892, 46] and that "the study of great scientists is perhaps the best suggestion one can offer to the young person who wants to learn and to judge the importance of the subjects" [Segre 1891, 44]. Segre often made annotations or additions either before a specific lecture or years later:

these are bibliographical clarifications, complements to the discussion, advice to students, or changes in the order of the exposition. He not infrequently proposes exercises, suggests topics for research, or faces problems which have remained open because, in his view, the main purpose of an advanced course is to initiate students into research by putting tools and methods at their disposal and stimulating them. It is no mere chance that the first efforts of Severi on numerative geometry, or those of Giovanni Z. Giambelli, or again some of Fano's work, such as the paper quoted earlier, show the influence of Segre's lectures.

In the preface to his treatise *Introduzione alla geometria proiettiva degli iperspazi* (Spoerri, Pisa 1907), E. Bertini wrote that he had consulted "the extensive manuscript résumés which Segre himself wrote annually for his courses" (p. V); F. Enriques and O. Chisini did not fail to quote them in their *Lezioni sulla teoria geometrica delle equazioni e delle funzioni algebriche* (Vols. I–IV, Zanichelli, Bologna 1915–1934; see II p. 541 and III p. 154), and F. Severi used them in his *Trattato di Geometria algebrica* (Zanichelli, Bologna 1926), especially in the chapter on the geometry on an algebraic curve.

The notebooks also offer a very clear example of Segre's working method, which, as Beniamino Segre stresses, consisted "of a highly skilful, elegant, stimulating interweaving of synthetic considerations and algebraic developments, the latter being kept to a minimum and carried out in such a way that they make entirely clear the geometric content of the results, at times even of the individual stages, and supply appropriate checks on the most delicate points" [B. Segre 1961, VIII–IX].

From them there emerges completely the figure of this committed researcher, leader, lecturer, and teacher who wrote: "A teacher should have love of the students, love of knowledge and self-denial" [*Fondo Segre (Segre Archive)*, Quaderni. 40, 26] and, in a letter to M. Pieri, admitted: "Having so many young people to set to work unfortunately means not having any more time to work for ourselves! But in the end we see our children's work as our own" [C. Segre to M. Pieri, Turin 20.11.1901, in Arrighi 1997, 115].

Given the historical and scientific importance of the collection, it has been decided to reproduce all the lecture notebooks (approximately 8000 pages) on CD-ROM, with critical and bibliographical material consisting of

—a biographical profile of Segre (with hitherto unpublished illustrations, reproductions of archive material, Segre's most important reviews, etc.);

—a section devoted to Segre's own teachers and students (with short bio-bibliographical information);

—a complete list of Segre's publications, including his reviews;

—bibliographical sources;

—archive sources;

—as some of the notebooks have already been studied (A. Brigaglia, A. Conte, S. Di Sieno, P. Gario, L. Giacardi), a brief introduction is provided, illustrating their salient points and scientific importance, and with an index of the writings quoted by Segre and an index of authors, with links to the notebooks.

A research engine makes it possible to surf easily within the CD-ROM.

The CD is so produced as to permit updates and possibly the creation of a Web site.

CORRADO SEGRE'S NOTEBOOKS

Teoria generale delle curve e superficie algebriche (1888–1889)
QUADERNI. 1
Introduzione alla teoria delle curve e superficie algebriche (1889–1890)
QUADERNI. 2
Introduzione alla geometria sugli enti algebrici semplicemente infiniti (1890–1891)
QUADERNI. 3
Lezioni di Geometria generale (1891–1892)
QUADERNI. 4
Introduzione alla geometria sugli enti algebr.^{i} sempl. infiniti (1892–1893)
Introduzione alla geometria delle trasformaz.^{i} biraz.^{li} del piano (1893–1894)
QUADERNI. 5
Teoria delle singolarità delle curve e superficie algebriche (1894–1895)
QUADERNI. 6
Fisica matematica (1895–1896)
QUADERNI. 7
Lezioni sulle singolarità delle curve e superficie algebriche (1896–1897)
QUADERNI. 8
Fisica matematica (1896–1897)
QUADERNI. 9–10
Lezioni sui gruppi continui di trasformazioni (1897–1898)
QUADERNI. 11
Lezioni sulle curve algebriche dei vari spazî (1898–1899)
QUADERNI. 12
Lezioni di Geometria numerativa (1899–1900)
QUADERNI. 13
Lezioni sulla teoria delle superficie razionali e dei sistemi lineari di curve piane (1900–1901)
QUADERNI. 14
Introduzione alla geometria sopra una superficie algebrica (1901–1902)
QUADERNI. 15
Lezioni di Geometria non euclidea (1902–1903)
QUADERNI. 16
Applicazioni degli integrali Abeliani alla Geometria (1903–1904)
QUADERNI. 17
Lezioni sulla forma delle curve algebriche (1904–1905)
QUADERNI. 18
Introduzione alla classificazione delle curve algebriche sghembe (1905–1906)
QUADERNI. 19
I gruppi in Geometria (1906–1907)
QUADERNI. 20
Capitoli vari di Geometria della retta (1907–1908)
QUADERNI. 21
Rassegna di concetti e metodi della Geometria moderna (1908–1909)

QUADERNI. 22
Superficie del 3° ordine e curve piane del 4° ordine (1909–1910)
QUADERNI. 23
Le curve e le superficie algebriche, dal punto di vista della Geometria delle trasformazioni birazionali (1910–1911)
QUADERNI. 24
Gruppi continui di trasformazioni (1911–1912)
QUADERNI. 25
Enti geometrici legati ai sistemi lineari di coniche e quadriche (1912–1913)
QUADERNI. 26
Capitoli di Geometria degl'iperspazi (1913–1914)
QUADERNI. 27
Teoria degl'invarianti applicata alla Geometria (1914–1915)
QUADERNI. 28
Capitoli di Geometria differenziale (1915–1916)
QUADERNI. 29
Vedute superiori sulla Geometria elementare (1916–1917)
QUADERNI. 30
Applicazioni degl'integrali Abeliani alle curve algebr.ᵉ (1917–1918)
QUADERNI. 31
Complessi di rette di 1° e 2° grado (1918–1919)
QUADERNI. 32
Lezioni sui gruppi d'ordine finito (1919–1920)
QUADERNI. 33
Geometria delle equazioni differenziali (1920–1921)
QUADERNI. 34
Capitoli di Geom.ᵃ algebrica (1921–1922)
QUADERNI. 35
Geometria dei cerchi e delle sfere (1922–1923)
QUADERNI. 36
Geometria differenziale (1923–1924)
QUADERNI. 37
[Elenco e valutazione degli studenti dal 1883 al 1892; Appunti di geometria proiettiva]
QUADERNI. 38
[Miscellanea di geometria superiore]
QUADERNI. 39
[Appunti relativi alle lezioni tenute per la Scuola di Magistero]
QUADERNI. 40

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