



n° serie, 3, 1989
fasc. 1, pp. 199-205

A NAPLES MATHEMATICAL MODELS AND INSTRUMENTS COLLECTION

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1. INTRODUCTION

From the eighties of the nineteenth century to the beginning of the first world war, the whole of Europe saw a lot of mathematical models and instruments designed and constructed. It was then quite fashionable and it enjoyed enormous interest, in the form of exhibitions¹ and frequent references².

In the thirties, the wind changed and the models went out of use. "As a result of the bad and unpredictable market conditions, we have held back their production" wrote, in 1932, Martin Schilling to the mathematical institute in Göttingen³. Slowly, they went almost forgotten and a substantial part was destroyed.

What has survived in Naples, of original collections from the mathematical institutes at the University, has been recently recovered and partially restored. Now, there is a permanent exhibit in the historical seat of the Department of Mathematics, at the University of Naples "Federico II"⁴. We thereafter describe this collection.

The collection includes 120 pieces; the models are made of several materials⁵: cardboard, plaster, wood, glass, brass, thread, celluloid, metal. About 80 pieces were sold by L. Brill and M. Schilling. Thereafter, our major reference is the catalog of M. Schilling⁶.

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To be short, we give reference to the firms of the time which made the models and, if it is possible, to the firm catalogues.

So, first we give the firm, next we give the firm description of the series, and, in round brackets, the series planner and planning date; finally we give the positions numbers in the series of the Naples collection models. At the moment, we don't know the series of some minor (for Mathematics) firms; in this case, we directly describe those models. In this way, we were able to classify about 100 models.

A little group of models was designed by Naples scientists⁷ and made by students; we describe as well the latter. A group of about 15 wooden models, dealing with elementary solid Geometry, is lacking their firm indications; some of them were undoubtedly made by students from Naples, some could be attributed to a specific firm; we give a short description for those models too.

At present time two plaster models are unidentified. About 10 pieces are severely damaged or substantially incomplete. We explicitly observe that this work is an analytical part of two more extensive research projects: the first is aimed at recovering Italian nineteenth century models collections⁸, the second is aimed at reconstructing the material organization, cultural environment, scientific activities of the Naples Mathematics Faculty between the end of the nineteenth century and the beginning of this one⁹.

2. MODELS DESCRIPTION

I. Firm Models

G. Cussons, Ltd (Lower Broughton, Manchester)¹⁰

Serie 3582: Models of penetration (wooden models).

Nr.: 4, 6, 11, 13, 15.

J. Ehrhard e C. (Bensheim, Hessen)

Schattenconstruction Lehrmittelanstalt (wooden models).

Taf.: 9, 11, 15, 20, 23, 24, 25, 26, 27, 28.

M. Schilling (Halle a.S.) [M. Schilling 1911]

Serie I: Gips-Modelle nach Originalen des mathematischen Instituts der kgl. Technischen Hochschule München (1. Folge). (A. Brill, 1877)

Nr.: 1, 3b, 5.

Serie II: Gips-Modelle nach Originalen der Techn. Hochschule München (2. Folge). (Klein 1-2, A. Brill 3-6, 1877)

Nr.: 1b, 1c, 3b, 3d, 4, 5.

Serie V: Gips-Modelle nach Originalen der Techn. Hochschule München (3. Folge). (A. Brill 1880)

Nr.: 1.

Serie VI: Modelle von Wellenflächen und eines Kreiskegels, sowie Gipsmodelle nach Originalen der Techn. Hochschule München (4. Folge). (Klein 6, 1880)

Nr.: 1, 2, 4.

Serie VII: Gips-Modelle von Flächen 3. Ordnung nach Rodenberg. (Rodenberg 1881)

Nr.: 1, 2, 4, 6, 8, 9, 13, 14, 17, 19, 21, 24a, 25.

Serie VIII: Gips-Modelle nach Originalen der Techn. Hochschule München (5. Folge). (A. Brill 1882)

Nr.: 2, 3, 4, 6a, 6c, 7c.

Serie IX: Gips-Modelle von Flächen 4. Ordnung nach Kummer. (Kummer 1862, 1866, 1872], 1883)

Nr.: 9.

Serie X: Gips-, Draht- und Messingblechmodelle, zum grössten Teil nach Originalen der techn. Hochschule München (6. Folge). (1885)

Nr.: 3, 4, 5, 7, 8b, 10d, 10e, 10k, 10l, 10m, 11a, 11b, 12a, 12b, 12c, 13.

Serie XI: Drahtmodelle über die Projectionen einer unebenen Curve nach Chr. Wiener. (Chr. Wiener 1884)

Nr.: 1, 8.

Serie XIV: Modelle zur Functionentheorie nach Dyck, Abgüsse nach Originalen der techn. Hochschule München (7. Folge). (Dyck 1886)

Nr.: 1a, 1b, 2a, 3.

Serie XVI: Confocale Flächen 3. Grades nach Neovius und Schwarz. (Neovius 1-3; Schwarz 4-9 1888)

Nr.: 9.

Serie XVII: Gips-Modelle verschiedener Art, zum Teil nach Originalen der techn. Hochschule München (8. Folge). (Neovius 1,3; A. Brill 2; Dyck 5-7; Klein 8, 9; 1886; 1888; 1891; 1898)

Nr.: 8a, 8b, 9a, 9b, 9c, 10, 12.

Serie XXIV: Kinematische Modelle nach. Fr. Schilling. (Fr. Schilling 1898)

Nr.: 3.

Serie XXVI: Modelle für darstellende und projective Geometrie. (Hauck 1-10; Fr. Schilling 11-23; 1901, 1909)

Nr.: 13.

Serie XXVIII: Modelle d. Raumcurven 3. Ordnung nach Ludwig. (Klein 1902)

Nr.: 1, 2, 3.

Serie XXX: Gips-Modelle verschiedener Art. (Hilbert 1,2; Stäckel 3; Zindler 4; inslerwaller e Voss 5; Darboux 6-7; Sommer 8; 1903, 1905, 1909, 1910)

Nr.: 1, 2.

Serie XXXI: Zweite Sammlung kinematischer Modelle, insbesondere für /erzahnungstheorie nach Fr.Schilling. (Fr. Schilling 1905)

Nr.: 5, 9, 11.

Serie XXXII: Verschiedene Modelle. (Rohn 1; Kötter 2; Hildebrandt 3; Jaetschenberger 4-5; Königs 6; 1906, 1908)

Nr.: 1, 2.

1. *Schröder* (Darmstadt)

Darstellende Geometrie (wooden models).

Abth I

Taf.: 2, 11.

Abth II

Taf.: 26, 27, 34.

società fabbricazione apparati e materiali elettrici (Napoli)

An integraph, incomplet (metal instrument).

A fragment of integraph (metal instrument).

Société Genevoise pour la construction d'instruments de physique (Genève)

Instrument for verifying a Hypocycloid property (metal model).

II. Models made in Naples by students

1. Two each on another rolling ellipses (wooden model; it is inspired by Schilling model series 24, nr. 8).

2. Thorus, obliquely sectioned by a plane (wooden model).

3. A quartic surface leaning on two conics (wood and thread model).

III. Model made by Prof. G. Andreoli, University of Catania, 1926.

1. Graphic of function $z = \frac{xy^2}{x^2 + y^4}$ (plaster model).

IV. Uncertain origin models

1. Penetration of three Cylinders (two obliquely) (wooden model).
2. Quadrangular dome (wooden model).
3. Bell-tower (wooden model).
4. Oblique triangular Prism (wooden model).
5. Right triangular Prism (wooden model).
6. Oblique circular Cylinder (wooden model).
7. Conic Frustum with interior conic cavity (wooden model).
8. Thorus, perpendicularly sectioned by two planes (wooden model).
9. Oblique circular conic Frustum (wooden model).
10. Cube decomposition in Parallelepida (wooden model).
11. Two right Parallelepida (fragments of wooden model).
12. Right Parallelepiped (fragment of wooden model).
13. Base for a model (wood and brass).

NOTES

1. Cf. Dyck (1892).
2. Cf. Schilling (1911), * zweite Teil * and Teubner (1905) and (1912).
3. Cf. Fischer (1987).
4. Cf. Carbone, Cardone, Palladino (1996).
5. It is well known in 1899 Schilling took over Brill's firm.
6. Cf. Schilling (1911).
7. Long lists of models made in Naples are described in Casaro (1906), Del Re (1906), Pascal (1914), Marcolongo (1935).
8. Cf. Morelli Palladino (1992), Palladino (1985), (1995), (1997a), (1997b), (1997c), (1998).
9. Cf. Carbone Cardone Casanovas Mancuso Palladino (1996), Carbone Cardone Mancuso (1997), Carbone Cardone Morelli (1996), Carbone Cardone Palladino (1994) and (1997), Carbone Catto (1997), Carbone Nastasi Palladino (1996), Cardone (1996).
10. Cf. Cussons (1911).
11. Cf. Schilling (1911).

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