Sylow, Peter Ludvig Mejdell | Encyclopedia.com

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(*b*. Christiania [now Oslo], Norway, 12 December 1832; *d*. Christiania, 7 September 1918)

mathematics.

Sylow was the son of a cavalry captain, Thomas Edvard Sylow, who later became a minister of the government. After graduation from the Christiania Cathedral School in 1850, he studied at the university, where in 1853 he won a mathematics prize contest. He took the high school teacher examination in 1856, and from 1858 to 1898 he taught in the town of Frederikshald (now Halden). Sylow was awarded a scholarship to travel abroad in 1861, and he visited Berlin and Paris. In 1862–1863 he substituted for Ole-Jacob Broch at Christiania University; but until 1898 his only chance for a university chair came in 1869, and he was not appointed. Finally, through Sophus Lie, a special chair was created for him at Christiania University in 1898.

From 1873 to 1881 Sylow and Sophus Lie prepared a new edition of the works of N. H. Abel, and for the first four years Sylow was on leave from his school in order to devote himself to the project. In 1902, with Elling Holst, he published Abel's correspondence. He also published a few papers on elliptic functions, particularly on complex multiplication, and on group theory.

Sylow's name is best-known in connection with certain theorems in group theory and certain subgroups of a given group. In 1845 Cauchy had proved that any finite group G has subgroups of any prime order dividing the order of G. In 1872 Sylow published a 10-page paper containing the first extension of Cauchy's result and perhaps the first profound discovery in abstract group theory after Cauchy. Sylow's main theorem read as follows: First, if p^m is the maximal power of p dividing the order of G, then G has subgroups of order p^i for all i with $0 \leq i \leq m$, and in particular subgroups H of order p^m (called p-Sylow groups): and the index j of the normalizer of H is congruent 1 mod p. Second, the p-Sylow groups of G are conjugate with each other. Sylow's theorems were, and still are, a source of discoveries in group theory and are fundamental to most structural research in finite groups.

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I. Original Works. Sylow's works are listed in H. B. Kragemo, "Bibliographie der Schriften Ludvig Sylows," in *Norsk matematisk forenings skrifter*, 2nd ser., no. 3 (1933), 25–29. They include "ThÉorèmes sur les groupes de substitutions," in *Mathematische Annalen*, **5** (1872), 584–594; and "Sur la multiplication complexe des fonctions elliptiques," in *Journal de mathÉmatiques pures et appliquÉes*, 4th ser., **3** (1887), 109–254.

Sylow's MSS are in the Oslo University Library, U.B. MS, fols. 730–808, and U.B. Brevsamling 7–8.

II. Secondary Literature. See T. Skolem, "Ludvig Sylow und seine wissenschaftlichen Arbeiten," in *Norsk matematisk forenings skrifter*, 2nd ser., no. 2 (1933), 14–24: and C. Størmer, "Gedächtnisrede auf Professor Dr. P. L. M. Sylow," *ibid*., no. 1 (1933), 7–13.

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