Kostrikin, A. I.
Lie algebras and finite groups. (Russian) ⎧Zbl 0547.17004⎫
Tr. Mat. Inst. Steklova 168, 132-154 (1984).

This is a survey from a volume dedicated to the 50th anniversary of Mathematical Steklov Institute. It gives an account of the investigations on Lie algebras and finite groups in the works of the author, his colleagues from the Algebra Department of the Steklov Institute and their pupils. At the same time it provides an outline of the current state of the area (the works of other authors are also reviewed).

§1 "Around Burnside" concentrates on the restricted Burnside problem which was solved in the affirmative by the author in 1959 for prime exponent. The brief history of this matter is also exposed. Firstly the connection between a finite group of prime exponent and its Lie ring is discussed. Secondly the author's theorem on Engel Lie algebras and his "sandwich method" is considered. The recent achievements on both themes inspired by the works of the author are included.

§2 is entitled "Modular variations on the theme of Cartan". It deals with the history and the current activities in the classification of simple Lie algebras over algebraically closed fields of characteristic $p > 0$. The program of this classification is described.

§3 "The approaches to the main hypothesis. Representations and deformations of Lie algebras" is a continuation of the preceding one.

§4 is "Automorphisms and cohomology of finite p-groups". It is devoted to regular automorphisms, p-automorphic groups and homogeneous algebras, cohomology groups of nilpotent groups and algebras, Golod-Shafarevich theorem and the groups of Golod.

§5 is on "Orthogonal decompositions of Lie algebras, lattices and automorphisms". The objects from the title sometimes give nice realizations of finite simple groups, both of Lie type and sporadic.

The survey is written very densely and vividly and contains a good lot of names and references.

Reviewer: Evgenii I. Khukhro

MSC:

		Cited in **1** Review
17-02	Research exposition (monographs, survey articles) pertaining to nonassociative rings and algebras	Cited in **3** Documents
20-02	Research exposition (monographs, survey articles) pertaining to group theory	
17Bxx	Lie algebras and Lie superalgebras	
20Dxx	Abstract finite groups	
17-03	History of nonassociative rings and algebras	
01A65	Development of contemporary mathematics	
20-03	History of group theory	
01A74	History of mathematics at institutions and academies (non-university)	
20F50	Periodic groups; locally finite groups	
20F05	Generators, relations, and presentations of groups	

Keywords:

prime characteristic; survey; Algebra Department; Steklov Institute; restricted Burnside problem; finite group of prime exponent; Lie ring; Engel Lie algebras; sandwich method; classification of simple Lie algebras; Representations; deformations; regular automorphisms; p- automorphic groups; homogeneous algebras; cohomology groups of nilpotent groups; Golod-Shafarevich theorem; groups of Golod; Orthogonal decompositions of Lie algebras; realizations of finite simple groups; Lie type; sporadic