

References

- ALPERIN, J. L.: [1] On a special class of regular p -groups. *Trans. Amer. Math. Soc.* **106**, 77—99 (1963).
- AMITSUR, A. S., and J. LEVITZKI: [1] Minimal identities for algebras. *Proc. Amer. Math. Soc.* **1**, 449—463 (1950).
- ANDREADAKIS, S.: [1] On the automorphisms of free groups and free nilpotent groups. *Proc. London Math. Soc. (3)* **15**, 239—268 (1965).
- AUSLANDER, MAURICE, and R. C. LYNDON: [1] Commutator subgroups of free groups. *Amer. J. Math.* **77**, 929—931 (1955).
- BACHMUTH, S.: [1] Automorphisms of free metabelian groups. *Trans. Amer. Math. Soc.* **118**, 93—104 (1965).
- [2] Induced automorphisms of free groups and free metabelian groups. *Trans. Amer. Math. Soc.* **122**, 1—17 (1966).
- , and I. HUGHES: [1] Applications of a theorem of Magnus. *Arch. Math.* **17**, 380—382 (1966).
- , and J. LEWIN: [1] The Jacobi identity in groups. *Math. Z.* **83**, 170—176 (1964).
- BAER, REINHOLD: [1] Group elements of prime power index. *Trans. Amer. Math. Soc.* **75**, 20—47 (1953).
- BATES, GRACE E.: [1] Free loops and nets and their generalizations. *Amer. J. Math.* **69**, 499—550 (1947).
- BAUMSLAG, G.: [1] Wreath products and p -groups. *Proc. Cambridge Philos. Soc.* **55**, 224—231 (1959).
- [2] Wreath products and extensions. *Math. Z.* **81**, 286—299 (1963).
- [3] Some subgroup theorems for free \mathfrak{v} -groups. *Trans. Amer. Math. Soc.* **108**, 516—525 (1963).
- [4] On the residual nilpotence of some varietal products. *Trans. Amer. Math. Soc.* **109**, 357—365 (1963).
- [5] A subgroup theorem for some product varieties. *Arch. Math.* **6**, 337—341 (1965).
- , and N. BLACKBURN: [1] Groups with cyclic upper central factors. *Proc. London Math. Soc. (3)* **10**, 531—544 (1960).
- , B. H. NEUMANN, HANNA NEUMANN, and PETER M. NEUMANN: [1] On varieties generated by a finitely generated group. *Math. Z.* **86**, 93—122 (1964).
- BIRKHOFF, GARRETT: [1] On the structure of abstract algebras. *Proc. Cambridge Philos. Soc.* **31**, 433—454 (1935).
- BRISLEY, WARREN: [1] A problem of D. W. BARNES. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra 1965. Gordon and Breach 1967.*
- [2] On varieties of metabelian p -groups and their laws. *J. Austral. Math. Soc.* (in print).
- BURNS, R. G.: [1] Verbal wreath products and certain product varieties of groups. *J. Austral. Math. Soc.* (in print).
- BURROW, MARTIN: [1] Invariants of free Lie rings. *Comm. Pure Appl. Math.* **11**, 419—431 (1958).
- COHEN, D. E.: [1] On the laws of a metabelian variety. *J. Algebra* (in print).
- COSSEY, P. J.: [1] On varieties of A -groups. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra 1965. Gordon and Breach 1967.*
- DUNWOODY, M. J.: [1] On verbal subgroups of free groups. *Arch. Math.* **16**, 153—157 (1965).

- FOX, R. H.: [1] Free differential calculus I: Derivation in the free group ring. *Ann. Math.* (2) **57**, 547—560 (1953).
- GASCHÜTZ, W.: [1] Über die Φ -Untergruppe endlicher Gruppen. *Math. Z.* **58**, 160—170 (1953).
- GOL'DINA, N. P.: [1] Free nilpotent groups [Russian]. *Dokl. Akad. Nauk S.S.S.R.* **111**, 528—530 (1956).
- [2] Free nilpotent groups: Corrigenda [Russian]. *Dokl. Akad. Nauk S.S.S.R.* **126**, 694 (1959).
- , and O. N. GOLOVIN: [1] Subgroups of free metabelian groups [Russian]. *Mat. Sbornik* **37**, (79), 323—336 (1955).
- GOLOD, E. S.: [1] Nil-algebras and residually finite p -groups [Russian]. *Izvestiya Akad. Nauk S.S.S.R., Ser. Mat.* **28**, 273—276 (1964).
- , and I. R. ŠAFAREVIČ: On the class field tower [Russian]. *Izvestiya Akad. Nauk S.S.S.R., Ser. Mat.* **28**, 261—272 (1964).
- GOLOVIN, O. N.: [1] Nilpotent products of groups [Russian]. *Mat. Sbornik* **27**, (69), 427—454 (1950). *Amer. Math. Soc. Transl.* (2) **2**, 89—115 (1956).
- [2] Metabelian products of groups [Russian]. *Mat. Sbornik* **28**, (70), 431—444 (1951). *Amer. Math. Soc. Transl.* (2) **2**, 117—132 (1956).
- GRUENBERG, K. W.: [1] Two theorems on Engel groups. *Proc. Cambridge Philos. Soc.* **49**, 377—380 (1953).
- [2] Residual properties of infinite soluble groups. *Proc. London Math. Soc.* (3) **7**, 29—62 (1957).
- [3] The Engel elements of a soluble group. *Illinois J. Math.* **3**, 151—168 (1959).
- [4] The residual nilpotence of certain presentations of finite groups. *Arch. Math.* **13**, 408—417 (1962).
- GUPTA, CHANDRA KANTA: [1] A bound for the class of certain nilpotent groups. *J. Austral. Math. Soc.* **5**, 506—511 (1965).
- GUPTA, N. D.: [1] Some group-laws equivalent to the commutative law. *Arch. Math.* **17**, 97—102 (1966).
- [2] Groups with Engel-like conditions. *Arch. Math.* **17**, 193—199 (1966).
- , and M. F. NEWMAN: [1] On metabelian groups. *J. Austral. Math. Soc.* **6**, 362—368 (1966).
- HALL JR., MARSHALL: [1] A basis for free Lie rings and higher commutators in free groups. *Proc. Am. Math. Soc.* **1**, 575—581 (1950).
- HALL, P.: [1] Verbal and marginal subgroups. *J. Reine Angew. Math.* **182**, 130—141 (1940).
- [2] The splitting properties of relatively free groups. *Proc. London Math. Soc.* (3) **4**, 343—356 (1954).
- [3] Finiteness conditions for soluble groups. *Proc. London Math. Soc.* (3) **4**, 419—436 (1954).
- [4] Some word problems. *J. London Math. Soc.* **33**, 482—496 (1958).
- [5] The Frattini subgroup of finitely generated groups. *Proc. London Math. Soc.* (3) **11**, 327—352 (1961).
- HEINEKEN, H.: [1] Eine Bemerkung über Engelsche Elemente. *Arch. Math.* **11**, 321 (1960).
- [2] Engelsche Elemente der Länge drei. *Illinois J. Math.* **5**, 681—707 (1961).
- [3] Über ein Levisches Nilpotenzkriterium. *Arch. Math.* **12**, 176—178 (1961).
- [4] Bounds for the nilpotency class of a group. *J. London Math. Soc.* **37**, 456—458 (1962).
- HIGMAN, GRAHAM: [1] Ordering by divisibility in abstract algebras. *Proc. London Math. Soc.* (3) **2**, 326—336 (1952).
- [2] Some remarks on varieties of groups. *Quart. J. Math. Oxford* (2) **10**, 165—178 (1959).

- HIGMAN, GRAHAM: [3] Identical relations in finite groups. *Conv. Internaz. di Teoria dei Gruppi Finiti*, Firenze 1960, 93—100. Rome: Cremonese 1960.
- [4] Amalgams of p -groups. *J. Algebra* **1**, 301—305 (1964).
- [5] The orders of relatively free groups. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra* 1965. Gordon and Breach 1967.
- [6] Representations of general linear groups and varieties of groups. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra* 1965. Gordon and Breach 1967.
- KALOUJNINE, L., and MARC KRASNER: [1] Produit complete des groupes de permutations et le problème d'extension des groupes III. *Acta Sci. Math. Szeged* **14**, 69—82 (1951).
- KNOFFMACHER, J.: [1] Extensions in varieties of groups and algebras. *Acta Math.* **115**, 17—50 (1966).
- KOGALOVSKI, S. P.: [1] Structural characteristics of universal classes [Russian]. *Sibirsk Mat. Ž.* **4**, 97—119 (1963).
- KOSTRIKIN, A. I.: [1] On Burnside's problem [Russian]. *Izvestiya Akad. Nauk S.S.S.R., Ser. Mat.* **23**, 3—34 (1959).
- KOVÁCS, L. G.: [1] Varieties and the Hall-Higman paper. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra* 1965. Gordon and Breach 1967.
- , and M. F. NEWMAN: [1] Cross varieties of groups. *Proc. Roy. Soc. (London) A* **292**, 530—536 (1966).
- — [2] Minimal verbal subgroups. *Proc. Cambridge Phil. Soc.* **62**, 347—350 (1966).
- — [3] On critical groups. *J. Austral. Math. Soc.* **6**, 237—250 (1966).
- — [4] Just-non-Cross varieties. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra* 1965. Gordon and Breach 1967.
- — [5] On non-Cross varieties (to be published).
- LAZARD, M.: [1] Sur les groupes nilpotentes et les anneaux de Lie. *Ann. Sci. Ecole Norm. Sup.* (3) **71**, 101—190 (1954).
- LEVI, F. W.: [1] Über die Untergruppen der freien Gruppen. II. *Math. Z.* **37**, 90—97 (1933).
- [2] Groups in which the commutator relation satisfies certain algebraic conditions. *J. Indian Math. Soc., New Ser.* **6**, 87—97 (1942).
- , and B. L. VAN DER WAERDEN: [1] Über eine besondere Klasse von Gruppen. *Abhandl. Math. Sem. Univ. Hamburg* **9**, 154—158 (1932).
- LEVIN, FRANK: [1] On some varieties of soluble groups I. *Math. Z.* **85**, 369—372 (1964).
- LIEBECK, HANS: [1] Concerning nilpotent wreath products. *Proc. Cambridge Philos. Soc.* **58**, 443—451 (1962).
- LYNDON, R. C.: [1] Two notes on nilpotent groups. *Proc. Amer. Math. Soc.* **3**, 579—583 (1952).
- MACDONALD, I. D.: [1] On certain varieties of groups. *Math. Z.* **76**, 270—282 (1961).
- [2] On certain varieties of groups. II. *Math. Z.* **78**, 175—188 (1962).
- [3] Generalisations of a classical theorem about nilpotent groups. *Illinois J. Math.* **8**, 556—570 (1964).
- [4] Another law for the 3-metabelian groups. *J. Austral. Math. Soc.* **4**, 452—453 (1964). Correction to appear in *J. Austral. Math. Soc.*
- [5] Some metabelian-like varieties of groups. *Amer. Math. Monthly* **72**, 159—162 (1965).
- [6] A theorem on critical p -groups. *Proc. Intern. Conf. Theory of Groups. Austral. Nat. Univ. Canberra* 1965. Gordon and Breach 1967.
- [7] The variety of regular p -groups. *Arch. Math.* (in print).
- MACLANE, SAUNDERS: [1] Duality for groups. *Bull. Amer. Math. Soc.* **56**, 485—516 (1950).

- MAGNUS, WILHELM: [1] Beziehungen zwischen Gruppen und Idealen in einem speziellen Ring. *Math. Ann.* **111**, 259—280 (1935).
- [2] Über Beziehungen zwischen höheren Kommutatoren. *J. Reine Angew. Math.* **177**, 105—115 (1937).
- [3] On a theorem of Marshall Hall. *Ann. Math.* **40**, 764—768 (1939).
- [4] Über Gruppen und zugeordnete Liesche Ringe. *J. Reine Angew. Math.* **182**, 142—147 (1940).
- MAL'CEV, A. I.: [1] On some classes of infinite soluble groups [Russian]. *Mat. Sbornik* **28**, (70), 567—588 (1951). *Amer. Math. Soc. Transl.* (2) **2**, 1—22 (1956).
- [2] Two remarks on nilpotent groups [Russian]. *Mat. Sbornik* **37**, (79), 567—572 (1955).
- [3] On free soluble groups [Russian]. *Dokl. Akad. Nauk S.S.S.R.* **130**, 495—498 (1960). *Transl.: Soviet Math. Dokl.* **1**, 65—68 (1960).
- MEIER-WUNDERLI, H.: [1] Über die Gruppen mit der identischen Relation $[x_1, x_2, \dots, x_n] = [x_n, x_1, \dots, x_{n-1}]$, $n \geq 3$. *Vierteljahresschr. Naturforsch. Ges. Zürich* **94**, 211—218 (1949).
- [2] Über endliche p -Gruppen, deren Elemente der Gleichung $x^p = 1$ genügen. *Comment. Math. Helvet.* **24**, 18—45 (1950).
- [3] Metabelsche Gruppen. *Comment. Math. Helvet.* **25**, 1—10 (1951).
- [4] Note on a basis of P. HALL for the higher commutators in free groups. *Comment. Math. Helvet.* **26**, 1—5 (1952).
- [5] Über die Struktur der Burnsidegruppen mit zwei Erzeugenden und vom Primzahlexponenten $p > 3$. *Comment. Math. Helvet.* **30**, 144—174 (1956).
- MORAN, S.: [1] Associative operations on groups. I. *Proc. London Math. Soc.* (3), **6**, 581—596 (1956).
- [2] Associative operations on groups II. *Proc. London Math. Soc.* (3), **8**, 548—568 (1958).
- [3] Unrestricted verbal products. *J. London Math. Soc.* **36**, 1—23 (1961).
- [4] A subgroup theorem for free nilpotent groups. *Trans. Amer. Math. Soc.* **103**, 495—515 (1962). *Errata and Addenda. Trans. Amer. Math. Soc.* **112**, 79—83 (1964).
- [5] Unrestricted nilpotent products. *Acta Math.* **108**, 61—88 (1962).
- MOSTOWSKI, A. W.: [1] Nilpotent free groups. *Fund. Math.* **49**, 259—269 (1961).
- [2] Automorphisms of relatively free groups. *Fund. Math.* **50**, 403—411 (1962).
- NEUMANN, B. H.: [1] Identical relations in groups I. *Math. Ann.* **114**, 506—525 (1937).
- [2] Ascending derived series. *Compositio Math.* **13**, 47—64 (1956).
- [3] On a conjecture of HANNA NEUMANN. *Proc. Glasgow Math. Ass.* **3**, 13—17 (1957).
- [4] Lectures on topics in the theory of infinite groups. *Lecture Notes prepared by M. PAVMAN MURTHY. Tata Institute of Fundamental Research. Bombay 1960.*
- [5] Special topics in algebra: Universal algebra. *Lecture notes prepared by PETER M. NEUMANN. Courant Institute of Mathematical Sciences, New York University 1962.*
- [6] On a theorem by AUSLANDER and LYNDON. *Arch. Math.* **13**, 4—9 (1963).
- [7] Twisted wreath products of groups. *Arch. Math.* **14**, 1—6 (1963).
- , and HANNA NEUMANN: [1] Embedding theorems for groups. *J. London Math. Soc.* **34**, 465—479 (1959).
- , and PETER M. NEUMANN: [1] Wreath products and varieties of groups. *Math. Z.* **80**, 44—62 (1962).
- , and TEKLA TAYLOR: [1] Subsemigroups of nilpotent groups. *Proc. Roy. Soc. (London) A* **274**, 1—4 (1963); **A 281**, 436 (1964).
- NEUMANN, HANNA: [1] On varieties of groups and their associated near-rings. *Math. Z.* **65**, 36—69 (1956).

- NEUMANN, HANNA: [2] On a theorem by AUSLANDER and LYNDON. *Arch. Math.* **13**, 1—3 (1962). A correction: *Arch. Math.* **14**, 367—368 (1963).
- [3] On a theorem by GASCHÜTZ. *J. Reine Angew. Math.* **212**, 109—112 (1963).
- [4] Varieties of groups. Lecture notes prepared by I. M. S. DEY and C. H. HOUGHTON. Manchester College of Science and Technology 1963.
- NEUMANN, PETER M.: [1] Some indecomposable varieties of groups. *Quart. J. Math. Oxford (2)*, **14**, 46—50 (1963).
- [2] On the structure of standard wreath products of groups. *Math. Z.* **84**, 343—373 (1964).
- [3] On word subgroups of free groups. *Arch. Math.* **16**, 6—21 (1965).
- , and M. F. NEWMAN: [1] Schreier varieties of groups (submitted to *Math. Z.*).
- , and JAMES WIEGOLD: [1] Schreier varieties of groups. *Math. Z.* **85**, 392—400 (1964).
- NOVIKOV, P. S.: [1] On periodic groups [Russian]. *Dokl. Akad. Nauk S.S.S.R.* **127**, 749—752 (1959).
- OATES, SHEILA: [1] Identical relations in groups. *J. London Math. Soc.* **38**, 71—78 (1963).
- [2] Identical relations in a small number of variables. *Proc. Internat. Conf. Theory of Groups. Australian Nat. Univ. Canberra 1965. Gordon and Breach 1967.*
- , and M. B. POWELL: [1] Identical relations in finite groups. *J. Algebra* **1**, 11—39 (1964).
- POWELL, M. B.: [1] Identical relations in finite soluble groups. *Quart. J. Math. Oxford (2)* **15**, 131—148 (1964).
- REMESLENNIKOV, V. N.: [1] Two remarks on nilpotent groups of class three [Russian]. *Algebra i Logika Seminar* **4**, 59—65 (1965).
- ŠMEL'KIN, A. L.: [1] The semigroup of varieties [Russian]. *Dokl. Akad. Nauk S.S.S.R.* **149**, 543—545 (1963). Transl.: The semigroup of group manifolds. *Soviet Math. Dokl.* **4**, 449—451 (1963).
- [2] Free polynilpotent groups [Russian]. *Dokl. Akad. Nauk S.S.S.R.* **151**, 73—75 (1963). Transl.: *Soviet Math. Dokl.* **4**, 950—953 (1963). *Izvestiya Akad. Nauk S.S.S.R., Ser. Mat.* **28**, 91—122 (1964).
- [3] Wreath products and varieties of groups [Russian]. *Dokl. Akad. Nauk S.S.S.R.* **157**, 1063—1065 (1964). Transl.: *Soviet Math. Dokl.* **5**, 1099—1101 (1964). *Izvestiya Akad. Nauk S.S.S.R., Ser. Mat.* **29**, 149—170 (1965).
- [4] On soluble products of groups [Russian]. *Sibirsk Mat. Ž.* **6**, 212—220 (1965).
- [5] On free polynilpotent groups. *Dokl. Akad. Nauk S.S.S.R.* **169**, 1024—1025 (1966).
- STROUD, P. W.: [1] On a property of verbal and marginal subgroups. *Proc. Cambridge Philos. Soc.* **61**, 41—48 (1965).
- STRUİK, RUTH R.: [1] On associative products of groups. *Trans. Amer. Math. Soc.* **81**, 425—452 (1956).
- [2] On verbal products of groups. *J. London Math. Soc.* **34**, 397—400 (1959).
- [3] On nilpotent products of cyclic groups. I. *Canad. J. Math.* **12**, 447—462 (1960).
- [4] On nilpotent products of cyclic groups. II. *Canad. J. Math.* **13**, 557—568 (1961).
- TAKAHASI, M.: [1] Note on word subgroups in free products of groups. *J. Inst. Polytech. Osaka City Univ. A* **2**, 13—18 (1951).
- TOBIN, S.: [1] On a theorem of BAER and HIGMAN. *Canad. J. Math.* **8**, 263—270 (1961).
- TURNER-SMITH, R. F.: [1] Marginal subgroup properties for outer commutator words. *Proc. London Math. Soc. (3)* **14**, 321—341 (1964).
- WARD, M. A.: [1] Basic commutators for polynilpotent groups. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra 1965. Gordon and Breach 1967.*
- WEICHSEL, PAUL M.: [1] A decomposition theory for finite groups with applications to p -groups. *Trans. Amer. Math. Soc.* **102**, 218—226 (1962).

- WEICHSEL, PAUL M.: [2] On isoclinism. *J. London Math. Soc.* **38**, 63—65 (1963).
— [3] On critical p -groups. *Proc. London Math. Soc.* (3) **14**, 83—100 (1964).
— [4] Critical and basic p -groups. *Proc. Internat. Conf. Theory of Groups. Austral. Nat. Univ. Canberra 1965. Gordon and Breach 1967.*
— [5] On metabelian p -groups. *J. Australian Math. Soc.* (in print).
— [6] Regular p -groups and varieties. *Math. Z.* **95**, 223—231 (1967).
- WEVER, FRANZ: [1] Über Invarianten in Lieschen Ringen. *Math. Ann.* **120**, 563—580 (1949).
— [2] Über Regeln in Gruppen. *Math. Ann.* **122**, 334—339 (1950).
- WIEGOLD, JAMES: [1] Nilpotent products of groups with amalgamations. *Publ. Math. Debrecen* **6**, 131—168 (1959).
— [2] Some remarks on generalised products of groups with amalgamations. *Math. Z.* **75**, 57—78 (1961).
- WIELANDT, H., and B. HUPPERT: [1] Arithmetical and normal structure of finite groups *Proc. Symposia in Pure Math. Amer. Math. Soc.* **6**, 17—38 (1962).
- WITT, E.: [1] Treue Darstellung Liescher Ringe. *J. Reine Angew. Math.* **117**, 152—160 (1937).
- WRIGHT, C. R. B.: [1] On the nilpotency class of a group of exponent four. *Pacific J. Math.* **11**, 387—394 (1961).

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