

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Mechanization in Industry

Volume Author/Editor: Harry Jerome

Volume Publisher: NBER

Volume ISBN: 0-87014-026-4

Volume URL: <http://www.nber.org/books/jero34-1>

Publication Date: 1934

Chapter Title: Index

Chapter Author: Harry Jerome

Chapter URL: <http://www.nber.org/chapters/c5254>

Chapter pages in book: (p. 473 - 486)

INDEX

(See Machines for detailed list of machines)

- Accounting, sound, importance of, 333
ADAMS, A. B., 388
Advertising, national, 341-2
Age of industry, influence of, 71, 342-3
Agriculture
 conditions in, 128-9
 mechanization in, 6, 122-30, 223, 284-5, 367, 437-42
 stages, 121-2
Agriculture, Department of, 16
Aircraft, 243n
ALFORD, L. P., 39, 252
American Engineering Council, 463
American Federation of Labor, 358, 362
American Glass Trade Directory, 99n, 101n
American Iron and Steel Institute, 420n
American Machinist, 253
American Mining Congress, 16, 463
American Telephone and Telegraph Company, 430n
American Washing Machine Manufacturers' Association, 432n
American Window Glass Company, 101n, 305, 350, 357
Amusements, 11, 169-71
ANDERSON, MARY, 172n, 368n
Association of Manufacturers of Wood Working Machinery, 432n
ATKINS, W. E., 360, 361n
Attitude of
 employers, 354-5
 labor unions, 356-7
 workers, 355-6
Automobiles, 123, 152, 183, 223, 343, 437, 457 (see also Motor vehicles)
BAKER, ELIZABETH F., 16, 93, 94n, 360, 369, 385n, 386, 421, 463
Barber-Colman Company, 423n
BARNETT, GEORGE E., 94n, 97n, 103n, 104, 106, 136n, 357n, 359, 396, 425n, 463
BEARD, C. A., 417n
BENSON, G. T., 91n, 153n
BEYER, O. S., Jr., 362n
Blast furnaces, 59-61, 237-9, 419-20, 455
'Bottle neck' departments, 403, 413
Bread, 241, 243n, 261n, 460
Brick, 10, 12, 58, 71-7, 186-7, 274-5, 277, 282 (see also Clay products)
Brick and Clay Record, 51
BRIGGS, ALFRED, 96n, 345
Building construction, 13, 134-40, 275, 277
 mechanization on the job, 136-8
 new, 45
 shop work, preliminary, 135-6
Butter, 240
Canning, 261n, 459

- Capacity (*see* Machines, Size, Speed)
- CARPENTER, W. M., 338*n*
- CARTWRIGHT, MORSE A., 463
- Cement, Mill and Quarry*, 246*n*
- Cement, Portland, 12, 15, 80, 455
- Census, Bureau of the, 167
- Census of Agriculture*, 123*n*
- Census of Manufactures*, 90, 100*n*,
101*n*, 102, 103, 106*n*, 172*n*, 177*n*,
201*n*, 209-11, 227*n*, 298*n*
- CHASE, STUART, 406*n*, 417*n*, 463
- Cheese, 240, 241
- Chemicals, 257-8, 269, 456
- Chicago Joint Board of Amalgamated
Clothing Workers, 358*n*
- Cigars and cigarettes (*see* Tobacco)
- CLAGUE, EWAN, 58*n*, 117, 386,
463
- Clay products, 15, 76, 241, 243*n*,
261*n*, 269, 456 (*see also* Brick)
- Clothing, men's work, 261*n*
- Coal Mine Mechanization Year Book*,
16, 131*n*
- Coal, retail, 13, 47, 163-5, 274-5 (*see
also* Mining)
- Coke, 332, 455
- Commerce Yearbook*, 49*n*, 251*n*, 252
- Common labor (*see* Labor, types of)
- Communication, 158-63
- Competition, 349-52
- Construction (*see* Building construc-
tion, Highway construction)
- Conversion, mechanization by, 45
- Cooperage, 241
- Copper, 241, 243*n*
- Costs, effort to reduce, 66
- Cotton goods, 10-11, 58, 80-7, 261*n*,
274, 278, 457
- COUPER, R. J., 386, 463
- CRANE, W. R., 465
- Crew reductions (*see* Labor displace-
ment)
- CROCKETT, C. B., 198*n*, 199, 200*n*
- Cyclical fluctuations (*see* Unemploy-
ment)
- DAHL, J. O., 451*n*
- Dairy products, 240
- DAUGHERTY, CARROLL R., 122*n*,
222, 223*n*, 465
- DAY, E. E., 344*n*, 462*n*, 464
- Demand, degree of elasticity of,
300-4
- DENNISON, H. S., 417*n*
- Displacement (*see* Labor displace-
ment)
- DOUGLAS, PAUL H., 388*n*
- DUNLAP, W. H., 5*n*
- EATON, LUCIEN, 134*n*
- Economic Reconstruction*, 21*n*
- Efficiency, personal, 38
- Elasticity (*see* Demand)
- Electric Hoist Manufacturers' Asso-
ciation, 435*n*, 447*n*
- Electric-lamp industry, 107-9
- Electric Overhead Crane Institute,
435*n*
- Electrical Merchandising*, 432*n*, 433*n*,
444*n*, 463
- Electrical World*, 174*n*, 432*n*, 444*n*,
463
- Electrification
factory equipment, 80, 250-3
farm operations, 128, 438
main roll drives, 62-3
- EPSTEIN, R. C., 112*n*
- Equipment (*see also* Handling, Pro-
cesses, Machines)
changes in plants inspected, 56,
73-6, 89-90 (*see also* Labor-sav-
ing changes)
changes, relative frequency of, in
post-War years, 76
existing, reluctance to scrap, 333-4
investment in, 271
obsolescence, 24, 319

- Equipment Research Corporation, 172*n*, 451*n*
- Establishments
 decline in number, 76-7, 239-43
 increase in size, 243-4
- Evolution (*see* Stages)
- Excavation (*see* Building construction, Highway construction)
- Factory, 187
- Federal Trade Commission, 298*n*, 306*n*
- FIELD, M. F., 85
- Financing, ease of, 334-6
- Findings
 limitations, 23-6
 summary, 17-23
- FITCH, JOHN, 407
- Five-day week (*see* Shorter work period)
- Flint Glass Workers' Union, 359
- Flour, 15, 241, 455
- Food and drink, commercial preparation of, 176, 269, 431
- Foreign and Domestic Commerce, Bureau of, 268*n*, 271*n*, 332
- Foundries, ferrous, 58, 66-71, 275, 277
- Foundry and machine shops, 12, 183, 185-6, 232-5, 241, 261*n*, 289, 458
- FOURCAULT, EMILE, 99
- FOWLER, C. B., 335*n*
- FRANK, GLENN, 417*n*, 463
- Fuel
 changes in, 75
 economy of, 48-9, 168
- Furniture, 12, 110-1, 261*n*, 459
- Garment industry, 12, 87-8
- Geographical location of plants inspected (*see* Survey)
- Geological Survey, 5*n*, 16, 49, 130*n*, 229
- GIRVIN, H. F., 91*n*
- GIVENS, MEREDITH B., 58*n*
- Glass, 12, 282, 451
 blown ware, 107-8
 containers, 103-6
 electric-lamp, 108-9
 plate, 102-3
 pressed ware, 106-7
 window, 97-102
- Glass Bottle Blowers Association, 425*n*
- Glass Factory Directory, 103
- Grading (*see* Building construction, Highway construction)
- GRIMES, W. E., 125*n*
- Growth, rate of, effect on mechanization, 343-4
- HABER, WILLIAM, 16, 135*n*, 358*n*, 368, 463
- Hand methods
 decline in, 99-102
 displacement of, 46-7
 prevalence of, in handling, 40-1
- Hand workers
 by processes, 276-80
 relative number of, 18*n*, 271-6
- HANDLER, EDITH, 91*n*
- Handling (*see also* Labor-saving changes)
 defined, 181-2
 equipment, types of, 49, 180-1, 285-6; fixed, 435-6, 447; mobile, 433-4, 446-7; semimobile, 190, 435-6, 447
 expense, ratio to payroll, 187-8
 importance of, 182-9
 interprocess, 186-7, 282
 intrafactory, 182
 skill required in, 203, 394-6
 volume of, in brick plants, 75-6, 186-8; in foundries, 68, 185-6; in manufacture, 183-8
- HANSEN, ALVIN H., 388*n*
- HARRISON, J. L., 143*n*
- Hart Schaffner and Marx, 358*n*
- Haulage, 46

- Highway construction, 11, 13, 56, 140-5, 275, 277, 285, 442-3
 Highway transportation, 152-3
 HOGG, MARGARET, 387*n*
 Home-made machines, 51-2
 Horse-motivated equipment, displacement of, 45-6, 74
 Horsepower
 establishments reporting, 214-6
 per wage earner, by industries, 223-6, 256-9; geographical differences in, 259-62; in agriculture, 223-6; in manufacture, 219-26, 455-62; in mining, 223-6; in railroads, 223-6
 rated, limitations of, 209-14
 total, increase in, 216-8
 Horses, displacement of, 110, 140, 165
 Hosiery, 183
 Household tasks, 11, 173-6, 285
 HUBER, CLYDE M., 466
- Ice, 332, 455
 Immigrants, unskilled, 4
 Immigration restriction, 6-7, 349
 Immigration, slump in, 3-4
Industrial Management, 166*n*, 182*n*
 Industrial Truck Association, 434*n*
 Information, sources of, 12-3, 15-7, 55-8
 Insurance, unemployment (*see* Job severance compensation)
 Interchangeable parts, 249
 Iron and steel, 10, 58-66, 269, 419-20, 456
Iron and Steel Engineer, 420*n*
Iron Trade Review, 245*n*
- JACKSON, JAMES A., 334*n*
 Job severance compensation, 336, 358
 JONES, D. L., 126*n*, 410*n*
- KENNEDY, D. D., 332, 463
- KING, W. I., 36, 122*n*, 298*n*, 387*n*, 463
 KINSMAN, C. D., 122*n*, 464
 KIRK, WILLIAM F., 465
 KJAER, S., 94*n*, 465
 KUZNETS, SIMON, 39*n*
 KYNOR, H. D., 133
- Labor
 opposition to mechanization, effectiveness of, 359-61; forms of, 355-7; methods of lessening, 361-3
 subdivision of, 83
 types of, 28-9, 272-5; auxiliary, 28, 272-5; embodied, formula for, 28, 36; indirectly required, 28; operating, 28; semiskilled, 294-7; skilled, 294-7; supervisory, 273-5; teamsters, 274-5; unskilled, 294-7
 Labor displacement
 bases for computing, 30-1
 constructive, 65-6, 371, 374-83
 potential, 371-2
 Labor-requirement ratios, 376-8
 Labor-saving changes
 defined, 27, 31-5
 handling, 188-202
 mechanical, types of, 42-5
 men saved, per change, 376-7; per plant, 374-5
 number of, 56, 67-9, 73-6, 79, 80-3, 85, 90-3, 138-40, 144-5, 367-77
 Labor-saving equipment (*see* Machines)
 Labor-saving ratios, 35-7
 Labor Statistics, Bureau of, 16, 63, 78, 89, 95, 113*n*, 117, 118*n*, 119, 155, 162, 295, 370*n*, 386, 465-6
 LA FEVER, MORTIER W., 112*n*
 Lag in absorption of displaced labor, 383-5
 Lamp chimneys, 107

- Large-scale production, relation to
 extent of market, 338-41
- LASSWELL, H. D., 360, 361ⁿ
- Laundries, 38ⁿ, 173
- Leather, 114-5, 257, 269, 457
- Legislation, 138, 353
- Libby Owens Sheet Glass Company,
 99
- Life history of machines (*see* Stages)
- LUBBERS, J. H., 98
- LUBIN, ISADOR, 386, 463
- Lumber, 12, 15, 109-11, 241, 257,
 261ⁿ, 269, 456
- MCCULLOUGH, H. F., 463
- MACELWEE, R. S., 153ⁿ, 154ⁿ
- Machine civilization, 17
- Machines and devices (*see also*
 Equipment, Mechanization,
 Processes, Sales)
 adding, 172, 449
 addressing and mailing, 172
 air compressors, 139, 177-8
 air-drying, 92
 annealing and drying ovens, 69,
 429
 AutoBrik, 317ⁿ
 'automatic spooler and high speed
 warper', 86-7, 213, 309, 313, 422,
 454
 ballast sweeper, rotary, 149-50
 blader, 144
 bleaching ball, 92
 block signals, 147
 bodies, demountable, 156
 bookkeeping, 163
 bottle-washing, 176, 431, 449
 bread mixers, 431, 444
 brick, automatic-dump, 44
 bulb-making, 109
 cake mixers, 431
 calculating, 172, 449
 canning, 177-8
 capacity of, increase in (*see* Size,
 Speed)
 car dumper, 154, 197
 card-punching, 172
 catch-basin cleaning, 430
 caterpillar tread, 48, 134, 136, 141,
 196, 247 (*see also* power shov-
 els, tractors)
 check-writing, 172
 chloride spreaders, 145
 cigar, automatic, 118-9, 310, 313,
 426, 451
 cleaning, 69, 173
 cloth-cutting, rotary, 47, 87
 cloth-pressing, 177-8
 combines, harvester and thresher,
 124-6, 231, 248, 285, 426, 439
 continuous (*see* kilns, conveyors,
 filters)
 conveyors, 72, 112, 163; belt, 139,
 190, 201; bucket, 139, 154, 201;
 continuous, 70, 112; overhead,
 75, 79, 92; portable, 156, 433-4,
 446; progressive-assembly, 112,
 191-3; self-loading, 433-4; types,
 193-4
 cookers, electric, 175, 444
 core-blowing, 68
 core-making, 453
 core-removing, 47
 corn husker and shredder, 127,
 426, 440
 corn picker, mechanical, 127-8,
 285, 440
 corn planter, multiple-row, 126,
 440
 cotton picker, 126, 285, 440
 cotton sled, 126, 440
 cranes, 139; crawler, 201; grab
 bucket, 194; locomotive, 165,
 201; overhead traveling, 110,
 192, 201, 435-6, 447; stationary,
 201
 cream separators, 124, 441
 crushers, rock, 80, 424
 cultivators, motor, 123, 124, 440

- cupola chargers, 68, 194
 cylinder (*see* window-glass machine)
 dictating, 172
 digesters, 89
 dish-drying, 176, 450
 dish washers, electric, 175, 176, 177-8, 285, 431, 432-3, 444, 445, 450
 distributing stations, automatic, 167
 distributors, automatic, 43, 81
 ditcher-spreader, 149
 ditching, 149
 dough mixers, 176, 450
 drag lines, 201
 drawing-in, 81, 85
 drills, portable, 253, 452
 'duckbills', 132*n*
 dump, automatic, 43, 74, 153
 edgers, 110
 electric appliances (*see* cookers, dish washers, floor polishers, ranges, vacuum cleaners, washing machines)
 elevators, bucket, 165; electric, 135; farm, 427; pneumatic, 154; portable, 441, 446; stationary, 441
 engines, gasoline (or internal combustion), 232, 247, 426; steam, 247
 ensilage cutters, 427, 441
 escalators, portable, 156
 excavating (*see* power shovels, trenchers)
 facing-tables, mechanical, 163
 'feed and flow' devices, 105
 feed grinders, 124, 426, 441
 feeding attachments, automatic, 43, 94, 311, 313, 421
 filling, automatic, 43, 47, 424
 filters, continuous, 424, 452
 finishing, 47, 143, 443
 floor polishers, electric, 175, 432-3, 444
 fruit juice extractors, 176, 450
 garment-working, 87, 424
 glass bottle, Owens, 105, 247; semi-automatic, 104-5, 311, 313, 425
 grader, elevating, 140, 141
 grain drills, tractor-drawn, 123, 124, 426
 grate shaker, 311, 313
 gravity chutes, 138, 164
 grinders, 80, 90
 harrows, disk, tractor-drawn, 124, 285, 426, 439
 harvesters and threshers (*see* combines)
 hay presses, 124, 426, 441
 hoists, 47, 137; cable, 132, 194; distributing tower, 138; electric, 135, 194, 435-6, 447; slusher, 65
 home-made (*see* Home-made machines)
 hot-metal carriers, 68
 integraph, 32, 176
 intertype, 95
 ironing, flatwork, 175, 230, 285, 432-3, 443, 445
 irons, electric, 174, 230, 285, 432-3, 443, 445
 job automatics, 94, 309, 313, 421
 kilns, cement, 246-7; continuous tunnel, 78-9, 451; periodic, 79; rotary, 80
 knotters, hand, 50, 454
 labeling, 47
 laundry equipment, 177
 lawn mowers, power, 177-8
 life history of (*see* Stages)
 linotype, 94
 listers, tractor-drawn, 123, 124, 426, 440
 litter carriers, 128, 427, 441
 loaders, 154; mast-and-gaff, 165; pit-car, 131-2; portable, 164

- 165, 196-7; self-feeding, 131-2, 446; snow, 169; wagon, 310, 313, 433-4
- locomotives, industrial, 47, 72, 195, 435-6, 447; mining, 132; steam, 145-6
- looms, automatic, 42-3, 81-3, 454; non-automatic, 50
- lumber carriers, 109-10, 309, 313, 433-4
- lumber pilers, 309, 313, 433-4, 446
- machine tools, 177-8, 253, 302-4, 422, 452
- magazines, multiple-type, 94
- main roll drives, electric, 63, 309, 313, 419-20
- manifolding, 172
- milking, 177-8, 285, 426, 441
- mixers, concrete or paving, 137, 142; mortar, 139
- molding, 47, 68, 248 (*see also* sandslingers)
- monorails, 68, 194
- monotype, 95
- motors, electric individual drive, 212
- nailing, 47
- oil burners, 42, 167, 175
- oilers, wick, 91
- packing or packaging, 47, 177-8, 424
- paint-spray, 47, 138, 150
- paper, 90
- pavers, 142
- pig-casting, 43, 60
- plows, tractor-drawn, disk, 123, 124, 426, 439; moldboard, 123, 124, 426, 439
- portable (*see* conveyors, drills, elevators, loaders, valve grinders)
- postage-canceling, 163
- postage-metering, 163
- potato diggers, 128, 426, 440
- pots, hand (*see* window-glass machine)
- power shovels, 47, 72, 74, 80, 130, 136-7, 140-1, 144, 182, 201, 309, 313, 429, 442
- presses, 95 (*see also* feeding attachments)
- pressing, steam, 47, 87
- production of (*see* Machine-producing industries)
- proportioning and metering system for paper stock, 47, 425
- pulverizers, coal, 43, 68, 167
- pumps, pulp, 92, 196
- ranges, electric, 175, 444
- ready-made (*see* Ready-made machines)
- refrigerators, electric, 175, 444
- rivet passer, automatic, 139
- riveting, pneumatic, 137
- Ross carrier (*see* lumber carrier)
- rotary hoe, 440
- sanding, 139
- sand-cutting, 67, 68
- sand reclaiming, 47
- sandslingers, 67, 68, 70, 453
- saws, power, 139
- scrapers, 140, 201
- screening plants, 47, 165
- section crew cars, motorized, 148, 311, 313, 430, 449
- self-feeding (*see* conveyors, loaders)
- sewing, electric, 175, 177-8, 285, 432-3, 444, 445; hand and foot, 175, 177, 445; industrial, 87, 177-8
- shakeout, 67, 68
- slicers, 176, 177
- sound movie, 169-70
- spooler (*see* 'automatic spooler and high speed warper')
- spraying, 124, 426, 441
- sprinklers, motorized, 168

- stitching, 47, 91
 stokers, automatic, industrial, 166,
 177-8, 429; locomotive, 27, 146,
 429, 450; residential, 175
 stone-planers, 136
 street-car, one-man, 152
 street-cleaning, 168-9, 309, 313
 449
 subgrader, 142, 285, 443
 surfacing, 138
 switchboards, automatic (*see* tele-
 phones, dial)
 tabulating, 172
 tailor-made (*see* Tailor-made ma-
 chines)
 telegraph, printer, 147, 159-60
 telephones, dial, 158-9, 309, 313,
 430
 threshing-machines, small-size, 439
 ticker, high speed, 161-2
 tie lifter, 149
 tie tamper, 149
 tobacco-preparing, 425
 tools, pneumatic, 139, 168
 towers, Boston, 165
 tractor-drawn (*see* cultivators,
 grain drills, harrows, listers)
 tractors, 76, 109, 122-5, 144, 157,
 197-201, 285, 310, 313, 426, 438,
 446
 train control, automatic, 50, 146-7
 'translux' theaters, 171
 trenchers, 201; form-line, 145;
 narrow, 182, 285, 429, 442
 trimmers, automatic, 154
 trucks, crane-equipped, 156, 199,
 200; hand-lift, 137, 196, 446; high-
 lift (tiering), 92, 156, 199, 200,
 446; industrial, electric, 72, 92,
 197-201, 310, 313, 433-4, 446;
 low-lift, 156, 199, 200; motor, 139,
 433-4, 437, 446; power-dump, 47,
 164, 165
 turret, cam-operated, 109
 tying-in (*see* warp-tying)
 typewriters, 172, 232
 typesetting, 177
 undercutting, 130-1, 133, 229, 281,
 310, 313, 448
 vacuum cleaners, electric, 175, 176,
 230, 285, 432-3, 444, 445
 valve grinders, 452
 vegetable-paring, 176, 431, 450
 vegetable-slicing, 450
 vending, coin device, 177, 450
 warper (*see* 'automatic spooler and
 high speed warper')
 warp-tying, 47, 81, 84-5, 311, 313,
 422
 washing, electric, 174, 230, 432-3,
 443, 445
 waste-heat boilers, 43, 80
 water systems, 426, 441
 weeders, steam-jet, 149
 welding, 177
 window-glass, Colburn, 98-9; cylin-
 der, 44, 98, 100, 213, 311, 313;
 Fourcalt, 98-9; hand pots, 99-
 100; sheet, 98-100
 wood-working, 47, 110-1, 422, 452
 wrapping, 47, 119
 yarn-working, 422
 Machine-producing industries (*see*
 also Marketing methods)
 characteristics of, 289
 earnings in, 297-300
 employment in, 232-3, 289-94
 grade of labor in, 294-7
 growth of, 232-5
 Machine-producing plant, essential
 features of, 289
 Machine shops (*see* Foundry and
 machine shops)
 Machine workers, relative number by
 processes, 277-80
 MACKLIN, THEODORE, 411
 MANN, L., 132
 Marketing methods, 304-6, 349-52

- Materials handling (*see* Handling)
- MAY, GEORGE O., 333ⁿ
- MAYO, E., 417ⁿ
- Meat (*see* Slaughtering and meat packing)
- Mechanical changes, 40-8
- Mechanization
 defined, 41-2
 degree, changes in, 17, 50, 236-9, 255-87 (*see also* Use, extent of)
 effects with regard to arduousness of work, 406-8; health, 404-6; labor displacement, 365-90; power required, 414; quality, 403, 408-11; repairs, 414-5; schedule control, 415; skill, 391-403; space required, 404, 412-3; waste of materials, 414 (*see also* Unemployment)
- limiting factors, pecuniary, 331-52; psychological, 354-63; technological, 328-30 (*see also* Legislation)
- measures of: establishments using power, 214-6; horsepower per wage earner, 205-6, 207, 219-22, 256-67, 269; investment-in-equipment, 206, 271; machine output ratio, 205-6, 229-30, 280-2; machine worker ratio, 206, 271-80; number of machines in use, 208, 231-2; proportion of operators machine-equipped, 230, 271-80; wage ratio (or labor expense ratio), 206, 226-8, 267-71
- rate, changes in, 20-2, 218-9
- Methods (*see also* Machines, Processes, Survey)
 fixed-base, 376-7
 year-to-year, 377-8
- Migration, 6, 129 (*see also* Immigration)
- Migration and Business Cycles*, 6
- MILLS, FREDERICK C., 5, 244ⁿ, 293ⁿ, 335ⁿ, 346ⁿ, 384, 389ⁿ
- Mines, Bureau of, 5ⁿ, 465
- Mining
 anthracite coal, 133, 428, 449
 bituminous coal, 11, 130-3, 237, 275, 428, 448
 metal, 65, 133-4
- MONTGOMERY, R. E., 360
- MORTON, A. B., 100ⁿ
- Motor vehicles, 112, 241, 243ⁿ
- Musical instruments, 269, 460
- MYERS, ROBERT J., 88ⁿ, 386, 464
- National Automobile Chamber of Commerce, 152ⁿ, 464
- National Glass Budget*, 98ⁿ, 100ⁿ, 101ⁿ
- National Industrial Conference Board, 348
- National Machine Tool Builders' Association, 302ⁿ, 423ⁿ
- National Research Council, 6
- National Window Glass Workers, 99
- Newsprint, 92, 277
- New York Edison Company, 167
- Nielsen Company, A. C., 187
- Non-ferrous metals, 269, 455
- Non-manufacturing industries, power in, 222-6
- Non-mechanical changes, 37-40, 254
- NOURSE, E. G., 417ⁿ
- Occupations, specialization of (*see* Labor, subdivision of)
- Office equipment, 171-3
- Operations, elimination of, 42-4
- ORCHARD, J. E., 327ⁿ
- Output-per-hour survey, 12-3, 15
- Overhead expense, 332-3
- PAUL, J. W., 463
- Paper (*see* Pulp and paper)
- Postal service, 162-3
- Pottery, 12, 77-80
- Power (*see also* Horsepower, Mechanization, measures of)

- electric purchased, 91, 212, 251
- equipment, 166
- production of, 56, 165-8
- statistics, limitations of, 209-14
- transmission of, 212-3
- types of, 212-3
- Printing
 - commercial, 93-4, 261*n*, 421, 459
 - newspaper, 94-6, 261*n*, 459
- Processes (*see also* Equipment, Machines)
 - assembly, 273, 289
 - bricklaying, 280
 - casting, pottery, 78; stereotyping plates, 94, 195
 - central proportioning, 143-4, 145, 285, 443
 - continuous, 102-3, 419-20
 - discontinuous, 102-3
 - drilling, 448
 - dry molding, 95
 - drying, 75, 78, 79-80
 - finishing, 143, 280
 - flask-making, 279
 - heating, residential, 175-6, 444
 - inspection, 44
 - painting, lacquer, 151
 - pattern making, 279
 - paving, 280
 - pneumatic caisson, 135*n*
 - progressive system of car repairs, 151
 - proportioning and metering system, automatic, 92
 - puddling, mechanical, 64
 - repairing, 41
 - sheet for window glass, 44, 98-9
 - snow removal, 150, 168-9
 - soil preparation and cultivation, 439
 - stripping with power shovels, 130, 448
 - testing, 41
 - tire building, flat drum, 113
 - weaving, 81, 279
 - welding, electric, 137
 - wheelbarrow proportioning, 143-4
 - wick oiling, 42
- Processing equipment, nature of, 49, 181
- Productivity
 - bases for computing: labor, 28-30; time, 30
 - increases in, 5-6, 76; anthracite coal mining, 5; bituminous coal mining, 5; blast furnaces, 61-2; copper mining, 5; iron mining, 5, 65; manufacture, 5; steam railways, 5
- Public Roads, Bureau of, 143, 427*n*
- Pulp and paper, 11, 12, 58, 88-93, 184, 269, 274, 277, 455 (*see also* Wood pulp)
- Quality (*see* Mechanization, effects of, Raw materials)
- Railroad repair shops, 151, 269
- Railways
 - steam, 145-51, 223
 - street, 152, 223
- Raw materials, 38, 83
- Ready-made machines, 53
- Recent Economic Changes*, 243*n*, 252*n*, 348
- Regularization of production, 336-7
- Reorganization of work, 83-4
- Rerouting, 37, 190
- REYNOLDSON, R. A., 367*n*
- Roads and pavements (*see* Highway construction)
- ROBERTS, GEORGE E., 352
- RORTY, MALCOLM C., 206*n*, 219*n*, 228*n*
- ROYLANCE, W. G., 23*n*
- Rubber products, 269, 457
- RUSSELL, H. L., 411
- Sabotage, 356
- Saddlery, 241, 461

- Sales of machines, 56-8, 172, 419-36
- Saturation, 85
- SCHUMPETER, JOSEF, 388
- Scientific management (*see* Non-mechanical changes)
- Scrap, increased use of, 62
- Seasonal variations, 39, 337 (*see also* Unemployment)
- Separation rates, 384
- Serialization of machines, 43
- Shoes, 115-6, 184
- Shorter work period, 39, 338, 362
- SIEGFRIED, ANDRÉ, 341*n*
- Singer Sewing Machine Company, 115
- Size
 - equipment units, increase in, 60-1
 - relation to mechanization, 244-8, 263-7
- Skill, grades of (*see also* Mechanization, effects of)
 - defined, 391
 - in machinery industries, 391-2
 - in repair work, 392-3
 - leveling, 63
- Slaughtering and meat packing, 117-8, 261*n*, 458
- Smelting and refining, 455
- Smith Corporation, A. O., 398
- SMITH, L. R., 398*n*
- SMITH, R. K., 442*n*
- SNYDER, CARL, 346
- Social Science Research Council, 6
- SOULE, GEORGE, 332*n*, 342
- Sources of information (*see* Information)
- Specialization (*see* Labor, subdivision of)
- Speed, increases in, 75, 86, 248-50
- Stages in the development and use of machines, 20-1, 306-23
 - commercial trial, 317
 - conception of primary principle, 315-6
 - declining use, 319
 - examples of machines in the several stages, 309-11, 320-23
 - obsolescence, 319
 - pre-commercial experimentation, 317
 - rapid increase, 318
 - recognition of need, 315
 - saturation, 319
 - slackening increase, 319
- Standard Statistics Company, 336
- Standardization (*see also* Interchangeable parts)
 - relation to large-scale production, 341-2
 - structural forms, 135-6
- Steel (*see* Iron and steel)
- Steel works and rolling mills, 12, 61-3, 455
- STERN, BORIS, 97*n*, 103*n*, 108, 153*n*, 157, 369, 373*n*, 381, 465
- Stevedoring, 11, 13, 153-7, 275, 278
- STEWART, ETHELBERT, 117*n*
- Stoker Manufacturers' Association, 430*n*
- Stone products, 241, 243*n*, 269, 456
- Straight-line flow, 37, 62, 190-1 (*see also* Rerouting, Serialization of machines)
- Street cleaning and maintenance, 168-9
- Stretch-out system, 37, 83
- Style changes, 38, 339
- Sugar, beet, 12, 15, 116-7, 455
- SURRATT, A. J., 442*n*
- Survey
 - information sought, 14-5
 - origin of, 3-8
 - plants inspected, geographical location of, 8-9; number of, 12-3
 - scope, 3-26
 - selection of industries, bases for, 10-4
- Survey of Current Business*, 302*n*, 423*n*, 434

- Tailor-made machines, 52-3
 TANSIG, A., 134
 TAPP, H. F., 444*n*
 TAYLOR, PAUL S., 148*n*
 Textiles, 12, 257, 269, 459
 THEE, T. C., 142*n*
 THOMAS, WOODLIEF, 344*n*, 462*n*,
 464
 THORP, WILLARD L., 211, 218*n*,
 464
 Tile, 12, 74-6, 274-5, 277
 Tires and tubes, rubber, 112-4, 183,
 457
 Tobacco, 118-9, 241, 257, 269, 461
 Transportation equipment, 269
 TROXELL, JOHN P., 356*n*, 397*n*
 TRYON, F. G., 132
- Unemployment
 absorption, lag in, 383-5
 cyclical, 388-9
 permanent, 387-8
 seasonal, 336-7, 390
 technological, 31, 385-7
 United Shoe Machinery Company,
 115, 305
 United States Steel Corporation, 335
 Use, extent of, 283-7, 437-54
- Vacuum Cleaner Manufacturers'
 Association, 432*n*
 Value added by manufacture, ratio of
 wages to (*see* Mechanization,
 measures of)
 VAN BARNEVELD, CHARLES E.,
 134, 464
- Wages
 differentials, 63, 344-9
 ratio to value added by manufac-
 ture, 267-71
 relation to mechanization, 262-3
 Wage earners per establishment,
 242-3 (*see also* Horsepower)
 War, Department of, 153, 466
 WATKINS, RALPH J., 390*n*
 WEINTRAUB, DAVID, 5, 382, 383,
 464
 WELD, L. D. H., 451*n*
 Wired homes
 number, 230, 443
 proportion equipped with spe-
 cific devices, 174, 445
 Women's Club Survey, 175
 Wood pulp, 277
- Yearbook of Agriculture*, 129*n*, 464

PUBLICATIONS OF THE
NATIONAL BUREAU OF ECONOMIC RESEARCH

- *1. INCOME IN THE UNITED STATES
By WESLEY C. MITCHELL, WILLFORD I. KING, FREDERICK R. MACAULAY
AND OSWALD W. KNAUTH
Volume I (1921) Summary 152 pp.
- 2. *Volume II* (1922) Details 440 pp.
- 3. DISTRIBUTION OF INCOME BY STATES IN 1919 (1922)
By OSWALD W. KNAUTH 30 pp., \$1.30
- *4. BUSINESS CYCLES AND UNEMPLOYMENT (1923)
By the NATIONAL BUREAU STAFF and 16 COLLABORATORS 405 pp., \$4.10
- *5. EMPLOYMENT, HOURS AND EARNINGS IN PROSPERITY AND
DEPRESSION, UNITED STATES, 1920-22 (1923)
By WILLFORD I. KING 147 pp.
- 6. THE GROWTH OF AMERICAN TRADE UNIONS, 1880-1923 (1924)
By LEO WOLMAN 170 pp., \$2.50
- 7. INCOME IN THE VARIOUS STATES: ITS SOURCES AND DIS-
TRIBUTION, 1919, 1920 AND 1921 (1925)
By MAURICE LEVEN 306 pp., \$3.50
- 8. BUSINESS ANNALS (1926)
By WILLARD L. THORP, with an introductory chapter, *Business Cycles
as Revealed by Business Annals*, by WESLEY C. MITCHELL
380 pp., \$2.50
- 9. MIGRATION AND BUSINESS CYCLES (1926)
By HARRY JEROME 256 pp., \$2.50
- 10. BUSINESS CYCLES: THE PROBLEM AND ITS SETTING (1927)
By WESLEY C. MITCHELL 489 pp., \$5.00
- *11. THE BEHAVIOR OF PRICES (1927)
By FREDERICK C. MILLS 598 pp.
- 12. TRENDS IN PHILANTHROPY (1928)
By WILLFORD I. KING 78 pp., \$1.00
- 13. RECENT ECONOMIC CHANGES (1929)
By the NATIONAL BUREAU STAFF and 15 COLLABORATORS
2 vol., 950 pp., per set, \$7.50
- 14. INTERNATIONAL MIGRATIONS
Volume I, Statistics (1929), compiled by IMRE FERENCZI of the Inter-
national Labour Office, and edited by WALTER F. WILLCOX
1,112 pp., \$7.00
- 18. *Volume II*, Interpretations (1931), edited by WALTER F. WILLCOX
715 pp., \$5.00
- *15. THE NATIONAL INCOME AND ITS PURCHASING POWER
(1930)
By WILLFORD I. KING 394 pp.

* Out of print.

16. CORPORATION CONTRIBUTIONS TO ORGANIZED COMMUNITY WELFARE SERVICES (1930)
By PIERCE WILLIAMS and FREDERICK E. CROXTON 347 pp., \$2.00
17. PLANNING AND CONTROL OF PUBLIC WORKS (1930)
By LEO WOLMAN 260 pp., \$2.50
19. THE SMOOTHING OF TIME SERIES (1931)
By FREDERICK R. MACAULAY 172 pp., \$2.00
20. THE PURCHASE OF MEDICAL CARE THROUGH FIXED PERIODIC PAYMENT (1932)
By PIERCE WILLIAMS 308 pp., \$3.00
21. ECONOMIC TENDENCIES IN THE UNITED STATES: ASPECTS OF PRE-WAR AND POST-WAR CHANGES (1932)
By FREDERICK C. MILLS 639 pp., \$5.00
22. SEASONAL VARIATIONS IN INDUSTRY AND TRADE (1933)
By SIMON KUZNETS 455 pp., \$4.00
23. PRODUCTION TRENDS IN THE UNITED STATES SINCE 1870 (1934)
By ARTHUR F. BURNS 363 pp., \$3.50
24. STRATEGIC FACTORS IN BUSINESS CYCLES (1934)
By JOHN MAURICE CLARK 238 pp., \$1.50
25. GERMAN BUSINESS CYCLES, 1924-1933 (1934)
By CARL T. SCHMIDT 288 pp., \$2.50
26. INDUSTRIAL PROFITS IN THE UNITED STATES (1934)
By RALPH C. EPSTEIN 678 pp., \$5.00
27. MECHANIZATION IN INDUSTRY (1934)
By HARRY JEROME 484 pp., \$3.50

THE BULLETIN

Subscriptions to the National Bureau *Bulletin* (5 issues, \$1) may begin with any of the following numbers:

48. ASPECTS OF RECENT PRICE MOVEMENTS, F. C. MILLS (Oct. 31, 1933)
49. NATIONAL INCOME, 1929-32, SIMON KUZNETS (rev. ed., June 7, 1934)
50. RECENT CORPORATE PROFITS, SOLOMON FABRICANT (April 18, 1934)
51. RECENT CHANGES IN PRODUCTION, C. A. BLISS (June 28, 1934)
52. GROSS CAPITAL FORMATION, 1919-33, SIMON KUZNETS (Nov. 15, 1934)
53. CHANGES IN PRICES, MANUFACTURING COSTS AND INDUSTRIAL PRODUCTIVITY, 1929-1934, F. C. MILLS (Dec. 21, 1934)