
Index

- A** AARA computer, 220
 Abacus, 7
 contest of speed, 7
 counters, 12
 demise, 7
 English, 12
 European, 8
 Gerbert's, 35
 Greek, 8–9
 Inca, 8
 origins, 7, 10
 Roman, 10
 Russian, 13
 soroban, 7, 15
 spread of, 14–15
 swanpan, 7, 14
 table, 10–11
 ABC, 226–230
 components, 228
 control, 228
 failure, 230
 genesis of, 227
 Mauchly's visit to, 238
 operation, 229
 use, 228
 Abel computer, 220
 Accounting and Tabulating Machine Corporation, 137
 Accounting machines, 122–155
 Accumulator, 215. *See also* ENIAC
 Addition, analog, 160, 162
 Additive number system, 5
 Aiken, Howard, viii, 96, 203, 213–219, 224
 first proposals, 214
 IBM, 215
 influence of, 219
 Amsler, Jacob, 168
 Amsler planimeter. *See* Planimeters
 Analog calculation, 156
 accuracy of, 157
 addition, 160, 162
 Analog computers
 electrical, 191–194
 Analog computing devices, 156–204.
 See also Differential analyzer
 accuracy, 157, 160, 162, 195–196
 approximating complex functions, 166
 electrical, 177–178
 harmonic analyzer, 158, 172–176, 180
 harmonic synthesizer, 172, 177
 integrators, 167–174, 179–185, 187
 isograph, 177
 multipliers, 160
 network analyzer, 178
 noise in, 162, 195
 resolver, 158–159, 172, 194
 tide predictors, 162, 172–176
 Analogue, word origin, 247
 Analog versus digital techniques, 196
 Analytical engine, 59–60, 67, 75–91,

Analytical engine (*cont.*)

200, 203. *See also* Babbage, Charles; Ludgate, Percy; Torres y Quevedo, Leonardo
 arithmetic operations, 82–83
 barrel control, 85
 construction, 90
 control mechanism, 85–86
 design, 81, 90
 design variations, 77
 importance of, 95–96
 influence of, 96–97
 limitations of, 89
 Lovelace, Ada, 88–89
 microprogram control, 89
 mill, 76–77, 79–80, 91
 number register, 79
 numbers in, 77
 operation, 76, 80, 82–83, 85–86
 origin, 75
 plan view, 78
 printing mechanism, 79
 programming, 87–89
 published accounts, 88
 punched cards, 79, 86, 88
 relative addressing, 86
 sophistication, 79
 speed, 82–83
 store, 76–77, 79

Analytical Society. *See* Babbage, Charles

Antikythera device, 162–164

Approximation of functions, 64

ARC computer, 220

Arithmometer. *See* Thomas, Charles Xavier

Artillery firing tables, 237. *See also* ENIAC; Gunnery computers

ASCC, 215, 221, 244
 components, 216
 constant switches, 216
 control system, 216–217, 221
 operation, 215, 217
 reliability, 219–220
 uses, 218

Astrolabe, 165

Atanasoff, John V., 226–230, 247
 and John Mauchly, 238–239

Atanasoff-Berry computer. *See* ABC

Automata, 100–101

Automata theory, 119

Automatic Sequence Controlled Calculator. *See* ASCC

B Babbage, Benjamin, 60
 Babbage, Charles, viii, 3, 60–62, 66, 75–91, 200. *See also* Analytical engine; Carry mechanisms, anticipating; Difference engine awards, 65
 calculating machines, importance of, 95
 Clement, relations with, 67
 control mechanisms, 85–86, 211
 death, 62
 feedback functions, 75
 logarithms, 27
 publications, 61, 75
 Scheutz difference engine, 90
 second difference engine, 90
 Babbage, Henry P., 67, 91
 Baldwin, Frank S., 51
 Ballistic Research Laboratory, 237
 Ballistics, 166. *See also* ENIAC; Gunnery computers
 BARK computer, 220
 Bauersfeld, Walter, 165
 Bell Telephone Laboratories, ix, 177, 192, 207–212. *See also* Complex Number Calculator; Relay Interpolator
 calculating machines, 210
 Model II, 210
 Model III and IV, 211
 Model V, 211
 Model VI, 213
 need for calculators, 208
 Berry, Clifford, 228, 230. *See also* ABC; Atanasoff, John V.
 Bi-quinary numbers, 212
 Billings, J.S., 124
 BINAC computer, 245
 Binary coded decimal, 209
 Binary numbers, 204, 227, 244
 Bletchley Park. *See* Colossus machine
 Bomb sight computers. *See* Gunnery computers

- Boole, George, 105–106
 - Boolean algebra, 105–106, 117
 - Boolean functions. *See* Colossus machine
 - Booth, Andrew Donald, 220
 - Bradley, Francis, 112
 - Branching of control, 211
 - Briggs, Henry, 25–26, 29. *See also* Logarithms
 - British Tabulating Machine Company. *See* BTM
 - Brown, T.H., 214
 - Brunsviga calculating machine, 52–53
 - Bryce, James W., 136, 215
 - BTM, 137, 151
 - Bug (Hopper moth), 221
 - Bull. *See* Machines Bull
 - Burack, Benjamin, 114
 - Bureau of the Census. *See* Census; Census Bureau; Hollerith, Herman
 - Burkhardt, William, 115, 117
 - Burroughs, William S., 59
 - Burroughs Corporation, 254
 - Bush, Vannevar, 177, 179–180, 183, 185. *See also* Differential analyzer
- C**
- C-T-R, 136
 - equipment, 141–142
 - growth of, 136
 - Card Programmed Calculator. *See* CPC
 - Card sorter. *See* Sorting
 - Carroll, F.M., 136
 - Carry mechanisms, 225
 - anticipating, 76, 80
 - difference engine, 71
 - Leibniz's, 46–48
 - Pascal's, 41–43
 - Scheutz's, 93
 - Schickard's, 38–39
 - Census. *See also* Hollerith, Herman
 - data card, 125
 - equipment, 131
 - Hollerith's results, 130
 - mechanization of, 123
 - operations in, 125, 128
 - punched card, 126–127
 - speed of machines, 129
 - tabulating machine, 128–129
 - Census Bureau, 255
 - Chess playing machines, 95, 102
 - Chinese abacus, 7, 14
 - Choreb, 14
 - Clement, Joseph, 66–67, 96
 - Clocks, 163–171
 - Jens Olsen (Copenhagen), 165
 - Strasbourg cathedral, 165
 - Clockwork, 100–101
 - Code breaking, 232–236, 255
 - Colmar, Thomas de. *See* Thomas, Charles Xavier
 - Colossus machine, ix, 232–236
 - influence of, 235–236
 - later models, 235
 - operation, 232–234
 - Columbia University Statistical Bureau, 147, 153
 - Commercial versus scientific problems, 213
 - Complement numbers, 71
 - Complexity theory, 119
 - Complex Number Calculator
 - components, 209
 - operation, 209
 - origins, 208–209
 - remote access, 210
 - speed, 209
 - Comptometer, 54–55
 - speed, 54
 - Computer
 - characteristics, 251–252
 - components, 251
 - development of, 252–253
 - first modern, 236
 - input/output equipment, 254
 - manufacturers, 254
 - market for, 253
 - Computer design, 117
 - Computer patent, 238–239
 - Computer Research Corporation, 245, 254
 - Computing-Tabulating-Recording Company. *See* C-T-R
 - Comrie, L.J., 95–96, 147, 224
 - Control systems, 211, 218, 230, 246. *See also* Paper tape control

Control Systems (*cont.*)
 systems
 Analytical engine, 85–86
 ASCC, 216–217, 221
 ENIAC, 241
 Coradi planimeter. *See* Planimeters
 Coulba, 14
 Counting, 4
 Counting board, 10–11
 CPC, 149, 246, 253, 255

D Daniell, John Frederic, 109
 Davy, Sir Humphrey, 65–66
 DeForest, Lee, 223
 Dehomag, 137
 Delamain, Richard, 29
 De Morgan, Augustus, 31, 105, 110
 Descartes, Rene, 103
 Difference engine, 59–60, 62–74. *See also* Babbage, Charles; Comrie, L.J.; Grant, George; Scheutz
 difference engine; Wiberg, Martin
 addition mechanism, 71
 Babbage's first (1822), 64
 Babbage's second, 90
 carry mechanism, 70
 construction of, 65, 67
 design, 68–72, 74
 government support, 66
 importance of, 95–96
 Lardner's description, 92
 limitations, 75
 logarithm tabulation, 73–74
 number register, 70
 operation, 70–72
 origins, 62
 printing results, 65, 73–74
 size, 70
 speed of, 64
 spin-offs, 67
 Differences, method of. *See*
 Difference engine
 Differential analyzer, ix, 179–185,
 189–190, 193, 237, 253. *See also*
 Analog computing devices
 accuracy, 180, 183–185
 components, 181, 183, 185
 invention of, 174, 176–177

 MADDIDA, 245, 248
 Meccano, 184
 RDA2, 185
 torque amplifiers, 177
 use of, 182–185
 Differential equations, 180. *See also*
 Differential analyzer
 Differential gears, 160, 162, 164
 Differential machine. *See* Smee,
 Alfred
 Digital, 247
 Digital calculation, 156
 Digital computer, inventor, 239
 Digital versus analog techniques, 196
 Disk integrator. *See* Integrators
 Dondi, Giovanni de, 165
 Duplation, 6
 Durfee, B.M., 136, 149
 DVL. *See* Schreyer, Helmut; Zuse,
 Konrad, Z3
E EAM. *See* Tabulating machines
 Eccles-Jordan flip-flop, 225, 240
 Eckert, J. Presper, 236–242
 Eckert, Wallace J., 147, 149, 153,
 214, 224, 244
 Eckert-Mauchly Computer
 Corporation, 239, 245
 Edison, Thomas, 223
 EDVAC computer, 243, 254
 Ehrenfest, Paul, 117
 Electric accounting machine. *See*
 tabulating machines
 Electro-biological machine, 109
 ElectroData, 245, 254
 Electromagnetic technology. *See*
 Relay
 Electronic calculators, 223–249
 Electronic Numerical Integrator and
 Computer. *See* ENIAC
 Electronic technology, 218, 223–249,
 252. *See also* Schreyer, Helmut;
 Zuse, Konrad; Z2
 reliability of, 220, 242–243, 246
 versus relays, 224
 Engineering Research Associates,
 220, 255
 ENIAC, ix, 226, 236–242

- circuit, 240
 - components, 240–241
 - control system, 241–243
 - influence of, 236, 243
 - modification of, 242–243
 - origins, 236–237, 239
 - reliability, 242
 - speed, 241
 - use, 242
 - vacuum tubes, 240
 - Enigma, 236. *See also* Colossus machine
 - ERA, 220, 255
 - Euler, Leonhard, 112
 - European abacus, 8
- F**
- Feedback, 180, 182
 - Felt, Dorr E., 54, 59
 - Fibonacci, 10
 - Fleming, J.A., 223
 - Flint, Charles, 136
 - Flip-flop, 225, 240
 - Flowers, Thomas H., 233, 235
 - Ford, E.A., 136, 140
 - Ford, Hannibal, 187
 - FORTRAN, 255
 - Foster, William, 29–30
 - Fourier analysis, 172, 179
 - Frege, Gottlob, 106
 - Fuller's slide rule, 33, 196
- G**
- Galvani, Luigi, 109
 - Gang punch, 125
 - Geheimschreiber. *See* Colossus machine
 - Gelosia multiplication, 17–18
 - Genaille, Henri, 20
 - Genaille-Lucas rulers, 20–23
 - Gerbert, 35
 - Godel, Kurt, 117
 - Gonnella, Tito, 167
 - Grant, George, 94
 - Gunnery computers, 162, 166, 186–190, 192. *See also* Analog computing devices; Ballistics; Bell Telephone Laboratories, Models II, III, IV
 - M-9 anti-aircraft, 192
 - use of, 187
 - Gunter, Edmund, 27–29
 - Gunter's line of numbers, 28–29
- H**
- Halting problem, 119
 - Hamilton, Frank, 244
 - Hanzawa, Masao, 117
 - Harley, Reverend Robert, 108
 - Harmonic analyzer, 158, 172–176, 180
 - Harmonic synthesizer, 172, 177
 - Hartree, Douglas R., 184
 - Harvard calculating machines, ix, 213–219. *See also* ASCC origins, 214
 - Harvard Mark II, III, IV, 218, 221
 - Hatchet planimeter. *See* Planimeters
 - Heath Robinson. *See* Colossus machine
 - Hermann, Herr, 167
 - Heron of Alexandria, 100–101
 - Herschel, John, 60, 62
 - Hindu-Arabic numerals, 10
 - Holbach, Baron d', 104
 - Hollerith, Herman, 122–134, 136. *See also* Census; Punched-card machinery
 - competition with Powers, 137
 - Hollerith Electric Tabulating System. *See* Punched-card machinery; Tabulating machines
 - Hopper, Grace, 217, 221
- I**
- IBM. *See also* ASCC; Aiken, Howard; C-T-R; Hollerith, Herman; Tabulating Machine Company; Watson, Thomas J.
 - competition with Remington Rand, 142, 151
 - founding, 137
 - growth of, 138
 - punched-card equipment, 142
 - war-time growth, 149
 - IBM 704 computer, 115
 - IBM 1401 computer, 151
 - IBM 400 series machines, 143

IBM 600 series machines, 149-150
 IBM Card Programmed Calculator,
 149, 246, 253, 255
 IBM Pluggable Sequence Relay
 Calculator, 149
 IBM SSEC, 149, 244
 Inca abacus, 8
 Institute for Advanced Study
 computer, 255
 Instruments, analog, 156-204
 Integraph, 179
 Integrating tabulator. *See* Tabulating
 machines
 Integrators, 167, 174, 179-185, 187
 International Business Machines. *See*
 IBM
 Iowa State College, 153. *See also*
 ABC; Atanasoff, John V.
 Isograph, 177

J Jacquard, Joseph Marie, loom, 60,
 87, 124
 Jacquard cards, *See* Analytical
 engine, punched cards
 Japanese abacus, 7, 15
 Jaquet-Droz writer, 102
 Jetons, 12
 Jevons, William Stanely, 108,
 110-113
 Jevons' logic piano, 110

K Kalin, Theodore, 115, 117
 Kastner, A. G., 45
 Kelvin, Lord, 158, 162, 172-176, 180
 Kepler, Johann, 25. *See also*
 Schickard, Wilhelm
 Key-driven adding machine. *See*
 Comptometer
 Key punch, 133, 142
 Kircher, Athanasius, 19, 29, 105

L Lake, C.D., 136, 142, 149
 Lambert, J.H., 112
 La Mettrie, Julien de, 103
 Lardner, Dionysius, 89, 92
 Lasker, W.W., 140

Laws of thought. *See* Boolean algebra
 Lawson, Judge Earl, 239
 Leibniz, Gottfried Wilhelm, 42, 44,
 105, 112
 carry mechanism, 46-48
 mechanical calculator, 45-47, 49
 Royal Society relations, 48
 stepped drum mechanism, 45, 49,
 51
 Leonardo of Pisa, 10
 Linear equation. *See* ABC; Wilbur
 linear equation solver
 Logarithms, 3, 23-25, 28. *See also*
 Napier, John
 base, 26
 spread of, 26-27
 tables, 26-28
 use of, 27
 Logic diagrams, 112
 Logic machines, 99-122
 electrical, 114-115
 electromechanical, 114, 116
 programmed, 115
 usefulness, 115
 Logic piano, 110-113
 Logic, mechanization of, 105
 London University, 220
 Lovelace, Ada, 88, 211
 programs for Analytical Engine,
 89
 Lucas, Edouard, 20
 Ludgate, Percy, 95
 Lull, Raymond, 104-105

M Macaroni box comptometer, 55
 Machines Bull, 137
 MADDIDA, 245, 248
 Maillardet, Henry, 102
 Mallock machine, 178
 MANIAC, 255
 Mannheim, Amedee, 31-32
 Marquand, Allen, 113-114
 Matsuzake, Kiyoshi, 7
 Mauchly, John W., 210, 236-242
 and John V. Atanasoff, 238-239
 Mayo, Herbert, 109
 Mechanical calculating machines.
 See Brunsviga calculating

machine; comptometer;
 Leibniz, Gottfried Wilhelm;
 Millionaire calculating
 machine; Pascal, Blaise;
 Schickard, Wilhelm;
 Thomas, Charles Xavier
 Mechanical calculator systems. *See*
 Zuse, Konrad, Z1
 Mediation, 6
 Memory systems
 electronic, 227, 254
 mechanical, 205–206
 regenerative, 228, 254
 Menabrea, L.F., 88
 Merriam, W.R., 132
 Mersenne, Fr. Martin, 29
 Method of differences, 62, 148
 Microprogramming, 89
 Millionaire calculating machine, 56
 MIT, 179, 185, 191, 254
 Moore School of Electrical
 Engineering, 236–242
 Multiplication, analog, 160

N Nakasima, Akira, 117
 Napier, John, 3, 16
 logarithms, 23, 25–26
 Napier's bones, 3, 17–19, 36–38,
 57
 publications, 25
 Napier's bones. *See* Genaille-Lucas
 rulers; Napier, John
 National Bureau of Standards, 254
 National Cash Register, 254
 Naval gunnery computers. *See*
 Gunnery computers
 Network analyzer, 178
 Neumann, John von, 210, 220
 Newman, M.H.A., 233
 Nicholas of Cusa, 105
 NORC, 255
 North, S.N.D., 133
 Northrop Aircraft, 245
 Number system, 4
 additive, 5–6
 bi-quinary, 212
 Egyptian, 5
 floating point, 205, 211

 positional, 6
 Roman numerals, 5–6

O Odhner, Willgodt T., 52, 59
 Olsen, Jens, 165
 Operational amplifier, 192
 Orreries, 163–171
 Orrery, Earl of, 165
 Oughtred, William, 28–30. *See also*
 Slide rule
 circles of proportion, 30

P Pantograph punch, 126–127
 Paper tape control systems, 203, 206,
 211, 216. *See also* ASCC
 Paper tape reader, Colossus, 233
 Pascal, Blaise, 34, 39–40
 carry mechanism, 41–42
 mechanical calculator, 39–43
 Peacock, George, 60
 Peano, Guiseppe, 106
 Petit, Pierre, 20
 Phillips, William, 225
 Pierce, Charles Saunders, 106, 113
 Pin-wheel gear. *See* Variable-toothed
 gear
 Pipeline, 72, 83
 Planetariums, 163–171
 Planimeters, 167
 Amsler, 169–170
 Coradi, 171, 177
 first examples, 167
 hatchet, 170
 moment, 171
 Pluggable Sequence Relay
 Calculator, 149
 Polar planimeter. *See* Planimeters
 Pope Sylvester II, 35
 Porter, Robert P., 124
 Positional number systems, 6
 Powers, James Legrand, 136
 competition with Hollerith, 137
 Powers Accounting Machine
 Company, 135–136, 140. *See also*
 Remington Rand Corporation
 equipment, 141–142, 200
 Powers Key punch, 134

Powles Caliparea, 160
 Prefix arithmetic notation, 209
 Price, Derek de Sola, 164
 Program controlled calculator. *See*
 Relay calculators; Paper tape
 control systems
 Program storage, 213. *See also* Paper
 tape control systems
 internal, 212
 paper tape, 211
 Prosthaphaeresis, method of, 23
 Punched cards
 ABC computer, 230
 Analytical engine uses, 76
 numeric, 138
 types, 139–140, 142, 151
 U.S. census, 125–127
 Punched-card machinery, viii,
 122–155, 213–215, 254. *See also*
 BTM; C-T-R; IBM; Powers
 Accounting Machine Company
 advantages, 129–130
 commercial development,
 135–146
 commercial use, 145
 competing firms, 137
 early trials and patents, 124
 electronics in, 149–150
 equipment, 125–127, 129,
 133–134, 141, 143, 200
 improvements to, 132, 134, 140,
 142
 industry size, 137
 mechanical principles, 140
 office equipment, 141
 publicity of, 130–131
 reliability, 132
 replacement by computers, 150
 sales analysis with, 146
 scientific applications on,
 147–148
 speed, 144
 spread of, 132
 statistics, 144. *See also* Census
 ultimate development, 149–155
 uses of, 132, 144–146, 148, 153

Q Quarter-squares formula, 198

R Rabdologia. *See* Napier, John
 Radar, 226
 RDA2, 185, 253. *See also*
 Differential analyzer
 Reckoning table, 10–11
 Recorde, Robert, 12–13
 Recursive function theory, 117, 119
 Relational Machine. *See* Smee, Alfred
 Relay, 201–202
 Relay calculators, 200–222. *See also*
 AARA computer; BARK computer
 reliability, 219
 Relay Interpolator, 210–211
 Relay versus mechanical
 components, 202–203
 Reliability
 of ASCC, 219–220
 of electronics, 220, 234, 242–243,
 246
 of punched-card equipment, 132
 of relay equipment, 219
 Remington Rand Corporation, 137,
 239
 competition with IBM, 142, 151
 Remote terminals, 209–210
 Resolver, 158–159, 172, 194
 Ring counters, 225
 Rockwood, Charles, 113
 Roman numerals, 5–6
 Russell, Bertrand, 106, 115

S Salamis abacus, 8–9
 Sang, Edward, 167
 Scheutz, Edvard, 92
 Scheutz, Georg, 92
 Scheutz difference engine, 90, 92–94
 calculated tables, 93
 construction, 93
 operation, 93
 second copy, 93
 usefulness, 93–94
 Schickard, Wilhelm, 34–35
 contact with Kepler, 36
 mechanical calculator, 36–37, 39
 Schott, Gaspard, 19
 Schreyer, Helmut, 205, 230–232. *See*
 also Zuse, Konrad

Scientific Computing Services, 147
 Scientific versus commercial
 problems, 213. *See also*
 Punched-card machinery
 Scott, Michael, 16
 SEAC, 254
 Seaton device, 123
 Sector, 28, 31
 Selective Sequence Electronic
 Calculator, 149, 244
 Servomechanisms, 188
 Sestakov, V.I.S., 117
 Shannon, Claude, 116–117
 Shapley, Harlow, 214
 Slide rule, 3, 27–28, 30–31, 66
 accuracy, 196
 American use, 32
 circles of proportion, 30
 circular, 29
 demise, 33
 Fuller's, 33, 196
 Mannheim, 31–32
 origins, 29–30
 scales, 32
 Soho, 31
 Thatchers, 196
 Smee, Alfred, 108–110
 Soroban, 7, 15
 Sorting, 152
 Hollerith sorter, 133
 machines, 140–143
 needle, 133
 Sorting box. *See* Tabulating machines
 Sperry Gyroscope Co., 189
 Sperry Rand, 150. *See also*
 Remington Rand Corporation
 SSEC, 149, 244
 Stanhope, Charles, third Earl of, 106
 Stanhope Demonstrator, 106, 108
 Stchoty, 14
 Steiger, Otto, 56
 Stepped drum gear, *See* Leibniz,
 Gottfried, Wilhelm
 Stibitz, George, viii, 203, 207–212,
 247. *See also* Complex Number
 Calculator; Relay Interpolator
 excess-3 code, 209
 model K, 208
 Stored program concept, 235,

243–244, 246, 252
 Strowger, Almon, 202
 Sub-tabulation method, 64
 Svoboda, Antonin, 166, 191
 Swanpan, 7, 14
 Swiss Federal Technical Institute.
 See Zuse, Konrad, Z4
 Sylvester II, Pope, 35
 Symbolic logic. *See* Logic machines

T Tables, 27, 65–66, 73–74, 93–94, 96,
 148, 218, 237, 242, 244. *See also*
 Logarithms
 ballistic, 190
 Tabulating Machine Company, 132.
 See also C-T-R; Census; Hollerith,
 Herman; IBM
 early operations, 135
 growth of, 136
 Tabulating machines, 122–155, 200.
 See also Hollerith, Herman; IBM
 alphabetic, 142
 improvements in, 132
 operation, 129
 Tarrant, Robert, 54
 Telegraph relay, 202
 Telephone switching, 202
 Teleregister, 245
 Thomas, Charles Xavier, 50, 59, 66
 Thompson, J.J., 223
 Thomson, James, 174
 Thomson, William. *See* Kelvin, Lord
 Tide predictors, 162, 172–176
 Torque amplifier, 177, 180
 Torres y Quevedo, Leonardo, 95
 Turing, Alan M., 89, 117–119, 233
 halting problem, 119
 Turing machines, 118–119
 Turing Machine, *See* Turing, Alan M.

U United States census. *See* Census
 Univac 1004 calculator, 150
 Universal Turing Machine. *See*
 Turing, Alan M.
 University of London, 220

V Vacuum tubes. *See also* Electronic technology
 ENIAC, 240
 reliability, 234
Van Kempelen chess playing
Variable-toothed gear, 51–52
Venn, John, 112
Venn diagrams, 112
Vickers predictor, 188
Vlacq, Adrian, 27

W Wang, Hao, 115
Watson, Thomas J., 136, 214–215, 244
Watt, James, 31
Wetli integrator. *See* Integrators
Whirlwind computer, 254

Whitehead, Alfred North, 106, 115
Wiberg, Martin, 94
Wiener, Norbert, 210, 254
Wilbur linear equation solver, 177, 179
Wood, Tom, 7
Written number systems, 4
Wynn-Williams, C.E., 225, 233

Z Z1–Z11. *See* Zuse, Konrad
Zuse, Konrad, ix, 203–206, 215, 220, 230–231
 influence of, 206
 mechanical memory, 206
 Z1, 204–205
 Z3, 205–206
 Z4, 206–207, 221
 Z11, 220