Index

Note: Page numbers in *italics* refer to Figures; those in **bold** refer to Tables

Abercromby, Ralph, cloud expert 260, 271
  cyclone diagram 261, *262*
Adams, George, the Younger, electrometer (Wh.6648) 161, *162*
Adelaide Gallery, London 125
Agar, Jon 293
Airy, George, Astronomer Royal 136
Åkerman, Anders, globe pairs 76
Alberti, Samuel 240
Allaun, Charles, patent for mechanical monkey calculator 242
almanacs
  late medieval 52
  see also calendars
Ampère, André-Marie 166
Anderson, Edgar, botanist 227
Anderson, Katharine 262
Anderson, Robert, *Stereometrical Propositions* 95
Angeli, Jacopo, renaming of Ptolemy's *Geography* as *Cosmography* 58, 61
Antikythera mechanism 214
Antinori, Vincenzo 132
antiquaries, reconstruction of medieval instruments 41
Antique Art Galleries 200
Apian, Peter
  Cosmographicus Liber (1524) 58, *59*, 60–3, 67
  navicula sundial (Wh.0731) *62*, 62
  and paper universal altitude sundial (*organum Ptolomei*) 59, *60*, 62
  and Ptolemy 60
Apollo–Soyuz Test Project (1975) 302
archaeology, and identification of astronomical instruments 40–4
arithmometers 154
  Colmar's 138, 148
armillary spheres 66, 68, 70
astrolabe Wh.0305 (Joannes Bos fake) 202, 204, 207, *208*
astrolabe Wh.1264 (late medieval English astrolabe) 12–31, *13*
  calendar of feast days 18, 21–2, *22*
  dating 15
  material 15
  practicality of 30
  and St George 28
  settings (almucantars) 16, *17*
  size 15
  stars marked on rete 19, **20**
  tympans (absent) 16
astrolabes 11
  Chaucer's *Treatise* on 19
  instructions for making 36, 71
  latitudes 16, 45
  modifications and repairs 14
  owners of 44–5
  paper or wooden 41, 51
  role in medieval culture 30
  sale prices 198
  Sloane 21, 26
  Sutton's universal 84
    reverse print from 85
  for timekeeping 17
  see also astrolabe Wh.0305; astrolabe Wh.1264
astrological medicine 51
astrology
  Arabic star names 19, **20**
  and Christianity 14
astronomical instruments
  and archaeology 40–4
  manuscripts and texts 35–41
  owners 36
  portable 33
  practical uses for 35, 52
  for teaching and reference 34
  of wood 41
  see also astrolabes; cosmographical instruments; cylinder dials; navicular sundials
astronomical staff (Apian) 68, 71
astronomy 77
  see also cosmography
atlases 70
  cosmographic 75
augrim (calculating) stones 39

Augustine of Canterbury, St 27
Automatic Coil Winder and Electrical Equipment Co. 182
auxanometer, self-recording (Wh.2766) 104, *105*
Ayrton, William 176

Babbage, Benjamin Herschel 149
  drawing *127*
  guidebook to difference engine model 126, 131
  models by 125
Babbage, Charles
  analytical engine project 128
  autobiography 134
  death 141
  doctrine of immortality 143
  house in Dorset Street 136–7, 144
  inspired by Jacquard loom 129
  and manufacturing 123, 128, 141
  and memory 122, 128–9
  and Polytechnic Institution 120
  preservation of brain *142*, 142
  public funds for calculating engine 122
  Treatise 129, 143
  see also difference engine
Babbage, Charles Whitmore 149
Babbage, Henry
  commemoration of father 143
  and construction of mill of analytical engine 144–6, 151
  construction of parts of father's models 135, 140, 146, 148–50
  early career 135–7
  family *144*
  gifts to Cambridge 132
  instructions for model 131, 150, **156–7**
  Memoirs 149–50
  model of difference engine (Whipple Museum) (Wh.2339) 130, *131*, 135, 154–5
  move to Bromley 144
  move to Cheltenham 150
  and technical notation of drawings 139, *139*
Babbage, Nevil Francis 130
Balfour, Arthur 285
Ball, Robert 153
Barbosa, António, *Elementos de cosmografia* (1926) 76
Barker, D.W. 270
Barozzi, Francesco 70
Bateson, William 276, 282
  and Punnett 277, 283, 285
battery, Volta's invention 160–1
Baxandall, David 152
Belleforest, François de 74
Bennett, Abraham 161
Bennett, Jim, on sundials as cosmographical instruments 55, 60, 81
Bergman, Tobern 75
Berkeley, Revd Miles Joseph 110
Bernal sale (1855) 203
Bernstein, Ralph 302
Biancani, Giuseppe 70
Biffen, Rowland 286
Bion, Nicolas, Stone's translation of *The Construction . . . of Mathematical Instruments* 97
Birminghan Philosophical Society 148
Blaeu, Willem Janszoon 75
Blundeville, Thomas, *Exercises* 69
Bond, Wilfred Noel, cloud camera 265, *266*
Bos, Joannes 214
  see also astrolabe (Wh.0305)
botanical instruments 103–7
botany
  collectors 109, 113
  cryptogamia (non-flowering plants) 104
  systematic 107
  taxonomic systems 102, 104
Botulph, St 25
Bowditch, Henry Ingersoll 125
Bowditch, Nathaniel 128
Boys, Charles Vernon 151, 153
Bradshawe, Mary (Min), wife of Henry Babbage 137, 141, *144*
Bragg, Lawrence 207
brain, and terminology of intellectual labour 142
Brand, Stewart, *Whole Earth Catalog* (1968) 297, 311
Bredon, Simon, Oxford scholar 37
Bree, Revd William, botanist 113
British Association (for the Advancement of Science) 140
  and analytical engine 145
  Babbage's models at 125
  Committee on Electrical Standards 170
  Henry Babbage's lecture (1888) 151
British Broadcasting Company (BBC) 183
British Museum, acquisition of antique scientific instruments 190, 193, 203
Brooker, Arthur 172
Brunel, Isambard, *Great Eastern* 137, 140
Brunel, Marc 124

Bryden, David 84, 95, 154
and Babbage's difference engine 135
Buxton, Harry 130

calculating machines 148
see also calculators; Consul, the Educated Monkey; difference engine
calculators
hand held electronic calculator collection (Wh.4529) 291–311, *292*
and ephemera 295, *295*
HP-35 'electronic slide rule' 295–9, *299*
HP-65 programmable 291, 300–3, *301*, *303*
personalisation 295
programmable 302
programming infrastructure 304–6
user communities 310
calendars
on astrolabes **23**
choice of, for astrolabes 26
of feast days, on Whipple astrolabe 18, 21–2, *22*
use of saints' days 22
Cambridge Philosophical Society 3
Cambridge Scientific Instrument Company 2, 103
galvanometers 159, 177–9
Cambridge University
1944 exhibition of Whipple collection 205
Department of History and Philosophy of Science 4, 188
genetics research at 285
Gotham Loan Chest 36
Canterbury, quadrant found in 47, *48*
Carrington, Benjamin, botanist 102
Casella, L. P. 2
Castlemaine, Earl of, globe (Wh.1466) *78*, 79
cataloguing projects, post-war 203
Catherine, St 28
Cave, Captain C. J. P. 257, 264, 272
Cavendish Laboratory, Cambridge 132, 178, 204
Cedillo Díaz, Juan, professor of cosmography 72
Celtis, Conrad 63
Central Institution, South Kensington 176
Ceruzzi, Paul 310
Chad, St 25
Chaucer, Geoffrey
Canterbury Tales 38, 51
Treatise on the Astrolabe 19, 25, 36
Chaves, Alonso de 73
Chetham's Library, Manchester 117
Chetwode, Buckinghamshire, quadrant found in 47, *48*
chicken breeding 284, 286
and epistasis in comb types 278
chicken heads, plaster models (Wh.6547) 275, *276*
limitations of 288
as teaching aid 282
for visualisation 282–5
chimpanzees, performing (US vaudeville) 249–53
Christianity, and astrology 14, *15*
chronogram, on fake sundial 196
Clark, Constance 252
classification, of collections 207
Clement, Joseph
master engineer 123
workshop 124, 147
Clement, St 29
Clifford, William 142–3
clocks, mechanical 33, 66
cloud cameras (Wh.4416) 257–9, *258*
early pinhole 264
fish-eye lens 257
obsolescence 273
translation from distortion to conventional image 265–8, *267*
clouds 260–2
Abercromby's cyclone diagram 261, *262*
classification 260, 269
reference images of 271
and relation to pressure systems 263
universality of forms 261
see also meteorology
Cold War, and computers 301
collecting and collectors
and anomalous objects 214
botanical 109, 113
changing nature of 214–16
and classification 207
factors in Whipple's interest in 210–12
as hobby 191
and visibility and legibility of objects 207
see also Evans, Lewis; Whipple collection; Whipple, Robert
Collins, John
descriptions of quadrants 91–4
The Sector on a Quadrant . . . 86–90
Colmar, Charles Thomas de, arithmometer 138, 148
compass dials
diptych (Wh.1681) 68, *69*
with nocturnals 45
portable 45–7, 51

compasses, magnetic 68
computers, mainframe 296
computers, personal
  Altair 8800: 291
  appeal of early 293
  microcomputers and PCs 304, 310
  and microprocessor technology 297
  origins 291
  ownership and autonomy 301
  prices 302
  Reverse Polish Notation (RPN) 296, 298
  and social politics 297
  and synthetic programming 309–10
Consul, the Educated Monkey, calculator toy (Wh.5821) 237–55, *238*
  advertisement for 253
  appeal of 252–4
  appearance 237, 252
  as calculator 241–3
  development of 241
  fragility 243, 248
  instructions 243, 245, *246*, 249
  mathematical puzzle in 246, *246*
  and Multe game 247–8
  as teacher 241–8, *246*
  as toy 238, 248–54
Consul, trained chimpanzee 249
  news coverage 250
Cooke, John, and Piltdown forgery *217*
Cooke, William Fothergill 175
Coronelli, Vincenzo Maria 75, 79
Corrie, Susannah, moss collector 114
cosmographers 64
  encyclopaedic cosmographies 70, 74
  manufacture of sundials 63
cosmographical instruments 66–74
  sundials as 55, 58–65
cosmography
  historical use of term 79
  school textbooks 76
  textbooks 69–70
  use of term in English 77
cosmography, Renaissance 55
  apparent decline after 1600: 57, 74–9
  and geography 61
  and mathematics 69
  and Ptolemy's *Geography* 58, 69
Coulomb, Charles-Augustin, law of electrostatic force 163, 168
Crop, John 39
Curie, Pierre and Marie, electroscope 164
cylinder dials 38, 41

Dalton, James, copy of Hobson's *Musci Britannici* 117
Danti, Egnatio 60
  manufacture of instruments 64–5
Darwin, Charles, Académie des Sciences, Paris 103
Darwin, Francis 104
Darwin, Horace 2
  botanical instruments 103
Daston, Lorraine 107, 240
Dawson, Charles, and Piltdown forgery 216
De la Rue, Warren 173
Delcambre, Colonel 264
Devonshire Commission on scientific instruction (1876) 127
Dewey, John 240, 244
Dick, Stephanie 294
difference engine (Babbage's)
  addition and carriage mechanisms 124, 140, 149
  deemed a failure 147
  demonstration models 125
  displays 124, 136, 148
  drawings by Benjamin Babbage 125
  fragments of, as gifts 130
  Henry Babbage's models 146
  machine tools for 123
  at Mathematical Laboratory, Cambridge 134
  modern working version of second engine 154
  public funds for 122, 136
  relics on display 126
  Whipple Museum segment (Wh.2339) 130, *131*, 135
Digital Equipment Corporation, minicomputers 296
diptych compass dial (Wh.1681) 68, *69*
Dobbys, Robert, owner of astrolabe 37
Dorsey, Noah Ernest 164
Drummond, Thomas, moss collector 110, 115
Duddell, William Du Bois 179–81
Dunn, Leslie Clarence 287
Dunstan, St 27–8
Dupin, Charles 125

Edinburgh, analytical engine mill on display 153
Edney, Matthew 80
education
  mathematics 255
  progressive theories of 240, 244–5, 254
  see also teaching
Educational Novelty Company, Dayton, Ohio 239, 241, 243
Educational Toy Manufacturing Co. 243, 253

educational toys 241–8, 254
Edward I, King 29
Edward III, King 29
electrical measuring instruments 159
  black-box technologies 159
  development of 183–5
  incomplete, in Whipple collection 184
  see also electrometers; galvanometers
electricity, early detection of 161
electromagnetism, measurement of 160, 165
electrometers 161–5
  Adams (Wh.6648) 161, *162*
  calibration 163
  Curie-type gold-leaf (Wh.1353) *162*, 164
  gold-leaf 161
  principles of 161
electroscopes 161, 163
  to measure radioactivity 164
  use for atmospheric electricity 165
Elliott Brothers, galvanometer *169*, 170
Eton College, *Musci Britannici* copy 107
Evans, Lewis, collector of antique scientific instruments 48, 187
  annotation of sales catalogues *188*, 188, 192, 196
  collection *189*, 203
  identification of fakes 196, **197**, 203
  and sundials 199
Evans, Sir Arthur 187
evolution, teaching of 252
exhibitions
  1851 Great 122, 137
  1862 South Kensington 121
  1876 South Kensington 127
  1911 Coronation 153
  1944 Cambridge 205
  1976 Science Museum 135
  analytical engine mill in 153
exsiccatae (sets of dried specimens) 101
  observational function of 103, 117
  production of 110

Farr, William, General Register Office 121, 138, 143, 145
Ferguson, Richard Saul 22
Findlay, Sir John, collector 191
Finé, Oronce 60
  De cosmographia sive mundi sphaera 69
  De solaribus horologiis . . . 64
Finsbury Technical College 175
First World War, and meteorological research 259, 264
Fisher, William, bookseller 86
Fitzgerald, William, journalist 152
Fleming, John Ambrose 170
forgers, and response to market 220
forgery, detection of 201
  difficulties of 212
  international cooperation and data 202, 213, 220
  metallurgical analysis 206–7
  visibility and legibility 207, 214, 218
Foster, Professor George Carey 176
France, Office National Météorologique de 263
Franklin, John, Arctic expedition 155
Franks, Augustus Wollaston, collection of scientific instruments 203
Frederik Muller & Co., dealers 204, 208
Frisius, Gemma 60, 67
Froissart, Jean, *L'orloge amoureus* 33*n*2, 33
Fusoris, Jean, of Paris, astrolabe maker 21

Gallucci, Giovanni Paolo, *Della fabrica et uso di diversi stromenti* . . . 71
galvanometers 159–86
  and astatic needle 167
  AVOmeter 182
  Ayrton–Mather type 169
  D'Arsonval type 167
  development of 166
  and electromagnetism 165
  'Lineman's Detector' (Wh.3090) *169*, 171–2
  to measure strength of electrical current 160
  and measurement of alternating currents (AC) 180
  moving-coil 167
  moving-coil pointer multimeter *179*, 181–3
  moving-coil reflecting (Wh.4190) 177–8, *177*
  moving-coil reflecting (Wh.4292) 184
  moving-magnet 167
  moving-magnet pointer (Helmholtz tangent type) (Wh.1347) 166
  moving-magnet reflecting (Wh.0939) *169* 169–71, 185
  standardised and bespoke 178–83
  thermal reflecting (Wh.4045) *179*, 179–81
  and torsion balance 168
  see also electrometers
Garton, William, engineer 136
Gatty, Margaret, *The Book of Sun-dials* (1872) 199

General Post Office, Telegraphic School of Science 172
Genetical Society of Great Britain 285
genetics 275–90
  developments in 285–90
  inheritance patterns 279
  see also Mendel's laws
geography 70, 77
  and cosmography 61, 80
  textbooks 75
George, St 27–8
Ginzburg, Carlo, 'semiotic paradigm' 204, 219
globes 76
  celestial 66
  cosmographical 67, *67*
  'English' or 'Castlemaine' (Wh.1466) 78, *78*
  pairs 76, 78
  terrestrial 66
Goclenius, Rudolf, *Cosmographiae seu sphaera mundi descriptionis* 70
Gonville, Edmund 29
Good, John, account of Sutton quadrants 96–7
Gould, Rupert 134
Gower, John, *Confessio Amantis* 39
Gravatt, William 126, 138
Gray, Asa, botanist 103
Gray, John Edward, naturalist 114
Great Exhibition (1851) 122, 137
Gregorian calendar, on Sutton's quadrant *98*, 99
Gregory, Sir Richard 273
Greville, Robert Kaye, botanist 113
Gunther, Robert T. 188
  Early Science in Cambridge 3
Guthrie, Edwin 148
hagiographies 27
Hall, Rupert, first director of Whipple Museum 202, 205
  and Bos astrolabe 204
Halske AG, volt-ammeter 182
Hamilton, Gertrude 200
Harding, George, dealer in antique scientific instruments 192
Harris, John 99
  The Description and Uses of . . . Globes 95
Hartree, Douglas 133–4
Harvard University, Babbage fragment in 149
Harvie, Thomas, commission for quadrant 88–9
Heilbron, John 161
Hele-Shaw, Henry, professor of engineering 146
Henley, William 161
Henryson, Robert 39
Hewlett-Packard Calculator Digest 311
Hewlett-Packard (HP) (Wh.4529) 296
  HP-35 'electronic slide rule' 295–9, *299*
  HP-41C 305, 309
  HP-65 programmable calculator 291, 300–3, *301*, *303*
  and HP-9100A 295, 298
  library of user-submitted programs 304, 307
  newsletter 304–7
  and PPC (HP-65 Users Group) 307–10
  support material 302, *303*
Heylyn, Peter, *Cosmographie in Foure Bookes* 75
Hill, Robin
  cloud camera (Wh.4416) 257–8, *258*, 265–8, 271–2
  and International Survey of the Sky 257
History of Science Lectures Committee 3
Hobson, Edward 107
  Hooker and 108, 110, 113–14
  Musci Britannici (Wh.4577) 101–18, *112*
  preparation of exsiccatae 110, 114
  suppliers of specimens 113
home electronics hobby 183
  see also calculators; computers
Hondius, Jodocus 75
Hooker, Joseph 142
  enthusiasm for mosses 116
Hooker, R. H. 269
Hooker, William Jackson, botanist 104
  copy of Hobson's *Musci Britannici* 117
  and Hobson 108, 110, 113–14
  Muscologia Britannica with Thomas Taylor 105, *106*, 115
Hookham, Francis, calculator collection (Wh.4529) 291, *292*, *295*
Hopwood, Arthur 251
Hopwood, Nick 276, 283
Hornaday, William 250, 252
Howard, Luke, cloud classification 260, 270
Humboldt, Alexander von 79
  Babbage and 125
Hunterian Museum, Charles Babbage's brain in 142, *142*
Hurlock, George, bookseller 86
Hurt, John, will (1476) 36

Iberian Union (1580–1640) 73
IBM, System/360 mainframe 296
IEEE Computer Society, Computer Elements Technical Committee (1974) 304

Institution of Civil Engineers 140
International Cloud Atlas (1891) 260, 263, 270–1
International Survey of the Sky 257, 260, 269
  importance of Hill's cloud camera 263, 271

Janssonius, Johannes 75
Jardine, Boris 84
Jarvis, Charles, draughtsman 124, 136
Jesuits, Madrid, and cosmography 72
Jobs, Steve 291
John de Manthorp, vicar of Hayton 36
John of London, star list 19
Johnson, Boris 291
Jordanova, Ludmilla 4, 11
Journal of Genetics 285
Julian calendar, use on Sutton's quadrant 97

Kant, Immanuel 75
Keith, Arthur, and Piltdown forgery 216, *217*
Kelty, Chris 310
Kelvin, Lord *see* Thomson, William
Kennedy, John 309
King's College, London 126, 136
Kiralfy, Imre, exhibitions 153
klinostat, botanical instrument 104

Lardner, Dionysius, science lecturer 122, 124, 138
latten (alloy) 15
Leibniz, Gottfried Wilhelm 303
Lennard-Jones, John 133
Les systèmes nuageux (French meteorological office) 263–5
Lestringant, Frank 74
Ley, Revd Clement 263, 270
Leyland, Roberts, botanist 114
libraries, medieval, astronomical instruments and manuscripts 40
Linnaeus, Carl, taxonomic system 105
Linnean Society of London 116
Lockyer, Norman 127
Lucy, St 28
Ludgate, Percy 153
Lyell, Charles 114–15

machine tools, for Babbage's components 123
Macleay Museum, Sydney 130
Macock, J., printer 86
Maddison, Francis 34
Madrid
  Imperial College (Jesuit) 72
  Royal Mathematical Academy 72
Manchester Society of Chartered Accountants 148
manufacturing
  artisan 120, 122, 129
  Babbage and 123, 128
Margaret of Antioch, St 27, 29
Marke, John, instrument maker 95
Marshall, William Prime 148
Martin of Tours, St, hagiographies 28
Marx, Karl 128
mathematical authors 64, 70
mathematics
  and cosmography 69
  early modern culture of 56
Maurolico, Francesco 70
Maxwell, James Clerk 132
Mayer, Tobias, lunar globe 76
medicine, astrological 51
memory
  mechanical (Babbage) 122, 128–9
  and museums 119–21
Mendel, Gregor, hybridisation experiments 277
Mendel's laws of genetics 276, 279, 286
  of dominance 281
  and epistasis 278
  of independent assortment 281
  role of factors (genes) 278
  of segregation 281
Mensing, Anton, collector and dealer 201, 204, 208
  astrolabe collection *211*
Mercator, Gerard 60
  Atlas 70, 75
Merrifield, Charles 145, 147
Merton College, Oxford, library 40
metallurgical analysis 12
  and detection of forgeries 206–7
Meteorological Office 270
meteorology
  amateur photographic contributions to 257, 259, 269–73
  cloud study 260–2
  coordination of photographs and synoptic charts 268–71
  international cooperation in 257
  synoptic mapping 262–5
  and weather maps 264
  see also cloud camera; clouds
microprocessor technology 297
microscope, Ellis aquatic (Hooker's gift to Hobson) (Wh.1824) 108, *109*
Mizauld, Antoine, *De mundi sphaera sive cosmographia* 69
models 275
  and practical investigative strategies 289

models (cont.)
as teaching aid 282, 290
see also chicken heads; Punnett square
Montessori, Maria 240, 244, 247
Moray, Sir Robert 94
Morden, Robert, globe-maker 95
Morgan, T. H., and fruit flies 288
Morland, Samuel 148
mosses *see Musci Britannici*
Moulton, John Fletcher 147
Mount, Richard, bookseller and publisher 96
Mount, William 96
Mountbatten, Earl 134
Moxon, Joseph, globe *78*, 79
Munro, Robert William, instrument maker 146, 151–2, *152*
Münster, Sebastian 60, 64, 70, 74–5
Musci Britannici (Edward Hobson) (Wh.4577) 101–18, *112*
copies in public institutions 117
Hooker's copy 117
making of 107–12
presentation of (*exsiccatae*) 101, *102*
price 109
publication circuit 113–16
subscribers 113
Muscologia Britannica, Hooker & Taylor 105, *106*
second edition 115
museums
acquisition of scientific instruments 190–2
and historical narratives 120
and memory 119–21

navicula sundials 48–50
in Apian (Wh.0731) *62*, 62
Geneva 48
Greenwich 48
Oxford 48
provenance locations 49, *50*
reconstructed (Wh.5902) 41, *42*
Yorkshire 49
navigational charts, Spanish 72–3
Needham, Dorothy 280
Nelson, Richard J. 303
and PPC group 307–9
Netherlands, cosmographic atlases 75
New York Times 250, 301
Nicholas of Lynn, astronomer 25
Norwich, Whipple astrolabe associated with 16
Nuñez, Pedro 73, 77
Nuremberg, Kosmographische Gesellschaft 75
Nyburg, Henry, letter to Price *209*
Nyhart, Lynn 283

Oakley, Kenneth, and Piltdown forgery 218
objects, as culture-carriers 240
Ohm, Georg Simon 160
Ohm's law, on electrical resistance 160
Oldenburg, Henry 94
Olszewski, Margaret Maria 283
Opp, C. H., instrument maker 198
Ørsted, Hans Christian 160, 165
Osborne, Tom, and HP-9100A 295
Oughtred, William
circle of proportion 135
'horizontal instrument' 83, 89, 93
Oxford University
astronomical instruments 36
History of Science Museum 84
Evans's collection 188, 203

Page, Thomas 96
Pease, Michael 282
Peel, Sir Robert, Prime Minister 136
Perner, Adam, instrument maker 198
Perse School Hall, Whipple collection in 4
Pestalozzi, Johan 240, 244, 247
'Peter', performing chimpanzee 250–1, *251*
Philip II, King of Spain 72
Philip IV, King of Spain 72
photography, popularised 272
Pierrepont, Thomas, bookseller 86
Piltdown controversy 201, 216–19, *217*
Pitt Rivers, Lt-General Augustus, collection 212
planimeters, Hele-Shaw and 146
Pliny the Elder 70
Plowden, William 137
Pollock, Frederick 132, 147
Polytechnic Institution, Regent Street, London 120
Popular Electronics 291
Portable Antiquities Scheme (PAS), astronomical instruments 42–4, *44*, *46*
Portugal, cosmography in 72, 76
Pouillet, Claude 166
Powerhouse Museum, Sydney 149
PPC (HP-65 Users Group) 307–11
Price, Charles, instrument maker 96
Price, Derek J. de Solla 34
and Antikythera mechanism 214
and Bos astrolabe 202, 204, 207, *208*, 212
career 205

concept of 'scientometrics' 202, 215
'Fake Antique Scientific Instruments' (1956 paper) 201, 213
and fake scientific instruments 187, 190, 196
'International Checklist of Astrolabes' (1955) 209, 213
and international cooperation 213
methods of identifying fakes 204–10, *209*
and Piltdown forgery 216–19
prints
of instruments bound into books 86
Sutton's engraved reverse 85, *85*
Ptolemy, Claudius
Almagest 39, 71
Geography 58
On the Analemma 62
Punnett, Reginald
and Cambar autosexing poultry breed 282
chicken heads 275
experimental poultry breeding 284, 286
Heredity in Poultry 281, 287
Mendelism 279, 286–7
work with Bateson 277–9, 283, 285
Punnett square 276, 279, *280*, 281
as conceptual tool 286, 289
dissemination of 287
Puttick and Simpson, Auction Gallery 187, 192
buyers 192–4
catalogues *188*, 188, 194
sale prices 195–9

quadrants 66
attribution of Collins's to Sutton 99
Collins's 'small quadrant' 91
'great universal' equatorial (Wh.2754) 91, *91–2*
replacement solar declination (Wh.6644) 98, *98*
'horizontal quadrant' 93
medieval 47–8, *48*
projections 89–90
reverted tail 91–3, *92*
'small pocket quadrant' (Wh.5831) 93, *93*
Sutton's 83–99
Quarterly Review 286

R. & J. Beck, cloud camera 257, 264, 266
radioactivity, measurement by electroscope 164
Rankin, Joy Lisi 294
Rede, William, Oxford scholar 37
Regiomontanus dial 62, 73
research
genetics 285, 289
industrial 173
meteorological 259, 264
Whipple model 4–7
Robertson, William Henry 241
and Consul, the Educated Monkey 238
patents 238, *239*, 242, 253
Royal Air Force, and cloud camera 266
Royal Anthropological Institute, and Piltdown forgery 217
Royal Astronomical Society 152
Royal Institution 173
Babbage's models at 125
Royal Meteorological Society 261, 272
Quarterly Journal 265, 267
Royal Society, Evolution Committee 286
Rutherford, Ernest 133
Ryan, Edward 141

Sachs, Julius 104
Sacrobosco, *De sphaera* 70
St Andrews, University of 283
saints' days 22
English 27
and hagiographies 27
sandglasses 66
Sarum calendar 25
Saxton, Joseph, instrument maker 125
Scheutz, Georg and Edvard, difference engine 138, *139*
Schneider, Norman 167
Schweigger, Johann 166
Science magazine, advertisements 182
Science Museum 126
1976 exhibition 135
analytical engine mill in 151, *152*
Babbage fragment in 149
'Making the Difference' exhibition 154
see also South Kensington
scientific instruments
collections 203
deliberate forgeries 200
European manufacturers 196
fake antiques 187, 190, **197**
inscriptions on 193–4, *194*
instructions for use 194
role in development of science 205
sale prices 195–9
visibility and legibility 207, 214, 218
see also astronomical instruments; botanical instruments; cosmographical instruments; electrical measuring instruments
'scientometrics', Price's concept of 202, 215
Sedgwick, Adam 285

seed herbarium (Wh.6624) 223, *224*
for identification of forage crop weeds 225, 230
seed market, international 225, 227, 235
forage crops 231–3
regulations 232
seed testing 228–31, *230*, 236
and purity 234
Testing of Seeds Order (1917) 235
seeds
adulteration of commercial supplies 227
and companion seeds 233
red clover 228
reference collection (Canada) *234*
'source indicators' 224, 233
see also weeds
Seller, John, instrument maker 97
Semphill, Hugh
sundials as cosmographical instruments 55, 66, 74
and other cosmographical instruments 66, 71
Senex, John, instrument maker 97
Seville, Casa de Contratación 72, 76
Sibton Abbey, Suffolk 48–9
Siemens, galvanometer *179*, 181–3
Sinnott, Edmund 287
Slingo, William 172
Smith, David 247
The Teaching of Arithmetic (1913) 244
Smith, Grafton Elliot, and Piltdown forgery 216
social politics, and computers as consumer good 297
Somer, John, astronomer 25
South Kensington
1862 international exhibition 121
1876 exhibition 127
Special Loan Collection of Scientific Apparatus 190–1
see also Science Museum
Spain, cosmography in 72–4
speculum cosmographicum (cosmographical mirror) 67, *68*
Stanhope, Charles 148
stars, marked on Whipple astrolabe 19, **20**
Statistical Society of London 143
Stebler, Friedrich, agronomist 231, 233, 235
Sterne, Dr Richard 94
Stewart, John 113
Stiborius, Andreas 63
Stoeffler, Johannes
astrolabe projections 89
Cosmographicae aliquot descriptiones 71
Stolle, Manuel Burillo, *Elementos de cosmografía* . . . (1903) 76
Stone, Edmond, translation of Bion 97
Stovin, Margaret, plant collector 114
Strabo 70
Strand Magazine 151
Sturgeon, William, moving-coil galvanometer 167
sundials 58
as cosmographical instruments 55, 58–65, 74, 81
fake (chronogram identified by Evans) 196
with fake inscription (Wh.0226) *194*
ivory diptych (Wh.1681) *69*
paper universal altitude (*organum Ptolomei*) 59, *60*, 62
popularity of 199
in Portable Antiquities Scheme (PAS) 43, *44*
Regiomontanus dial 62, 73
ring dials 43
sale prices 198
Sutton, Henry, engraver 83–99
brass quadrant 84
and Collins's *The Sector on a Quadrant* 86, 88–9, 92
printed paper quadrants 84
reputation 94–9
Sydney, Macleay Museum 130
Symons' Meteorological Magazine 269

Taylor, Eva, on Sutton 83
Taylor, Thomas 117
Muscologia Britannica with William Hooker 105, *106*
teaching
astronomical instruments for 34
of evolution 252
models and visualisations for 282, 290
technical colleges 175–8
trade-based 174–5
see also education
The Telegraphic Journal 174
telegraphy
training 175
use of galvanometers 167, 171
Testing of Seeds Order (1917) 235
Texas Instruments (TI) 297
Thales of Miletus 38
Thevet, André 70, 74–5
Thomas of Canterbury, St 27
Thompson, Anthony, instrument maker 94
Thompson, Silvanus P. 169, 171
Thomson, J. J. 133
Thomson, William (Lord Kelvin) 146

moving-magnet reflecting galvanometer 169
quadrant electrometer 163
timekeeping
astrolabes for 17
medieval instruments for 33, 51
see also clocks
The Times, argument over mechanised memory (1946) 134
Tissot, Auguste, *Précis de cosmographie* (1869) 76
toys 249
animal 249
educational 241–8
Turing, Alan 134
Turner, Fred 298

UNESCO 220
United States of America
development of computing 292
educational toy market 243
genetics research 289
public education 239
view of mathematics 255
University College, London
Babbage fragment in 149, *150*
engineering wing (1893) 178
physical laboratory 176
Uppsala, Cosmographical Society 75

Varley, Cromwell F. 167
Vatican, Tower of the Winds 65
vaudeville, New York 249
Volta, Alessandro 160–1
electrometer 161

Wallis, John 89, 94
Walter of Elveden, astronomer 25–6, 29
Walter, Herbert 287
waterclocks 66
Waters, Kenneth 289
Watkins, Francis, instrument-maker 124
Webster, Percy, dealer in antique scientific instruments 193, 196
weeds
definition 223, 225
dodder seeds 232
mobility of 226, 231, 235
see also seeds
Weiner, J. S., and Piltdown forgery 217
Weishaupt and Co., dealers in antique scientific instruments 192
Wellcome, Henry, collection 212
Wellington, Duke of, Prime Minister 141
Werner, Johannes, *Paraphrases* 61
Wheatstone, Charles 175
Whipple collection
early homes of 4, 188
fake scientific instruments 187, *194*
Whipple, George Mathews 2, 270
Whipple, Robert Stewart ii, 1–2
and 1944 Cambridge exhibition 205
as collector 199–200, 204, 210–12
and forgeries 212
paper on galvanometers 159–60
Whipple Library 4
Whipple Museum of the History of Science 4
'Designated' status 2
founding 1, 204, 206
Price at 202, 204–5
student research on collections (since 1995) 313
Whipple Museum objects
Adams electrometer (Wh.6648) 161, *162*
astrolabe Wh.0305 (Joannes Bos fake) 202, 204, 207, *208*
astrolabe Wh.1264 (late medieval English) 12–31, *13*
auxanometer (Wh.2766) 104, *105*
chicken heads, plaster models (Wh.6547) 275, *276*
cloud camera (Wh.4416) 257–8, *258*
Consul, the Educated Monkey, calculator toy (Wh.5821) 237–55, *238*
Curie-type gold-leaf electrometer (Wh.1353) *162*, 164
dial with fake inscription (Wh.0226) *194*
difference engine (Wh.2339) 130, *131*, 135
diptych compass dial (Wh.1681) 68, *69*
Ellis aquatic microscope (Wh.1824) 108, *109*
'English' globe (Wh.1466) 78, *78*
galvanometers
'Lineman's Detector' (Wh.3090) *169*, 171–2
moving-coil reflecting (Wh.4190) 177–8, *177*
moving-coil reflecting (Wh.4292) 184
moving-magnet pointer (Helmholtz tangent type) (Wh.1347) 166
moving-magnet reflecting (Wh.0939) *169*, 169–71, 185
thermal reflecting (Wh.4045) *179*, 179–81

Whipple Museum objects (cont.)
'great universal' equatorial quadrant (Wh.2754) 91, *91–2*
'great universal' quadrant with replacement solar declination (Wh.6644) 98, *98*
hand held electronic calculator collection (Wh.4529) 291–311
Musci Britannici (Wh.4577) 101–18, *112*
navicula dial (Wh.0731) *62*, 62
navicula dial (Wh.5902) *42*
seed herbarium (Wh.6624) 223, *224*, 225, 230
'small pocket quadrant' (Wh.5831) 93, *93*
Whipple research model 4–7
White City exhibition 153
Whitworth, Joseph 123, 138, 149
Whole Earth Catalog (1968) 297, 311
Wilkes, Maurice 133–4, 141, 154
wills and probate inventories, ownership of astronomical instruments 36
Wilson, C. T. R. 165
Wilson, John, antiquarian 48
Wilson, William, moss expert 110
Wimsatt, William 286, 288
Witmer, Dr Lightner 250
Wood, R. W., *Physical Optics* (1911) 265
Woodward, Arthur Smith, and Piltdown forgery 216
Worcester, William, clerk 39
Wozniak, Steve 310
Wright, Richard
and Charles Babbage 123
and Henry Babbage 144
Würzburg, Sachs botanical institute 104

Zamorano, Rodrigo 73
Ziegler's wax embryo models 283
zoomorphism, on astrolabes 21