

# Index of Subjects

- abrasion tests, charnockites 232-234
- Advisory System for Site Investigation (ASSIST) 404
- aggregate crushing values, charnockites 232-234
- aggregates, use of charnockites in 234-235
- algae and SRBs in confined groundwater production system 155-160
- alkali-tolerant microbes and radioactive waste disposal 153
- alkali-silica reaction, charnockites 234
- alkalinity, coal mine discharge waters 244-255, 259, 264-267, 269-273
- Allen Hill Spaw, Matlock Bank 264, 277, 278, 279
- alluvial gravels, Spey flood plain 123-125
- alluvium, estuarine, Grangetown Gasworks site 84
- aluminium levels
  - in mine drainage 270 *et seq*
- Yorkshire/Derbyshire 247
- amoebiasis 181
- ankerite 273
- anticipation and the geological model 368, 372, 373, 395, 405-406
- aquifers
  - characteristics, British aquifers 148-150
  - distribution, Basilicata 7-9, 23, 24
  - as environments for microbiological activity 147-154
  - hydrogeochemistry, Yorkshire/Derbyshire 237-256
  - karstified aquifer, Thames catchment 143-146
  - modelling, Cardiff Bay 57-60
  - protection implications, Spey Scheme 123, 134, 135
  - temperature and microbiological activity 150-151
- aquifer-river interactions modelling, Spey Scheme 123-136
- ARC/INFO GIS 126
- arsenic
  - in groundwater supplies 167-168, 179
  - removal by bacteria 167
- ASSIST 404
- Australian engineering geology 302-304, 410
- Bacillus* sp. 150, 186
- bacteria
  - in Chalk aquifers 146
  - chemoautotrophic 161-163
  - chemoheterotrophic 163
  - waterborne pathogens 180
  - see also* faecal coliform bacteria; iron bacteria; sulphate reducing bacteria
- barium 271 *et seq*
- barrages
  - Cardiff Bay, hydrogeological studies 49-61, 84-85
  - Morecambe Bay, survey 97
- Basilicata, slope instability 3-26
- Bateig Stone
  - mineralogy 222
  - performance in BRE tests 223
  - physical properties 223
  - pore size distribution and durability 221-1, 230
- beryllium 271 *et seq*
- Bhagirathi river valley slopes, LHZ mapping 27-36
- bifouling in boreholes 163-165
- biocorrosion in boreholes 165-166
- biological removal of iron from groundwater 166-167
- biosparite-biomicroite 222
- bitumens in British aquifers 148-149
- Blewbury Pumping Station, crustacean discovery 144-146
- bituminous mixes using charnockites 234
- block models 383, 395
- borehole database, Grassano 11-20
- borehole sampling, Yorkshire/Derbyshire 240-256
- boreholes
  - bifouling and biocorrosion in 163-166
  - exploratory 383-395
- boron 271 *et seq*
- Bouguer anomalies, Lake District 103
- brines, coal mine discharge waters 243-244, 257-259, 278
- brittleness, charnockites 235
- Bukit Timah Granite, Hindhede Quarry 281-288
- Bullhouse mine water 262, 264, 273
- buried valley geophysical survey, Gilpin-Kent Valley 97-113
- cadmium 271 *et seq*
- calcrete, presently forming 341
- capture zone simulation 131-135
- carbon, organic, in British aquifers 149
- carbonate shelf facies model 315-316, 341
- Carboniferous limestones, Wales, karstic limestone in 378-379
- Cardiff Bay Barrage
  - geology and history of area 51-57
  - Grangetown Gasworks case study 79-93
  - hydrogeological studies 49-61, 84-85
  - modelling procedures 57-60, 85-87
  - property protection 60-61, 63
  - pumping tests 63-77
  - rising groundwater 49, 57, 59-61, 63-77, 79-93
- Carnon river pollution 162
- Castleton karst, bacteria in 171-178
- cavern project, radon investigation case study 115-122
- CCTV images of macrobiota, Chalk aquifer 143-146
- cesspools, and groundwater contamination 184
- Chalk
  - aquifer characteristics 148-149
  - macrobiota in Thames catchment aquifer 143-146
  - retrogressive slumping 193
- chalybeate springs, Yorkshire/Derbyshire 241, 263
- charnockites
  - as aggregate 234
  - in concrete 234-235
  - geotechnical assessment 231-236
  - occurrence of 231
- chartered geologist status 408
- chemicals, contaminant, Grangetown Gasworks site 87-90
- chemicals, synthetic organic, in groundwater supplies 152
- Chert Beds, retrogressive slumping 193
- chloride levels
  - mine drainage 270
  - Yorkshire/Derbyshire 243-244, 254
- chlorite 210-216, 219
- cholera 180, 181
- civil engineering, geologists in 299-304
- civil engineers, education and training in geology 407-410
- classifications
  - field geological data 368-371
  - karstic features 379
  - rock groups 315, 319
  - rock mass 368-375, 392
  - soil types 316, 327, 413-415
- clay, marine, shear strength 197-203
- clay mineralogy, Madinah 210-211
- clay soil fabric, and sampling 392
- clays, swelling characteristics 205-220
- climates past and present 319-320
- climatic landslide triggering mechanisms, Grassano 20-24

- closed circuit television *see* CCTV
- Clostridium* 186
- Coal Measures
- groundwater hydrogeochemistry 237-256, 257-280
  - groundwater supply problems 239-240
  - hydrogeology 237-240, 259-280
  - site investigation for tunnels 394
- coal mine drainage, hydrogeochemistry 257-280
- coal mining activity and aquifer hydrology 240, 257-280
- coastal landslide, displacement assessment 193-196
- cobalt 271 *et seq*
- computer software in site investigation 404-405; *see also specific programmes*
- concrete using charnockites 234-235
- cone penetration and field vane test correlations, Muar Clay 198-202
- consolidation and shear strength, soft marine clay 197-203
- construction materials using charnockites 231-236
- contaminant behaviour 147
- contaminants in groundwater supplies 151-152
- contaminated land
- assessments, Cardiff Bay 87-92
  - assessments, Yorkshire/Derbyshire 240
  - treatment by bacteria 167-168
- continental shelf facies 315-316, 341, 392
- copper 271 *et seq*
- cost and efficiency of making geological model 382-383
- cratons 341
- Crenothrix* sp. 163
- crustacean in Chalk aquifer, Blewbury Pumping Station 144-146
- cryptosporidiosis 180
- dam reservoir slope stability, India 27-36
- data collection in the field 367-376
- denitrification in aquifers 151-152
- Derbyshire
- hydrogeochemistry of groundwaters 237-256, 257-280
  - Peak District cave systems, radon concentrations 122
- desert environment model 326
- desk studies
- and GEM 395, 396, 399
  - and geological model 346, 348-352
- “determinability” of geology by fieldwork 368
- Devonian, road tunnel site
- case study of field data collection 367-371
  - case study testing GEM 398-404
- Dharan-Dankuta Highway, geological model case history 362-364
- diarrhoeal disease 181
- Dinorwic, rock mass classification problems 371
- discontinuities and joints, and site investigation 392-395
- diseases, waterborne 180-181
- dolomitic limestone aquifer, microbially mediated reactions 156-159
- dracunculiasis 181
- drainage
- characteristics, cut soil slope, Hong Kong 137-141
  - see also* coal mine drainage
- drains, horizontal, Hong Kong 137-141
- Duke's Level mine water, Buxton 262, 266, 271, 273, 276, 279
- Dunston Colliery mine water 262, 266, 273, 276, 277
- durability of Bateig Stone 221-230
- durability tests for porous stones 225-229
- duricrusts, ancient and presently forming 341
- dynamic harmonic regression (DHR) technique 69, 71-72
- earthquake case history, Nepal 364
- Eccleshall Woods mine water 264, 270
- education and training
- civil engineers 407
  - combined degrees 407-408
  - engineering geology 407-410
- embankment trials, Muar Clay 201-202
- Engineering Environment Matrix (EEM) 404
- engineering geology (definition) 294
- education and training 407-410
- research 410
- types of engineer 299-301
- engineering geomorphology (definition) 294
- environment models 324-326
- environmental conditions for microbiological activity in aquifers 150-151
- environmental impact
- Cardiff Bay Barrage 49-61
  - river-aquifer interactions, Spey river 134-135
- environments, geological 411-412
- EPOCH R & D programme 3
- erosion (definition) 315
- differential 316
- Eryobdellidae* 144
- excitation-emission matrix spectroscopy 271
- fabric of clay soil, and sampling 392
- faecal coliform (FC) bacteria, measurement in Castleton karst 171-178
- faecal pathogens in groundwater 181-185
- failure, technical factors contributing to 309
- faults, and site investigation for geological model 395
- feldspars, perthitic 231
- ferruginous waters, Yorkshire/Derbyshire 247, 254, 257-280
- fertilizers from sewage sludge 183-184
- field geological data, gathering and classification 367-376
- fill, anthropogenic, Cardiff Bay 51, 54, 164, 79
- fill density, Gilpin-Kent Valley infill 100-103, 111
- filtration, effect on coal mine drainage 264
- fissured aquifers and groundwater microbiology 150
- fissures in Chalk aquifer 143-146
- flatworms in Chalk aquifer 144
- fluoride in groundwater 179
- fluoride levels
- in mine drainage 270
  - Yorkshire/Derbyshire 246, 254
- forestry, use of sewage sludge 184
- Fort Regent Granophyre 117
- foundation conditions, interpreting 380-381
- fractures in Chalk aquifer 143-146
- free swell tests, Madinah clays 214
- Friesland, land subsidence in drained peat 37-48
- Gallionella ferruginea* 161-162, 167
- Gammarus niphargus* 144
- Ganges Basin, high arsenic levels in aquifers 167
- Garhwal Himalaya, LHZ mapping 27-36
- gasworks site, groundwater level case study 70-93
- Gawber Prospect mine water 269, 270, 276
- GEM *see* Geological Environment Matrix
- Geographical Information Systems (GIS) 404
- ARC/INFO 126
  - at Grassano 24
  - land subsidence estimation maps (2D-GIS) 46-47
- Geological Environment Matrix (GEM) 395-404
- case histories 396-404, 416-419

- geological environments aide-moire 411-412  
geological hazard mapping, India 27-36  
geological hazards, Basilicata 3-26  
geological mapping 409, 410; *see also* maps and mapping in site investigation  
geological model 294, 315-316  
  case histories 353-367  
  cost and efficiency 382-383  
  examples 320-346  
  and field data collection 367-375  
  in site investigation 346-348, 376-395  
geologists in civil engineering 299-304  
  education and training 407-410  
geology, Madinah 206-208  
geology for engineers  
  definition 294  
  historical perspective 297-298  
  some ways forward 405-410  
geomaterials  
  definition 294  
  research 410  
geomechanics 410  
geometric relationship and the geology 383-389  
geomorphological mapping case history, Ok Tedi Mine 364-366  
geomorphology (definition) 300-301  
geophysical survey, Gilpin-Kent Valley 97-113  
geotechnical (definition) 294, 295  
  assessment, Nigerian charnockites 231-236  
  characteristics, Madinah clays 209  
  investigations, Friesland peat areas 43-46  
  investigations, Grassano 17-18  
  model 346, 348  
  problems and soil types (aide-moire) 413-415  
giardiasis 180, 181  
gibbsite 276  
Gilpin-Kent Valley  
  geology and topography 97-98  
  geophysical survey 97-113  
  gravity survey 103-105  
  seismic survey 100-103  
glacial erosion, Gilpin-Kent Valley 111-112  
glaciated valley models 324, 362  
glaciated valley survey, Gilpin-Kent Valley 97-113  
glass-reinforced epoxy (GRE) pipes 166  
glass-reinforced plastic (GRP) pipes 166  
Goyt Moss Adit mine water 262, 266, 268, 270, 271, 276, 278  
gram-negative bacteria 186  
Grangetown Gasworks groundwater rise case study 79-93  
granite  
  quarry water level prediction 281-288  
  radon emanation characterization studies 117-122  
  weathering models 326  
  *see also* charnockites  
Grassano, slope instability 9-25  
gravity surveys  
  Gilpin-Kent Valley 103-105  
  Lake District 103  
ground investigations 386-395  
groundwater abstraction, Scotland 123  
groundwater conditions, climate and vegetation 412-413  
groundwater contamination  
  assessment, Cardiff Bay 87-92  
  Castleton karst 171-177  
  in confined production system 155-160  
  microbiological, public health implications 179-188  
  modelling, Spey Abstraction Scheme 134-135  
  potential sources of 181-182  
  Yorkshire/Derbyshire 240  
groundwater flow  
  modelling, Cardiff Bay Barrage 57-60  
  monitoring and horizontal drains, Hong Kong 137-141  
  systems and microbially mediated reactions 155  
  tracers 152  
groundwater hydrogeochemistry, Yorkshire/Derbyshire 237-256, 257-280  
groundwater hydrogeology, Madinah 206-208  
groundwater in drinking water, national usages 179  
groundwater levels, Cardiff Bay Barrage 49, 57, 59-61  
groundwater microbiology 147-154  
groundwater model studies, Friesland 39-41  
groundwater modelling, river-aquifer interactions, Spey Abstraction Scheme 125-135  
groundwater protection  
  guidelines 92  
  Scheme for Scotland 123, 135  
  Spey Abstraction Scheme 123, 125-126, 134-135  
groundwater pumping tests, Cardiff Bay Barrage 63-77  
groundwater quality  
  and iron bacteria 166-168  
  and microbiology 151-152  
  public health aspects 179-180  
groundwater recharge, from contaminated surface water and sewage 183  
groundwater sampling, Yorkshire/Derbyshire 240-256, 262-264  
groundwater seepage through granite 282, 284  
groundwater temperature and microbiological activity 150-151  
gypcrete, presently forming 341  
gypsum saturation 277  
halloysite 276  
hazard, risk and uncertainty 304-309; *see also* landslide hazard  
heavy-metal bioaccumulation by iron bacteria 167-168  
helminths 180  
herbicides in groundwater supplies 152  
Heversham-Stainton Fault 108  
hillslope drainage, Hong Kong 137-141  
hilltop towns, S. Italy 3-26  
Himalayan subduction zone, site investigations 362  
Himalayas, LHZ mapping, Garhwal Himalaya 27-36  
Hindhede Quarry water level prediction 281-288  
Hipper river discharge 260, 266, 268, 270, 271, 273, 276, 278  
historical perspective of geology for engineers 297-298  
Holocene peat areas, Friesland 37, 43  
Hong Kong, cut soil slope drainage 137-141  
horizontal drains in cut soil slope, Hong Kong 137-141  
hot dryland environment model 326  
human error 308, 309  
Hunters Bar mine water 262, 266, 270, 276  
hydrodynamic consolidation of peat 41-42  
hydrogen sulphide in confined groundwater production system 156-159  
hydrogeochemistry, Millstone Grit and Coal Measures groundwater 237-256, 257-280  
hydrogeological case study, abandoned granite quarry 281-288  
hydrogeological conditions and LHZ mapping 34  
hydrogeological databases  
  Cardiff Bay 49-51  
  Grassano 11, 18

- hydrological environments, near-surface 319-320  
hydrological mapping, Basilicata 7-9  
hydrogeological model, Hindhede quarry 284  
hydrogeological monitoring, horizontal drains, Hong Kong 137-141  
hydrogeology  
  land subsidence in drained peat areas, Friesland 37-48  
  Madinah 206-208  
  Millstone Grit and Coal Measures 237-240  
hypersthene, pleochroic 231
- igneous rocks 315, 319, 321  
igneous terrain, example of geological model 348  
illite 210-216, 219  
index properties, Madinah clays 208-210  
India, slope stability mapping 27-36  
intelligent systems in site investigation 404-405  
iron, biological removal from groundwater 166-167  
iron bacteria, occurrence and behaviour in boreholes and aquifers 161-169  
iron levels  
  in mine drainage 266, 271 *et seq*  
  Yorkshire/Derbyshire 247m 254  
iron oxidizing bacteria 161-163  
iron reducing bacteria 163  
Italy, slope instability 3-26
- jarosite 271  
Jersey, St Helier Surface Water Link and Storage Cavern 115  
Jersey Shale Formation 117  
joints and discontinuities, and site investigation 392-395  
joints and LHZ mapping 31-32  
Jurassic Limestone aquifer characteristics 148-149
- kaolinite 210-216, 219, 276  
karst/karstic limestones  
  bacteria in, Castleton, Derbyshire 171-178  
  in Carboniferous limestones of Wales 378-379  
  and groundwater microbiology 150  
  radon concentrations, Peak District 122  
karstic features classification 379  
karstified aquifer, Upper Cretaceous Chalk 143-146  
Kent-Gilpin Valley *see* Gilpin-Kent Valley  
kerogen, in British aquifers 149  
Kielder tunnels, site investigation 394  
Kilnhurst Boardwalk, natural ferruginous waters 263, 277, 279  
Kingsteignton bypass ground conditions 382  
knowledge base systems (KBS) 404
- Lake District  
  Enhanced Landsat 5 imagery 111  
  gravity survey 103  
  rock densities 105  
land application of sewage sludge and waste water 183-184  
land subsidence  
  in drained peat areas, Netherlands 37-48  
  estimation maps, Friesland 46-47  
land use and land cover, and LHZ mapping 33  
landfill leachate and groundwater contamination 184-185  
landforms 301, 314-319  
landslide  
  displacement assessment, photographic method 193-196  
  hazard evaluation factor (LHEF) rating scheme 28-31  
  hazard zonation (LHZ) mapping, India 27-36  
  mapping, Basilicata 5, 24  
landsliding, S. Italy 3-26  
landslips, geological model case histories 353-367  
land-use control, Spey Abstraction Scheme 135  
latrine pits, and groundwater contamination 182  
lead in mine waters 271 *et seq*  
lead mine waters, ferruginous 263-264, 277-278  
*Leptothrix* sp. 163, 167  
LHZ *see* landslide hazard zonation  
Lias, Lower Lias landslide monitoring 193-196  
limestone  
  aquifer characteristics 148-149  
  microbial denitrification 152  
  microbially mediated reactions 155  
  in Middle East, case study testing GEM 398  
  porous, pore size distribution and durability 221-230  
  *see also* karst  
Lincolnshire Limestone  
  evolutionary pattern 254  
  microbial denitrification 152  
  microbially mediated reactions 155  
lithium 271 *et seq*  
Lower Coal Measures, site investigation for tunnels 394  
Lower Lias, Lyme Regis, landslide monitoring 193-196
- machineability, charnockites 235  
macrobiota in Chalk aquifer, Thames catchment 143-146  
Madinah, Malaysia  
  clays, swelling characteristics 205-220  
  geology, hydrogeology and soil stratigraphy 206-208  
magnesium levels, Yorkshire/Derbyshire 247, 254 *et seq*  
Malaysian Muar Clay, shear strength 197-203  
Mam Tor springs 237 *et seq*  
manganese in mine drainage waters 270 *et seq*  
Mangla Dam Project, site investigation case history 362, 377  
maps and mapping in site investigation 352-353, 364-366, 394, 395; *see also* geological mapping  
mass movement triggering mechanisms 20-24  
Matlock Bank spa water *see* Allen Hill Spaw  
Mercia Mudstone 84  
  smectite in 377-378  
mercury porosimetry 222-229  
metamorphic rocks 315, 319, 322  
methanogenic waters, Yorkshire/Derbyshire 241-243  
microbial growth requirements 147-148  
microbial oxidation, subsurface 147  
microbially mediated reactions in groundwater flow systems 155, 167-168  
microbiological groundwater contamination, public health implications 179-188  
Middle East limestone case study testing GEM 398  
Millstone Grit  
  hydrogeochemistry of groundwaters 237-256, 257-280  
  hydrogeology 237-240  
  mine drainage pollution 162  
mineral acidity in mine drainage 268, 273  
mineralogy of commercial Bateig Stone varieties 221  
mining  
  and radon emanation measurements 122  
  *see also* coal mining  
MINTEQA2 251, 273  
misinterpretation of geological site interpretation 377-379  
MODELCAD 126  
MODFLOW 73-75, 126  
MODFLOWP 126, 127  
MODPATH 126, 131  
moisture absorption, charnockites 232  
Morecambe Bay Barrage survey 97

- morphoclimatic zones 319  
Muar Clay shear strength 197-203
- nematodes 180, 183  
Nepal, earthquake case history 364  
Netherlands Geological Survey land subsidence database 37, 46  
nickel 271 *et seq*  
Nigerian charnockites, geotechnical assessment 231-236  
nitrate  
    in British aquifers 149, 151-152  
    levels in mine drainage 270  
    levels in Yorkshire/Derbyshire 246  
nitrite in British aquifers 149  
Novelda Stone *see* Bateig Stone  
nuclear waste disposal, and geomicrobiology 152-153
- object orientated modelling 404  
observational method of risk reduction 308  
ochre (iron oxyhydroxide) 247, 262, 279  
Odin Sough mine water 263-264, 276, 277-278, 279  
Ok Tedi geological model case history 364, 366  
Old Red Sandstone, Spey flood plain 126  
organic synthetic chemicals in groundwater supplies 152  
organics, refractory, leaching of 271  
*Oscillatoria* 159  
overburden pressure and vane shear strength, Muar Clay 198-202  
oxidation  
    by iron bacteria 161-3  
    microbial subsurface 147  
    of peat 42, 46, 47  
    *see also* pyrite oxidation  
oxygen, dissolved  
    and aquifer microbiology 149, 157-159  
    on-line metering 158
- Papua New Guinea *see* Ok Tedi  
parameters, engineering soils 392  
parasites in sewage sludge 183  
particle tracking analysis 131-134  
pathogenic organisms in sewage sludge 183  
Peak District karst  
    bacteria in 171-178  
    radon concentrations in cave systems 122  
peat  
    Gilpin-Kent Valley 101, 111-112  
    oxidation, Friesland 42, 46, 47  
    subsidence in drained peat, Netherlands 37-48  
Peat Meadow Area, Friesland 37-38  
periglacial environment model 324  
periglacial areas of S. England, problems of interpreting site investigation information 379  
permeability of rock mass 285  
pesticides in groundwater supplies 147, 152  
pH values  
    coal mine drainage 264  
    Yorkshire/Derbyshire 244  
photography in landslide displacement assessment 193-196  
phyllite, weathering 31  
piezometric level monitoring, rainstorms, Hong Kong 137-141  
Pinhay pumping station landslide monitoring 193-196  
pits and trenches, exploratory 386-389  
plasticity index and vane shear strength, Muar Clay 198-202  
plate tectonics 313-314, 341  
poliovirus behaviour in soil 185  
polluted land, groundwater contamination, Cardiff Bay 79-93  
pollution, microbial, in aquifers 151-152  
pollution monitoring, Spey Abstraction Scheme 134, 135  
pore size distribution, Bateig Stone 221-230  
porous stone durability tests 225-229  
potentiometric surface simulation 129-130  
problem-solving 299-301, 406  
proton generation and consumption in mine drainage 266, 273  
public health implications of microbiological contamination of groundwater 179-188  
public health risk of Castleton karst bacteria 176-177  
pump clogging 163  
pumping tests  
    Cardiff Bay Barrage 63-77  
    Spey flood plain 129-131  
pyrite oxidation 241, 245, 257, 266, 271, 279
- Q rock mass quality system 368-371  
quarry  
    in horizontally-bedded clastic sedimentary rocks 392  
    walkover sketches 310-312  
    water level prediction 281-288  
Quaternary, importance of 295-296, 324, 346
- radioactive waste disposal, and geomicrobiology 152-153  
radioactivity of schorl-rich surfaces 122  
radioelement levels, Yorkshire/Derbyshire 248-249, 271 *et seq*  
radon  
    concentrations, Peak District cave systems 122  
    emanation 115, 117  
    analysis in water and in air 119-122  
    elevated 237  
    generation 117  
    hazard regulations 115, 122  
    sampling, Yorkshire/Derbyshire 241, 264, 271  
rainfall, and water level prediction, Singapore 281-288  
rainstorm conditions, groundwater flow monitoring, 137-141  
reduction processes in aquifer chemistry 151  
refractory organics, leaching of 271  
relief, relative, and LHZ mapping 33-34  
remote sensing research 410  
research in engineering geology 410  
reservoir rim slope stability, India 27-36  
residual soils 316-319, 346; *see also* tropical residual soils  
Ringlinglow mine water 273  
risk, hazard and uncertainty 304-309  
river crossing foundation conditions, interpreting site investigation information 380-381  
river-aquifer interactions modelling, Spey Scheme 123-136  
rock (definition) 298  
rock forming/modifying agencies 310-346  
rock forming/modifying environments, use in GEM 395-396  
rock groups, classification 315, 319  
rock mass  
    classification systems 368-375, 392  
    discontinuities, and site investigation 392-395  
    permeability 285  
    quality (Norwegian Q system) 368-371  
    rating (RMR) 368-371  
rock material characteristics 316, 320, 392  
rock mechanics  
    historical perspective 297-298  
    research 410  
    starting point in 371

- Rotherham colliery spoil tip water sampling 262-263  
 salinity, coal mine discharge waters 243-244, 257-259, 260  
 salt crystallization tests 225-229  
 sampling and testing  
   and the geological model 386-395  
   planning schemes for 405  
 Sandstone, Triassic  
   aquifer characteristics 148-149  
   microbial denitrification 152  
 sanitation, and groundwater contamination 182-183  
 saturation modelling 251, 273-277  
 Saudi Arabian Madinah clays, swelling characteristics 205-220  
 schist, weathering 31  
 schistosomiasis 181  
 Schmidt hammer rebound values, charnockites 232, 235  
 schorl in joint linings, and radioactivity 122  
 Scotland  
   groundwater abstraction 123  
   Groundwater Protection Scheme 123, 135  
 sedimentary rocks 315, 319  
 sedimentary terrain, example of geological model 348  
 seepage, Singapore quarry 282, 284-285  
 seismic survey, Gilpin-Kent Valley 99-103  
 seismicity, Basilicata 5  
 semi-arid and temperate upland environment model 326  
 septic tanks, and groundwater contamination 184  
 sewage sludge disposal, and groundwater contamination 183-184  
 shear strength data interpretation, soft marine clay 197-203  
 shear zones, Mangla Dam Project 362, 377  
 Sheephouse Wood mine water 262, 264  
 shrimp-like crustacean in Chalk aquifer, Blewbury 144  
 siderite 257, 262, 268, 278  
 silicon  
   in groundwater, Yorkshire/Derbyshire 247  
   in mine drainage waters 270  
 Silurian bedrock, Gilpin-Kent Valley 97-98, 103, 105  
 Singapore  
   rainfall 281-282  
   water levels 286  
 Singapore Island hydrogeological case study 281-288  
 site investigation  
   approaches 293-297  
   common problems 387  
   computer software 404-405  
   and geological model 376-395  
   case histories 353-367  
   stages 348, 349, 383  
   preliminary 346-353, 383  
   main 348, 353, 383-395  
   uncertainty, hazard and risk 304-309  
 slate, rock mass classification problems 371  
 slope  
   drainage, Hong Kong 137-141  
   instability, S. Italy 3-26  
   morphometry 32-33  
   stability, Tehri Dam Reservoir area, India 27-36  
   stability problems, geological model case histories 353-367  
 small-scale geological features, influence on sampling 389-392  
 smectite 210-216, 219, 377-378  
 Smekley natural ferruginous water 263, 264, 277, 279  
 soil mechanics  
   and geology 376-377  
   historical perspective 297-298  
   research 410  
   soil shrinkage, of peat 41  
   soil slope drainage, Hong Kong 137-141  
   soil stratigraphy, Madinah 206-208  
   soils  
     definition 298, 316  
     engineering parameters 392  
     and processes 319  
     residual 316-319, 346; *see also* tropical residual soils  
     types 316, 327, 411-415  
   soundness tests, charnockites 232-234  
   spa waters 241, 245, 263, 273  
   speciation modelling 251, 273-277  
   specific gravity, charnockites 232  
   specific heat capacity, charnockites 234  
   Spey Abstraction Scheme 123  
   spoil tip leachates 259, 262-263, 276-277, 278-279  
   spring sampling, Yorkshire/Derbyshire 240-256  
   St Helier, radon investigations 115-122  
   STATIGRAPHICS 216  
   stereo-triplet displays for landslide assessment 193-196  
   strength values, charnockites 232  
   strontium 276-277  
   structural geology features 392-395  
   subjective probability assessment 309-310, 348  
   subsidence, drained peat areas, Friesland 37-48  
   subsurface microbiology 147  
   *Sulfolobus* 150  
   sulphate levels, Yorkshire/Derbyshire 246, 254  
   sulphate reducing bacteria (SRBs)  
     coexisting with algae in groundwater 155-160  
     and radioactive waste disposal 153  
   SURFER kriging interpolation 26  
   swell consolidation tests, Madinah clays 211-214  
   swelling characteristics, Madinah clays 205-220  
 Taff Vale Trunk Road site investigation case history 362  
 tapeworms 180, 183  
 Taran Slip, S. Wales 362  
 technical innovation 406-407  
 Tehri Dam Reservoir area, LHZ mapping 27-36  
 television images *see* CCTV  
 temperate environment model 326  
 tender price and geological model 382-383  
 terminology and jargon 304  
 terrain evaluation and classifications 352-353  
 testing and sampling  
   for geological model 386-395  
   planning scheme for 405  
 Thames catchment, macrobiota in Chalk aquifer 143-146  
*Theobacillus* sp. 167  
*ferrooxidans* 162-163  
*Thermoplasma* 150  
*Thiobacillus* 150  
 till, Gilpin-Kent Valley 101-103, 111  
 tin 271 *et seq*  
 trace elements in mine drainage 271 *et seq*  
 tracers, bacteriophages as 152  
 Transport and Road Research Laboratory reports 376-377, 392  
 trenches *see* pits and trenches  
 Triassic Sandstone  
   aquifer characteristics 148-149  
   microbial denitrification 152  
 tropical residual soils 326-327, 340-341  
 tropical soils, behavioural characteristics of 415-416  
 tropical weathering model 326

- tunnel case studies
  - effect of discontinuities on site investigation 394
  - field geological data collection 367-371
  - radon investigation 115-122
  - testing GEM 398-404
- tunnel valley, Gilpin-Kent Valley 111
- typhoid 180, 181
  
- ultrasonic pulse velocity, charnockites 232
- uncertainty, hazard and risk 304-309
- underground projects, radon investigation case study 115-122
- Unstone 2 mine water 262, 266, 268, 273
- uranium 116, 117, 119-121, 271 *et seq*
- Vancouver landslide, Papua New Guinea 364-366
- vane
  - and cone penetration test correlations, Muar Clay 198-200
  - and laboratory test comparisons, Muar Clay 200-201
- vegetation, climate and groundwater conditions 412-413
- viable non-culturable (VNC) bacteria 186
- viral behaviour in soil 185
- viral infection outbreaks 180
- viruses, in groundwater 152, 183
  
- wadis, Madinah 205
- walkover
  - and GEM 395, 396, 399, 401
  - and geological model 346-348
  - sketches 310-313
- waste, radioactive *see* radioactive waste
- waste water
  - irrigation/reuse schemes 180
  - pathogens 180
  - reuse and groundwater contamination 183-184
  
- water level prediction, abandoned granite quarry 281-288
- water quality
  - of bathing (recreational) waters (EEC directive) 177
  - in a confined groundwater production system 155-160
  - drinking water (WHO guidelines) 179
  - and microbiology 151-152
  - monitoring 135
- water supply
  - public health aspects 179-188
  - sampling, Yorkshire/Derbyshire 249-251
- weathering 315, 319-320
  - anticipated from fieldwork 368
  - environment model 326-327
  - and LHZ mapping 31
  - in past times in present temperate climatic areas 341-346
  - tropical *see* tropical residual soils
- well pumping, Madinah 208
- well sampling, Yorkshire/Derbyshire 240-256
- wellhead protection zones 126
- Wheal Jane groundwater levels 162-163
- Woolwich and Reading Beds, smectite in 377
- World Health Organization Guidelines for Drinking-Water Quality 179
  
- Yorkshire, hydrogeochemistry of groundwater 237-256, 257-280
  
- zinc levels
  - in mine drainage 270
  - Yorkshire/Derbyshire 247

# Index of Localities

- Alaska, Turnagain Heights, Anchorage 307  
Alicante, Spain 222  
Anchorage, Alaska 307  
Arizona State Park, Lake Havasu City 184  
Arnside 97, 102, 110, 111  
Australia 302, 410
- Balkans 271  
Bangladesh 168  
Basento Valley, S. Italy 3  
Basilicata, S. Italy 3-26  
Bateig Hill, Alicante 222  
Belgium 179  
Berkshire 148  
Bhagirathi Valley, India 27  
Bhillangna Valley, India 27
- Canada 410  
Cardiff Bay 49-61, 63-77, 79-93  
Carnon river, Cornwall 162  
Castleton, Derbyshire 171-178, 279  
Cornwall, Carnon river 162  
Cumbria, Gilpin-Kent Valley 97-113
- Denmark 179  
Derbyshire 237-256, 257-280  
    Castleton 171-178  
Dharan-Dhankuta Highway, Nepal 362-364  
Dinorwic, N. Wales 371
- Ely river, S. Wales 49-61, 64, 79  
Epsom Spa 273
- Florida, Richmond Heights 181  
France 166, 167, 410  
Friesland Province, Netherlands 37-48
- Ganges Basin, India 167  
Garwhal Himalaya 27-36  
Germany, Ruhr area 276  
Gilpin-Kent Valley, S. Cumbria 97-113  
Grange-over-Sands 103  
Grangetown, S. Cardiff 79-93  
Grassano, S. Italy 9
- Himalayas 27-36  
Hindehede Quarry, Singapore 281-288  
Hipper river, Derbyshire 260, 266, 268, 270, 271, 273, 276, 278  
Hong Kong 137-141
- India 168  
    Ganges Basin 167  
    Tehri Dam reservoir area 27-36  
Israel 184  
Italy 179  
    Basilicata 3-26
- Jersey, St Helier 115-122
- Jordan 152
- Kent river, S. Cumbria 97
- Lake District, Gilpin-Kent Valley 97-113  
Lake Havasu City, Arizona 184  
Lima, Peru 183  
Lincolnshire 148  
Los Angeles 307  
Lyme Regis 193
- Madinah, Saudi Arabia 205-220  
Malaysia  
    Muar Plain 197-203  
    Singapore 281-288  
Mam Tor 241, 245, 248, 254, 277, 279  
Mangla Dam, W. Pakistan 362, 377  
Morecambe Bay 100, 101, 111  
Muar Plain, Malaysia 197-204
- Nepal, Dharan-Dhankuta Highway 362-364  
Netherlands, Friesland Province 37-48  
New York City 185  
Nigeria 231  
Norway 179
- Ok Tedi Mine, Papua New Guinea 364, 366  
Oman 152  
Pakistan 165  
    Mangla Dam 362, 377  
Papua New Guinea, Ok Tedi Mine 364  
Peak District 237-256, 257-280  
Peru 182, 183  
Pinhay 193  
Portugal 179
- Rotherham 262  
Ruhr area, Germany 276, 278
- Saudi Arabia, Madinah 205-220  
Scotland, Spey river 123-136  
Sheffield 239  
Shropshire 148  
Singapore 281-288  
South Africa 410  
Spain, Bateig Hill, Alicante 222  
Spey river, Scotland 123-136  
St Helier, Jersey 115-122  
Sweden 179  
Switzerland 179
- Taff river, S. Wales 49-61, 64, 79  
Taff Vale, S. Wales 362  
Tehri Dam reservoir area, India 27-36  
Texas 181  
Thames catchment 143-146  
Turnagain Heights, Alaska 307



United States 152, 179, 181, 184, 185, 307, 410

Wales

Cardiff Bay 49-61, 63-77, 79-93

Dinorwic 371

Taff river 49-61, 64, 79

Taff Vale 362

West Bengal, India 167

Yorkshire 237-256, 257-280

Zambia 182

Zimbabwe 182

## Index of Authors

- Anbalagan, R. 27
- Ball, T. K. 115  
Banks, D. 143, 237, 257  
Burke, S. P. 257
- Chen, M. 123  
Chilton, P. J. 147
- Del Prete, M. 3
- Edwards, R. J. G. 49  
Eze, E. O. 231
- Fookes, P. G. 293  
Fort, R. 221
- Garcia del Cura, M. A. 221  
Gostelow, T. P. 3  
Grainger, P. 193  
Gray, C. G. 257  
Gunn, J. 171  
Gupta, P. 27
- Heathcote, J. A. 63  
Hodkin, D. L. 115  
Hossain, D. 205  
Howard, G. 179  
Howsam, P. 161  
Hunter, C. 171
- Indraratna, B. 197
- Kalaugher, P. G. 193
- Lewis, R. T. 63
- Matsah, M. I. 205
- Nieuwenhuis, H. S. 37
- Ordonez, S. 221
- Pedley, S. 179  
Perkins, J. 171
- Russell, D. I. 63
- Sadaqah, B. 205  
Schokking, F. 37  
Simoni, A. 3  
Soley, R. W. N. 63  
Soulsby, C. 123
- Talbot, D. K. 115  
Taylor, W. P. 97  
Thomas, B. R. 79  
Tranter, J. 171  
Tyrrel, S. F. 161
- Walton, N. R. G. 155  
Waters, A. 143  
West, J. M. 147  
Whiteside, P. G. D. 137  
Willetts, B. 123  
Wilson, C. D. V. 97
- Zhao, J. 281