

Index

Page numbers in *italic* refer to Figures. Page numbers in **bold** refer to Tables.

- accessibility index 170
- Acipenser fulvescens* 114
- Aegean Coast *see* Ephesus
- aeolian landforms, Argentina 45
- Agassiz, Lake 110, 119, 122
- agriculture 4, 6
 - development on East European Plains 11, **12**
 - methods of research 13–14
 - spatio-temporal analysis 15–17, *18*
 - central temperate zone 25
 - northeastern cold zone 19–23
 - northwestern cold zone 25
 - southern warm zone 17, 19
 - western temperate zone 23–25
 - theory 14–15
 - terracing in Argentina 40, *44*
- Alborz Mountains 51
- alluvial deposition 27
- alluvial fans of Holocene
 - Argentina *42, 44, 45*
 - Tepe Pardis 51
 - Western Sicily 99–100
- alluvial stratigraphy
 - Big Fork River Valley 110, *111*
 - methods of analysis 110–111
 - results
 - deposits 112–118
 - radiocarbon dating **112**, 116, 117, 118
 - results discussed 118–122
 - summary 122–123
 - Ephesus 27–29
 - sedimentation record in Gulf 29–30, 34
 - Hellenistic–Early Roman 30, *31*
 - late Byzantine 32
 - Roman Imperial–Byzantine 32, 33, 35–36
 - summary history 36
- Altithermal *see* Hypsithermal
- Amazons 28
- Ananianskyay culture 11
- Ananinskii tribe 14
- Archaic artefacts 122
- Archaic period
 - Argentina 40
 - Northern Plains 186
- Argentina, Tucumán Province *see* Santa María Valley
- aridity, impact of 3
- Armata Palaeosol 103, 104
- Artemis and the Artemision 28, 29
- Attalus II Philadelphus 32
- attractiveness equation 171–172, 177–178
- aurochs bone remains 165, 173
 - significance of resource landscape 170–174
 - summary 174–175
 - tool assemblage 166
- Bavaria *see* Burgweinting *Siedlungskammer*
- beaver remains 114, 116
- Bedoulian 176
- Bell Beaker Culture 140
- Bezaure 176
- Big Fork River Valley (USA) 110
 - geomorphology *111*
 - Holocene stratigraphy
 - methods of analysis 110–111
 - results
 - alluvial deposits 112–118
 - radiocarbon dating **112**, 116, 117, 118
 - results discussed 118–122
 - summary 122–123
- bison hunting 181
- Blackduck artefacts 110, 114, 116, 120, 121, 123
- Bos* bone remains 165, 173
- Bronze Age
 - Bavaria 140, 155–156
 - China 125
 - East European Plains 11, **12**
 - Shetland site 73–74
- Buff ware 51
- Bülbüldağ 28
- Burgweinting *Siedlungskammer*
 - biological setting and vegetation 139
 - climate 139
 - geological setting 138–139
 - history 137–138
 - hydrological setting 139–140
 - peat 140
 - rescue excavation 140–141
 - charcoal study
 - methods 141–142
 - results
 - chronology 150–152
 - geochemistry 145, 146, 148
 - microscopy 148–150
 - stratigraphy 142–145, 145–146, *147*
 - results discussed
 - Bronze Age 155–156
 - Iron Age 156
 - Mesolithic 152–154
 - Neolithic 154–155
 - Roman Empire 156–157
- Byzantine, sedimentation at Ephesus 32, 33
- $\delta^{13}\text{C}$ record
 - tufa in SW China
 - methods of analysis 88
 - results 93–94
 - results discussed 93–94
- ^{14}C dating *see* radiocarbon
- Canada *see* North American Northern Plains
- Capra* bone remains 165, 173
- Capreolus* bone remains 165, 173

- cattle
 bones record **62**, **63**, 71
 breeding **12**
- Cayster River *see* Küçük Menderes River
- ceramic period, Argentina 40
- Cervus* bone remains 165, 173
- chaîne opératoire* 169–170
- Chalcolithic sites
 Ephesus 29
 Sicily 99, 104
 Tepe Pardis 49–50, 61, **62**, **63**, 64–65
- chamois bone remains 165
- Chappice Lake, Hypsithermal record 183
- charcoal in sedimentary record
 Big Fork River Valley **112**
 Burgweinting *Siedlungskammer* 137
 methods of analysis 141–142
 results
 chronology 150–152
 geochemistry 145, 146, 148
 microscopy 148–150
 stratigraphy 142–145, 145–146, 147
 results discussed
 Bronze Age 155–156
 Iron Age 156
 Mesolithic 152–154
 Neolithic 154–155
 Roman Empire 156–157
 Tepe Pardis **62**
- chernozem soil 11
- China
 Henan Province
 Shang society–environment interaction 125
 climate 126–128
 landscape and geomorphology 128–129
 soils and vegetation 129–130
 stratigraphic survey
 methods 130–131
 results
 Anyang Project 133
 Shangqiu Project 131–132
 results discussed 133–135
 Shang Period 5–6
 Xiangshui River tufa record 86, 87, 88
 methods of analysis 88
 results
 hydrochemistry 88, **89**, 90
 isotopic composition 91–93
 profiling 90
 radiocarbon dating 90–91
 summary of results 93–94
- Cibicides* spp. 76, 78, 79–80
- Classical–Archaic time, sedimentation at Ephesus 29, 30
- climate and climate change 5–6
 4.2 K Event 125, 126
 forest zone of East European Plains **16**, 17
 Holocene tufa record of SW China 86, 87, 88
 methods of analysis 88
 results
 hydrochemistry 88, **89**, 90
 isotopic composition 91–93
 profile 90
 radiocarbon dating 90–91
 summary 93–94
see also Hypsithermal
- Clovis groups and artefacts 122, 181
- coastal sites, hazards of 27
- colonial v. indigenous settlement, Sicily 104–105
- Copper Age *see* Chalcolithic
- Corded Ware Culture 140
- cost-benefit equation 171
- cost-of-passage 170
- crop rotation 15
- Cypress Hills, Hypsithermal record 183, 188
- Dama* bone remains 165, 173
- Derbent River 28
- Dongge Cave stalagmites 126
- Dunde Ice Core 127
- Durance 177
- Dustbowl (Great Plains of America) 190
- Dyakovskaya culture 11
- East European Plain, forest zone 11
 agricultural development 11, **12**
 agricultural landscape analysis
 methods of research 13–14
 spatio-temporal data 15–17, 18
 central temperate zone 25
 northeastern cold zone 19–23
 northwestern cold zone 25
 southern warm zone 17–19
 western temperate zone 23–25
 theory 14–15
- Egypt, Old Kingdom fall 126
- Elphidium* spp. 76, **78**, 79–80
- Elymi 98, 99, 103, 104
- embedded procurement 163
- Entella 97, 99
- Ephesus
 Chalcolithic sites 29
 floodplain geomorphology 28–29
 geographical setting 27–28
 harbour development 35–36
 Neolithic sites 29
 sedimentation record in Gulf 29–30, 34
 Hellenistic–Early Roman 30, 31
 late Byzantine 32
 Roman Imperial–Byzantine 32, 33
 summary history 36
- Equus* bone remains 165, 173
- erosion 5
 impact on site preservation 187, 189
- Eryx 97, 99
- estuarine sites, hazards of 27
- Euphrates, River, effects of 5
- Fair Isle, Mesolithic 72
- fallow deer bone remains 165, 173
- fertilizer in agriculture 15
- Finno-Ugric tribes 11
- fire use 4
see also charcoal
- fire history of Burgweinting *Siedlungskammer* 137–138
 biological setting and vegetation 139
 climate 139
 geological setting 138–139

- hydrological setting 139–140
 peat 140
 rescue excavation 140–141
 charcoal study
 methods 141–142
 results
 chronology 150–152
 geochemistry 145, 146, 148
 microscopy 148–150
 stratigraphy 142–145, 145–146, 147
 results discussed
 Bronze Age 155–156
 Iron Age 156
 Mesolithic 152–154
 Neolithic 154–155
 Roman Empire 156–157
- flooding *see* river courses
 fluvial fans, Holocene of Argentina 42, 44, 45
 Folsom artefacts 122
 foraging strategy 164
 foraminifera
 use in environmental record on Shetland
 methods of analysis 74
 results 76
 results discussed 79–80
- forest clearance 130, 133
 forest zone of East European Plains
 agricultural development 11, 12
 agricultural landscape analysis
 methods of research 13–14
 spatio-temporal data 15–17, 18
 central temperate zone 25
 northeastern cold zone 19–23
 northwestern cold zone 25
 southern warm zone 17–19
 western temperate zone 23–25
 theory 14–15
- Formative period, Argentina 40
 foxtail millet 129
 France *see* Bau de l'Aubesier
- Gaudryina rudis* 78, 80
 geoarchaeology, defined 1, 2
 geochronology *see* optically stimulated luminescence
 dating *also* radiocarbon dating
 geomorphological mapping, Argentina
 methods 40–41
 results 41–45
- Germany *see* Burgweinting *Siedlungskammer*
 glaciation, Eastern European Plains 17, 18
 glacial landform units 43–44
 goat bone remains 165, 173
 grain growing 11, 15
 great migration 11, 12
 Greeks, colonists on Sicily 104, 105
 grey ware 52, 54
 Guardipee, Hypsithermal record 183
 Guérin 176
- Hadrian's dam 32
 Hallstatt Period 140
Haynesina sp. 78
 Hellenistic Period, sedimentation at Ephesus 29,
 30, 31
- Herrenhöfe 140
 hiking algorithm 170
 hoe-mattock agriculture 14
 Holocene
 climatic optimum *see* Hypsithermal
 East European forest zone 11
 land cover change in China 86, 87, 88
 tufa record
 methods of analysis 88
 results
 hydrochemistry 88, 89, 90
 isotopic composition 91–93
 profile 90
 radiocarbon dating 90–91
 summary 93–94
 landform evolution in Argentina 45–46
 landform evolution in Western Sicily
 alluvial fans 99–100
 Chuddia River 100–103
 landscape evolution in Big Fork River Valley
 (Minnesota) 110, 111
 methods of analysis 110–111
 results
 radiocarbon 112, 116, 117, 118
 stratigraphy 112–118
 results discussed 118–122
 summary 122–123
 sea-level highstand 29
 Holocene Event (3) 127
 horse bone remains 165, 173
 Huan River impact on settlement 128, 133, 134
 Huguang Maar, Lake, climate record 126
 human impacts *see* agriculture; fire; sedimentation
 Hypsithermal climatic optimum 65, 181, 183
 impact on precontact Northern Plains culture 183,
 186–191
- Inca period, Argentina 40
 Inva Basin 19, 20, 22
 Iran *see* Tepe Pardis
 Irish elk bone remains 165
 Iron Age
 East European Plains 12, 14, 15
 settlement in Bavaria 140, 156–157
 settlements in Sicily 97–98, 104
 Tepe Pardis cemetery 50, 54, 65
 sherds 52
- irrigation 5, 127
 Chalcolithic 49–50
 Late Neolithic 51–52, 64, 65
- Kama River 19, 20
 knapping debris, Palaeolithic 163
 Komi-permyaks 19, 20
 Küçük Menderes River 28, 29
 Hadrian's dam 32
 profiles 30
 sedimentation rate 29–30
- La Combette (France) 164, 166
 La Tène Period 140
 lacustrine record, Hypsithermal problems
 183, 188
 lake levels, impact of 3

- landform mapping
 Chuddia River (Sicily) 100–103
 Santa María Valley (Argentina)
 methods 40–41
 results 41–45
 Big Fork River Valley (Minnesota) 110, 111
 methods of analysis 110–111
 results
 radiocarbon **112**, 116, 117, 118
 stratigraphy 112–118
 results discussed 118–122
 summary 122–123
 Western Sicily, alluvial fans 99–100
 Laurel artefacts 110
 Les Sautarels 176
 Linear Pottery Culture 138, 140
 lithic landscape, Palaeolithic 163
 loess, East European Plains 17
 Longshan period 125
 Lost Lakes, Hypsithermal record 183
 Lysimachus 30, 32
- malaria 132
 manuring in agriculture 15
 Marnas River 28
 Medieval Climatic Anomaly 121, 123
Megaloceros bone remains 165
 Mesolithic
 Bavaria 152–154
 Fair Isle 72
 North Wales 81
 Orkney 72
 Shetland Islands 69, 72
 Mexico, Formative Period 5
 micropalaeontology *see* foraminifera
 midden sites, Shetland Islands 69
 millet cultivation 129
 monsoon belts
 China 127
 Indian Ocean 127–128
 Monte Polizzo Project 97, 98, 99
 landscape analysis 99
 alluvial fans 99–100
 Chuddia River 103–104
 proto-urban settlements 98–99
 site abandonment 103–104
 Mormoiron 177
 Moscow glacier 17
 Mousterian tools 166
Moxostoma macrolepidotum 116
 Mummy Cave Complex 187
 Murs 176
 muskrat remains 114, 116
- natural resources *see* resource exploitation
 Neanderthal remains 165
 Neolithic sites
 Bavaria 140, 154–155
 China 125, 126, 127, 132
 Ephesus 29
 Sicily population 98, 99, 104
 Tepe Pardis, transition to Chalcolithic 49–50, 51, 61,
62, **63**, 64–65
- West Voe (Shetland) midden sites 69
 chronology 71–72, **73**
 excavations 69–71
 geographical setting 72–74
 geological setting 72
 sedimentological study
 methods 74
 results
 micropalaeontology 76
 particle size data 74–76
 results discussed
 micropalaeontology 79–80
 particle size data 77–79
 summary and conclusions 80–81
- North American Northern Plains
 archaeological sites *184*, **185–186**
 cultural divisions *182*
 Hypsithermal 181, 183
 interpreting the impact 183, 186–191
 precontact cultures 181
 North Aurel 177
 Northern Plains *see* North American Northern Plains
- $\delta^{18}\text{O}$ record
 Mt Qilian ice core 127
 stalagmites in Dongge Cave 126
 tufa in SW China
 methods of analysis 88
 results 91–93
 results discussed 93–94
- oasis *see* refugium
 Oaxacan Coast 5
 Obva Basin 19, 20, 21, 22
 opol'e (field) areas, East European Plains 17, *18*, 19
 optically stimulated luminescence (OSL) dating
 Tepe Pardis
 methods 56–57
 results **60**, 61
- oracle bones 132, 133
 Orkney, Mesolithic 72
 otter remains 114, 116
- Palaeoindian period, Argentina 40
 Palaeolithic, Middle *see* Bau de l'Aubersier
 palaeosols 128, 133
 Panayirdag 28
 Pion, Mount 28, 30
 plough agriculture 11, 15
 poles'e (wood) area, East European Plains 17, *18*, 19
 pollen record
 China Shang Dynasty 130, 133, *134*
 Shetland 74
 Tepe Pardis
 methods of analysis 55–56
 results 59
- porcupine remains 116
 porech'e (river) areas, East European Plains 19, 21
 Preon, Mount 28, 30
 procurement strategy 163
 projectile point typologies, Northern Plains 187
 provisioning strategy 164
- Qilian, Mount ice core 127
Quinqueloculina spp. **78**, 79

- radiocarbon dating
 Big Fork River sediments **112**, 116, 117, 118
 Burgweinting *Siedlungskammer* 150–152
 Santa María Valley (Argentina) 40
 Shetland midden 71–72
 Tepe Pardis
 methods 57–58
 results 61, **62–63**, 64
 tufa in SW China
 methods 85
 results 90, **92**
- red deer bone remains 165, 173
 redhorse remains 116
 refugium hypothesis 188, 191
 Regensburg *see* Burgweinting *Siedlungskammer*
 Regional Development period, Argentina 40
 resource exploitation 3, 4, 163
 Bau de l'Aubesier (France) 164–165
 bone remains 165–166
 raw materials for tools project
 rock sources 166–168
 rock uses 168–170
 significance of resource landscape 170–174
 summary 174–175
 tool assemblage 166
 river courses, impact on landscape and society 3
 Ephesus 27–28
 floodplain geomorphology 28–29
 harbour development 35
 Neolithic sites 29
 sedimentation record in Gulf 29–30, 34
 Hellenistic–Early Roman 30, 31
 late Byzantine 32
 Roman Imperial–Byzantine 32, 33
 summary history 36
 Shang Period and society 5–6, 125
 effect of climate on 126–128
 landscape and geomorphology 128–129
 soils and vegetation 129–130
 stratigraphic survey
 methods 130–131
 results
 Anyang Project 133
 Shangqiu Project 131–132
 results discussed 133–135
 Rodanovskaya culture 19
 roe deer bone remains 165, 173
 Roman Empire
 evidence in Bavaria 140–141, 156–157
 evidence in Sicily 105
 Roman Period, sedimentation at Ephesus 30, 31, 32, 33
 Roussillon 176
 runoff agriculture 6
Rupicapra bone remains 165, 173
 Russian Federation *see* East European Plain
- St Jean de Sault 176
 St Trinit 175–176
 Santa María Valley (Argentina)
 cultural phases 40
 environmental setting
 Holocene 39
 Pleistocene 39
 geographical setting 37
 geological setting 37–39
 landform and settlement mapping
 methods 40–41
 results 41, 42
 aeolian 45
 denudational 43–44
 fluvio-alluvial 45
 structural–denudational 43
 summary 45–46
- Sault 175
 sea level 3
 mid-Holocene 29
 sedimentation
 impact on site preservation 187, 189
 use in environmental record
 Big Fork River Valley (USA) 110, 111
 methods of analysis 110–111
 results
 alluvial deposits 112–118
 radiocarbon dating **112**, 116, 117, 118
 results discussed 118–122
 summary 122–123
 Ephesus 27–29
 sedimentation record in Gulf 29–30, 34
 Hellenistic–Early Roman 30, 31
 late Byzantine 32
 Roman Imperial–Byzantine 32, 33, 35–36
 summary history 36
 Shetland
 methods 74
 results 74–76
 results discussed 77–79
 Sicily, Monte Polizzo Project
 landscape analysis 99
 alluvial fans 99–100
 Chuddia River 100–103
 proto-urban settlements 98–99
 site abandonment 103–104
 Tepe Pardis
 methods 54–55
 results 58–59
- Segesta 97, 98, 99
 Selinus River 28
 settlement patterns 14–15
 Shang Period and society 5–6, 125
 effect of climate on 126–128
 landscape and geomorphology 128–129
 soils and vegetation 129–130
 stratigraphic survey
 methods 130–131
 results
 Anyang Project 133
 Shangqiu Project 131–132
 results discussed 133–135
- sheep bones, record of **62**, 71
 shellfish, record in Shetland middens 69, 70, 71, 72
 Shetland Islands
 Jarlshof excavation 73–74
 pollen record 74
 Scord of Brouster excavation 73
 Sumburgh Airport excavation 73
 West Voe midden sites 69
 chronology 71–72, **73**
 excavations 69–71

- Shetland Islands (*Continued*)
 geographical setting 72–74
 geological setting 72
 sedimentological study
 methods 74
 results
 micropalaeontology 76
 particle size data 74–76
 results discussed
 micropalaeontology 79–80
 particle size data 77–79
 summary and conclusions 80–81
- Sicily
 Monte Polizzo Project 97
 landform–sediment analysis 99
 alluvial fans 99–100
 Chuddia River 100–103
 proto-urban settlements 98–99
 site abandonment 103–104
 Troina Project 97
Siedlungskammer *see* Burgweinting *Siedlungskammer*
 slash-and-burn agriculture 14
 Slav tribes 11
 steppe zone 11
 sturgeon remains 114
Sus bone remains 165, 173
- Tehran Plain *see* Tepe Pardis
 Tepe Pardis (Iran)
 environmental setting 50–51
 alluvial fan 51
 rescue excavation 51–52
 geochronology
 methods 56–58
 results 60, 61, 62–63, 64
 pollen analysis
 methods 55–56
 results 59
 sedimentary analysis
 methods 54–55
 results 58–59
 stratigraphy 52, 53
 summary of results 64–66
- terracing 5
 fluvial terraces in Argentina 42, 44, 45
 three-field system 15
Textularia spp. 78, 79–80
 Tigris, River, effects of 5
 tool types
 Bau de l'Aubesier, assemblage 166
 Palaeolithic 163
 tree growth rings and climate 127
 Treille 177
Trifarina spp. 78, 79–80
- Troina Project 97
 tufa record of environmental history in China 86, 87, 88
 methods of analysis 88
 results
 hydrochemistry 88, 89, 90
 isotopic composition 91–93
 profile 90
 radiocarbon dating 90–91
 summary 93–94
 Turkey *see* Ephesus
- Ubad period, Mesopotamia 49
 ungulates, record of 70
 urban society, development in China 132, 133
 Urnfield Period 140
 USA
 Great Plains cultural regions 182
 Zuni agriculture 6
see also Big Fork River Valley; North American Northern Plains
- Valday glacier 17
 Valerius Festus 32
 Vaucluse region *see* Bau de l'Aubesier
 vegas 43
 Verde, Río 5
 villae rusticae 141
- water acquisition strategies 188–189
 wheat cultivation 129
 wild boar bone remains 165, 173
 wildfires 137
see also fire history
 Woodland artefacts 110, 122
- Xia dynasty 126, 129, 133
 Xiangshui River
 setting 86, 87, 88
 tufa record
 methods of analysis 88
 results
 hydrochemistry 88, 89, 90
 isotopic composition 91–93
 profiling 90
 radiocarbon dating 90–91
 summary of results 93–94
- Yangtze delta, Neolithic culture 126
 Yellow River 126, 127, 128, 129, 130, 134
 Shang Dynasty stratigraphy 131–132
- Zhou dynasty 126, 132
 Zuni agriculture 6