



INDEX

- Abbāsīd 57, 74
 ‘Abbasid caliphate 253, 303
 Abila, Jordan 206
 absolane 70, 73
 absorption band 76
 Abu Shahrein (Eridu) 134, 145
 Abu Tahir family of potters 262
 Abū’l Qāsim 24, 73, 262, 274
 Achaemenid 205, 226
 Aci Gölü, Turkey 28
 Acre/Akko, Israel 61, 210, 256
 Acre Bay, Israel 28, 29
 Afghanistan 4, 112, 158, 296,
 298–300
 Agra, India 275
 Ahhotep 147, 168
 Aigues-Mortes, France 23
 Aix-en-Provence, France 246
 Akda’ Madeni, Turkey 74
 A’Ke-Si-Pi-Li castle, China 121
 Akhenaten, pharaoh, ‘king’
 130
 Akkad, Iraq 127, 128, 134
 Akkadian 127, 132, 133, 134
 Al-Biruni 263–4
 Al-Hakim II mosque 255
 al-Idrīsī 268
 al-Jābir 265, 282–4, 289
 al-Marwazī 255
 al-Muqaddasī 85, 254, 256, 262–3,
 267, 269
 al-Qazwīnī 267
 al-Rāfiqa, Syria 256, 336, 338
 al-Raqqā, Syria 31, 33, 44, 47, 65, 69,
 85, 87, 93, 97–100, 110, 112, 117,
 119, 162, 253, 257, 261, 263,
 266–69, 271–2, 274–8, 280, 282–97,
 299–302, 335–350, 354–6, 359,
 311–13, 321–2, 324, 327–8, 335–50,
 354–6, 359
 al-Tabarī 255–6
 alabaster 209, 223, 225–6
 Alalakh (Tell Atchana), Turkey 16,
 128, 135–6, 139, 143–4, 349
 Alashiya 130
 albite 60, 65
 alchemy 254, 262, 282, 303
 Aldrvandin type beakers 81
 Aleppo, Syria 24, 31, 33, 42, 92, 128,
 130, 253, 262–3, 266–9, 278, 292,
 304, 335, 337, 349–50, 356–7
 Alexander the Great 205, 208–9, 224
 Alexandria, Egypt 30, 63, 64, 263,
 330–1, 352–4, 359
 Alicante, Spain 23
 Allerona-type sword 153
 allunogen 71
 Al mass’oudi 264
 Almeria, Spain 253, 269
 alum 72, 324,
 alumina 3, 14, 29, 42, 43, 46, 47, 53,
 64, 66, 71, 163, 172–6, 187–8, 199,
 236–9, 241–7, 249, 279–87, 291–4,
 297–300, 312, 314–5, 318, 324–5,
 327, 332, 337, 340, 348, 350–1, 364,
 366, 367
 aluminium 159, 163, 188
 aluminium sulphate 71
 Amarna letters 130, 168
 amber 131, 138, 150, 153, 155
 Amenhotep II 169
 Amenhotep III 170
 Amorites 128, 136
 amorphous 2, 3, 19, 20, 363
 amphibole 329
 amporiskoi 209, 223, 225
Anabasis 23, 39, 41, 262
Anabasis articulatum 30, 32
Anabasis syriaca 31, 32, 35, 36
 Anarak, Iran 72, 148
 andesite 117
 Angel Gabriel 252
 Anglo-Saxon 94
 anneal 18, 20, 223, 229, 269
 anorthite 60
 Anthony 208–9
 Antigonids 205, 209
 Antikythera shipwreck, Greece 360
 antimony 74, 83, 147–8, 181, 188,
 210, 212, 232
 antimony trioxide 189, 210, 246
 Antioch, Syria 205, 206, 253–4, 277
 Antiochus I 205–6
 Antiochus XIII Asiaticus 205–6
 antler 150
 Antonio Neri 24
 aolian sand 57
 Aosta: see Augusta pretoria
 Apamea 205, 208
Apkallu 132
 Apollonia, Israel 97, 99, 246, 270,
 351
 Appenine 63
 Aqar Quf (Dur Kurigalzu), Iraq 136
 Aradus, Syria 206
 aragonite 46, 329
 Arikamedu 112–3
 Aristophanes 204
 armllet/bangle/bracelet 162, 285,
 296–300, 302, 336, 338, 341–4, 350,
 353, 363, 370
 Armorium, Turkey 78
 arsenic 70, 72, 73, 159, 172, 188
 arsenic oxide 159

INDEX

- Arthrocnemum* 23, 35, 39, 40
Arthrocnemum strobilaceum 31, 32, 36, 46
artifex vitri 204
Artiplex leuoclada 31, 35
aryballoi 209
 Ascalon/Ashkelon 168, 208
 Ashur, Iraq 134, 144
 Assur, Iraq 127–8, 135–6, 142
 Assyria 349
 Astarte, goddess 140
 asteroid 5, 6
 astronomy 254
 Athens, Greece 181
 atomic absorption spectrometry 26, 160, 166, 189, 247, 249
 atomic number 66
 atomic weight 66
 Attalids 205
 Augusta Pretoria (Aosta), Italy 88, 235, 247, 249
 Augustus, emperor 369
 Autun, France 230–1
 Avenches, France 228–9, 235
 Avignon, France 236
 Ayyūbid caliphate 253, 257–8, 267–8, 277, 280, 294, 350
- Bab el Hawa, Syria 337
 Babylon 128–30, 132, 143, 349
 Babylonia 127–8, 130–2, 143–4, 146
 Bactria 114
 Baghdad, Iraq 253–4, 257, 266–7, 289, 301, 303, 349
 Bahrain 294–5
 Balikh valley 33, 41, 128, 311, 313, 337
 Ban Don Ta Phet, Thailand 124, 125
 Bangle: *See* armlet
 Baniyas, Israel 276, 290, 338–9, 343–5
 barium 48, 60, 62, 96, 102, 104, 115–16, 118–23, 239–40, 243, 249–50, 312–3, 332, 364
 barium disilicate 123
 barium-lead glass 119
 basaltic rocks 60
 Basilicata, Italy 150
 Basra, Iraq 253, 254
 Basra, Morocco 302–3
 Baycheh Bagh mine, Iran 73
 beach sand 46, 72, 294, 309, 329, 330–2, 354, 358
 bead 2, 84, 131, 133–6, 138–40, 144, 146, 148, 153–5, 160, 162–8, 170, 172–3, 180–1, 183–4, 186, 188–9, 193–5, 197–8, 200, 363–4, 367, 370–1
 beaker 204, 226
 Bedouin 262
 bee-hive shaped furnace 100, 228–9, 272, 274
- Beirut, Lebanon 93–4, 97–9, 204, 206, 209, 211, 215, 217–22, 230–1, 235–47, 250, 290, 294–5, 302, 332, 338, 351, 356
 Bekaa Valley, Lebanon 206
 Bel, France 195–8
 Belus river, Israel 28, 63, 61, 64, 203, 240, 247, 331, 333, 351
 Beni Salama, Egypt 231, 248
 Benjamin of Tudela 267
 Bet Eli'ezer, Israel 93, 238, 241–3, 253, 270–1, 274, 332, 351
 Bet She'an, Israel 144, 206, 332
 Beth She'arim 280
 Beverley, UK 103
 Bihar, India 112
 Bir Hooker, Egypt 248
 Biringuccio 4, 75
 Birjand, Iran 148
 bismuth 72, 169
 Black Forest, Germany 74, 172, 174, 188
 blowing 2, 18, 100, 104, 204, 211, 213, 227–32, 235–40, 243–5, 249–51, 260, 265–7, 270, 363, 369, 371
 Boğazköy/Hattusa, Turkey 128, 144
 Bohemond of Antioch 277
 Bologna, Italy 151–2
 bone 65, 191
 bone ash 6, 46, 198
 Bonn, Germany 228
 bornite 72
 boron 48, 50
 Boshan glass factory 123
 Bosra, Syria 208, 222
 bracelet: *See* armlet
 Bracken 28, 106
 Bringairet, France 192–3, 198
 Bukhara, Uzbekistan 112, 296
 Büklükale, Turkey 349
 burkeite 52, 53
 Bursa, Turkey 253, 256
 Bury Ball, Devon, UK 78
 button, conical 190, 195
 button-based goblet 136, 143, 147
 Byblos, Lebanon 128, 130, 144
 Byzantine 81, 88, 94, 96
 Byzantium 254–6
- Caesarea, Israel 28, 61, 208
 cage cup 250, 370
 Cairo (Fustat), Egypt 28, 253, 260, 268, 270, 277, 279, 281, 292–3, 295, 304, 334
 Calabria 149, 150
 calcite 60, 168
 calcium 2, 5, 13, 16, 22, 27, 29, 36, 37, 41, 46, 48, 50, 53, 54, 60, 61, 65, 160, 179, 186, 188, 193, 199, 201
 calcium antimonate 19, 77, 78, 79, 147
 calcium carbonate 279, 315, 328, 333
 calcium fluoride 79, 80
 calcium oxide 42, 45, 46, 47, 48, 49, 53, 90–2, 94–5, 97, 101, 103–4, 108, 112–3, 117, 119, 122–6, 161–3, 170, 172, 183, 186, 190–2, 195–6, 199, 237–8, 241–8, 279, 281, 284–7, 291, 293–7, 300–2, 312, 315, 317, 322–3, 326, 329, 333, 350
 calcium phosphate 28, 65
 calcium stannate 79
 Caliph 252
 Caliph al-Ma'mun 254, 256, 303
 Caliph al-Mutasim 254, 257, 266
 Caliph al-Walid 254–5, 257
 Caliph Hārūn al-Rashid 253, 256–7, 266, 282, 303–4
 Camargue, France 24
 cameo 280, 350
 Canal Bianco, Italy 183
 Canatha (Qanawat) 205, 207
 Canosa, Italy 211, 224–5, 233
 Capitolias (Beit Ras) 206
 carbon 81
 carbon dioxide 29
 carbon monoxide 81
 Carchemish, Syria 131
 carnelian 138, 306
 Carpentras, France 236
 Carthage, Tunisia 23, 62, 245
 carving 13
 cassiterite 13
 cast vessel 204, 209–213, 223–4, 226, 228, 233, 235–6, 238–9, 242, 244–5, 249–50
 Castello del Tartaro 153, 155
 cedar 131
 Cem Sultan tomb, Turkey 256
 Cenezoic 337
 cerium 58, 80, 117
 cerium anomaly 117
 Chagar Bazar, Syria 134
chaîne opératoire 12, 14, 21, 84, 187, 259–60, 276, 332, 340, 347, 354, 364
 chalcidony 56
 Chalcis, Syria 205
 chalcocite 72
 chalcopyrite 72
 Chalestra, Macedonia, Greece 52
 Chaoyang, China 119
 charcoal 69, 89
 chemical environment 68
Chenopodium album 31, 35
Chenopodium murale 31, 35
 chert 56
 Chiaromonte, Italy 183, 185, 188
 China 197
 chinane plant 263
 chlorine 14, 29, 30
 chlorite 13
 Chotin, Slovakia 120

INDEX

- Christian 254, 259–60, 266, 269,
 282–3, 291, 303–4
- Christopher Merrett 107, 108
- chromite 60, 309
- chromium 61, 62, 66, 67, 180, 182–3
- Claudius 208
- Cleopatra 208–9
- cloisonné* enamels 124
- cobalt 8, 10, 66, 67, 69, 70, 71, 72, 73,
 75, 131, 134, 142, 147–8, 157–9,
 161–8, 170–5, 177, 181, 188–9, 191,
 200–1, 210, 230–2, 365, 368
- cobalt alum 159, 163
- cobalt sulphide 70
- cobaltite 70, 73, 74, 78, 159
- Codova, Spain 255
- colloid 76
- Cologne, Germany 228
- Colonia Julia Augusta Felix* 215
- conchoidal 4
- Constantinus Harmenopolus, legal
 manual 208
- copiapite 71
- copper 7, 13, 15, 17, 42, 44, 49, 66,
 67, 73, 75, 76, 80, 81, 128, 89, 96,
 104, 163–6, 168, 172, 174, 188, 197,
 210, 215, 232, 312–3
- copper ruby glass 76
- copper sulphide 11
- coquimbite 71
- core-formed vessel 20, 133, 135–6,
 139, 142–5, 147, 166, 209–10,
 223–6, 232–3
- craftsmen 147
- cretaceous 337
- cretaceous limestone 34
- criolite 122
- Cristallo glass* 46, 68, 76, 102, 107
- cristobalite 56
- Crottes à Roaix, Vaucluse, France
 197
- crucible 84, 85, 145, 148, 154, 156,
 169, 183, 191, 198, 201, 214–5, 223,
 229, 316–318, 320, 324–6, 324, 344,
 354, 360–1, 363–4, 369
- cullet 69, 142, 214, 232, 249, 275–7,
 307, 319, 335
- Cuma, Italy 63
- cuneiform text 17, 20, 28, 156–7
- cupellation 110
- cuprous oxide 77, 79, 80
- cuprovarite 13
- Cyprus 130–1, 138, 153
- Dagan 127
- Dakhla oasis, Egypt 71, 159, 172
- Damascus, Syria 31, 40, 138, 205, 207,
 252–6, 259, 263, 266–69, 277–8,
 290, 292, 294–5, 304, 335, 337–8,
 343, 349–50, 356, 358–9
- Darius III Codomanus 205
- De Diversis Artibus 67
- decapolis 206–7
- decoloriser 76, 83
- Deir 'Ain 'Abata, Jordan 160
- Delos, Greece 211, 253
- Demon mask 136, 142
- dichroism 76
- digenite 72
- Dingcun, Vietnam 125
- dinner service 224, 233–4
- diorite 117
- Dium (Tell Ashari?) 206
- Dog Star 52
- dolomitic limestone 28, 66
- Doñana, Spain 29
- Dor, Israel 93, 211, 270, 332, 351
- Dorestad, the Netherlands 103
- Dusu-coloured glass 21
- Dyonysus 370
- Dzhambul, Kazakhstan 112, 296
- Dzharkutan, Uzbekistan 114
- Eastern Han dynasty 123
- Eastern Zhou dynasty 121
- Ebla, Syria 127–8, 139, 144
- ebony 131
- Edirne, Turkey 253, 256
- efflorescence technique 15
- Egyptian blue 13, 215
- ehlipakku* 168
- Elam 130
- Elamite 128, 144
- Elateia, Greece 86, 89, 91, 161, 167,
 170–6, 181, 188–9, 192–3
- Electron probe microanalysis 160,
 163, 166–7, 190, 283
- Elkeby, Egypt 88
- Emperor Constantine VI 256
- Emperor Nicephorus I 256
- Emporia* 255
- Empress Irene 256
- enamel 80, 81, 88, 122, 124, 126, 257,
 259, 264, 267–70, 277
- energy quanta 68
- Entremont, France 226, 246
- eocene 337
- epidote 60
- erdkobalt 172
- Eridu (Tell abu Shahrain), Iraq 133–4,
 145, 158–9, 348, 364
- erythrite 70, 159
- Erzgebirge, Germany 74
- Ethiopian highlands 331
- Ethnographic studies 371
- Etruria 149–53, 155
- Etruscan 94, 155, 352
- Etymologiarum sive originum* 52, 63
- Euphrates River 33, 182, 246, 264,
 266–7, 301, 332, 342, 356
- Europe 85
- europium 60
- evaporite 52, 91, 92, 98, 100, 114
- Exeter, UK 108
- experiment 12, 284, 286–92, 301,
 303–4, 314, 316, 342, 349
- experimental archaeology 19
- Fabbricia dei Soci, Italy 153–5
- facet cut 249–50
- Façon de Venise* 102, 107–9, 111
- Fagus sylvatica* (Beech) 48, 49, 68, 102,
 105, 106
- Faience 7, 9, 12, 13, 14, 16, 17, 59, 71,
 75, 131, 133, 136, 138–9, 156,
 163–4, 166–7, 183–92, 195–9, 201,
 364–5
- Failaka, Kuwait 16
- Famen temple, Shanxi, China 358
- Fars, Iran 73
- Fatimid caliphate 253
- Fayum, Egypt 169
- feldspar 28, 54, 57, 60, 238, 240, 284,
 286, 309, 324–5, 329–30, 332, 339,
 354
- Fengmen-ling, China 123
- Fergana, Uzbekistan 112, 296
- ferric oxide 42, 287–9, 325–7
- filtration 186
- Firozabbad, India 114
- Fishbourne, UK 86 88, 120, 235
- flint 4, 56, 264
- fluorine 122
- fluorite 122
- Fondo Paviani, Italy 153–4
- Fondo Zanotto, Italy 153
- forest glass 48, 67
- fractionation 169,
- Fratta Polesine, Italy 152
- Frattesina, Italy 89–90, 91, 125, 148,
 150–5, 174–6, 183–5, 187–196,
 198–9, 200–1
- Freiburg, Germany 74
- frit, 'frit' 18 20, 21, 24, 50, 63, 65, 91,
 99, 115, 133, 136, 142, 148, 163–4,
 166, 169, 198, 215, 231, 246, 274–6,
 285, 316, 320, 361, 364
- Friuli plain, Italy 148–9
- fuel 98, 254, 259, 263, 273, 275
- furnace 2, 84, 209–10, 212–23,
 228–32, 363–5, 369, 371
- Fustat: *See* Cairo
- gabbroic rocks 60
- Gadara (Umm Qais), Jordan 206
- galena 74, 169
- Gambassi, Italy 64, 65
- garum (fish sauce) 208
- Gaul 64
- Gebel Zeit, Egypt 346
- geographical provenance 326, 332,
 361, 367
- Geography* 52

INDEX

- geological provenance 95, 163, 179,
 182, 199, 314, 328, 332, 361, 367
 George Sandys 263
 Georgius Agricola 50
 Gerasa (Jerash) 206–7
 Germagnana, Italy 64, 106
 Gerterode, Germany 107
Girgensonia 31, 35, 312
 Giribawa, Sri Lanka 115
 glass batch 10, 11, 12, 36, 162, 187,
 193, 198, 314–6, 319–20, 326–7
 glass ceramic 18, 19, 156
 glass colour 1, 66, 67
 glass melt 311, 315–20, 327, 333,
 342–345
 glass weights 280, 289
 glassy-faience 183–91, 195–6, 198–9,
 201
 Glastonbury, UK 105
 glaze 194, 254, 256, 262–4, 271, 334,
 364
 glazed steatite 13
 glazed vessel 133, 161–3
glebas nitri/glebas nitri 52
 goblet 290–1, 350
 gold 10, 75, 76, 131–2, 153, 186,
 194
 gold ruby glass 76
 gold-glass 209, 214
 Golfe de Fos, France 235–40, 243–4
 Gord, France 186, 195–8
 granite 117, 331, 333
 granitic rocks 60, 66
 Greater Iraq 253
 Greater Syria 253, 277
 Grotte Vittorio Vecchi, Italy 183,
 185
 guild 132
 gypsiferous limestone 33, 40, 47
 Hadera, Israel 93, 238, 241–3, 253,
 270–1, 274, 290
 Hadrian 370
 hafnium 88
 Hagoshrim, Israel 211
 Haifa, Israel 61, 62, 352
 halite 52
 Hallstatt C 94, 96
 Hallstatt D 94, 96
Halocnemum 23
Halopeplis 23, 31, 32, 35, 36, 39
 halophytic plant 23, 24, 28, 46, 54,
 85
Haloxyylon articulatum 31, 262
Haloxyylon recurvum 29
Haloxyylon salicornium 28
 Hama, Syria 144, 268
Hammada 23, 31
Hammada scoparia 24, 28, 262
 Hammurabi 128
 Han dynasty 5, 123, 364
 harvest season 310, 313, 335
 Hasanlu, Iran 94
 Hasmonaeans 206
 Hastinapur, India 113, 125
 Hatshepsut 165, 168
 Hatti 130, 138
 Hattusili I 128
 Hauterive Champvèyres,
 Switzerland 9, 89, 189, 192–3,
 195–7
 Hazar-tam, China 121
 Hazor, Israel 144
 heirloom 194, 200
 Hellenistic 4, 76, 83, 94, 95, 203–215,
 217, 221, 222–33, 310, 351
 hematite 81
 Hengistbury Head, UK 88
 Heracla, Syria 33
 Herat, Afghanistan 28, 371
 Herod 206, 208, 213
 High lime-high alumina glass 117,
 118, 364
 High iron, managanese, titanium glass
 (HIMT) 95, 96, 354
 Hippopotamus 131
 Hippius (Qalaat el-Husn) 206
 Hittite 92, 128–30, 136, 144, 163, 168,
 349, 357
 horse 130–31
 horse riding equipment 80
 horsemanship 130
 Hurrian kingdom of Mitanni 162
 Hurrian language 128–30
 Hutton, UK 104
 Hüttplatz, Germany 107
hyalos 204
 hydriae 209
 Ialysos, Rhodes 165
 Iberian Peninsula 64
 Ibn Jubair 256
 Igbo Ukwa, Nigeria 118
 igneous rocks 319
 Ile-Ife, Nigeria 117
 ilmenite 58, 60
 incised decoration 291, 353
 inductively coupled plasma atomic
 emission spectrometry 32, 44, 45
 inductively coupled plasma emission
 spectrometry 26, 65, 114
 inductively coupled plasma optical
 emission spectrometry 32
 ingot copper 131,
 ingot glass 131, 135–7, 139–42, 145,
 151, 154, 162–4, 166, 170, 179, 181,
 191, 202, 249, 334, 355, 357, 360,
 369
 ingot tin 131, 188–90, 192–6,
 198
 ingot, pick 151–3
 innovation 84, 235, 243, 364, 367
 iron 3, 42, 44, 57, 64, 65, 66, 67, 68,
 70, 80, 159, 165, 172, 188, 210, 264,
 267
 Iron Age 6, 64, 70, 73, 74, 351–3, 356,
 359
 iron oxide 58, 59, 81, 159, 175,
 188
 iron titanite 58,
 Ishtar, goddess 128, 140, 142
 Isidore of Seville 51, 63
 Islamic glass 83, 204, 252, 279–93,
 295–7, 299–305, 309, 311, 316,
 320–1, 323–4, 326, 330, 334–5,
 338–40, 343, 345–50, 353, 355,
 357–9, 369–70
 ivory 131, 153, 155
 Jabal Bishri, Syria 267, 356
 Jaboul, Syria 33, 41
 jade 119, 306, 364
 Jalame, Israel 97–99, 231–2, 242, 247,
 251
 James of Vitry 268
 Jebel Khalid, Syria 212, 233
 Jerusalem, Israel 130, 144, 208,
 211–13, 233, 250, 267
 Jewish 260, 262, 266–69, 271, 279,
 303
 Jezziyat, Iraq 28
 John Greene 108
 John the Grammarian 256
 Josephus 62, 203, 211
 Judaea 206, 208
 juglet 226
Julia Felix, shipwreck, Italy 360
 jurassic limestone 34
 Kakovatos, tholos tomb, Greece 144,
 165
 Ka-La-Ke'er, China 120
 Kaloula property, Rhodes 214
 Kandahar, Afghanistan 28
 Kar-Tukulti-Ninurta 135
 Kashan, Iran 24, 73, 159, 262
 Kassite 129, 135, 143, 349
 Kausambi, India 112–13
 Keli/Üshnan 26–8, 53, 261–3, 357
 Kemsar, Iram 159
 Kerala coast, India 112
 Kerma, Sudan 15, 184, 187, 195–7
 Kharga oasis, Egypt 71, 159
 Khirbat Faris, Jordan 116, 297–9,
 350
 kiln 215–8, 254, 271, 273–4, 364,
 368
 Kish, Iran 16
 Kition, Cyprus 16
 Kiziltur, Xinjiang, China 88, 122
 Kizzuwatna, Anatolia 130
 Knightons, Surrey 28
 Kom Helil, Memphis, Egypt 16

INDEX

- Kopia, Uttar Pradesh, India 115
 Kota Cina, Sumatra 122, 126
 Kufa, Iraq 254
- La Seube, France 75
 La Tène 64
 Lachish 144, 168
 Laser ablation inductively coupled plasma mass spectrometry 60, 241
 lajvard 73
 lanthanum 180, 183, 309, 318
 Laodice 205
 lapis lazuli 1, 4, 10, 70, 73, 138, 143, 148, 156, 168, 202, 368
 Latakia, Syria 253, 262
 Late Hellenic period 167
 lattice 3
 Lavrion, Greece 169, 369
 Le Narde, France 153
 leaching 50
 lead 22, 43, 44, 57, 70, 73, 74, 75, 80, 83, 84, 96, 99, 109–12, 117, 119–26, 169–70, 188, 215
 lead antimonate 77, 147, 160, 215, 334, 346
 lead arsenate 79
 lead isotope 74, 77, 131, 169–70, 333–5, 345–6, 355, 361, 366
 lead ore 334, 346
 lead oxide 267
 lead oxide-silica glass 119, 126, 264, 302–3
 lead-tin oxide 79, 267
 Leicester, UK 248
 Levant 203–4, 206, 210, 212–13, 215, 222–3, 225, 228–33, 235–43, 246–8, 250–1
 ligand field theory 68
 Limlingerode, Germany 107
 Limoges enamel 74
 Lincoln, UK 87, 105, 108–9, 111
 linear absorption coefficient 66
 linear-cut bowl 236–7, 239–40, 244
 linen smoothers 109–10
 linneite 73
 Lisht, Egypt 165
 Linterno, Italy 63
 lithification 60
 Little Birches, U.K 104
 London, UK 93, 108, 204, 229
 lost-wax technique 128
 Lou Lan, Xinjiang, China 112
 low magnesium-high potassium glass (LMHK) 167, 173–4, 183, 196
 Lübeck, Germany 111
 Luco/Laugen culture, Italy 152
 Lustre decoration 280–2, 291–2, 296–7, 303, 350
 Luxor, Egypt 61
 Lycurgus cup 76, 370
- Macedon 209
 Madagascar 115–7
 Magdalensburg, Austria 88
 Maghreb 254, 267
 magma 5
 magnesium 13, 14, 16, 26, 27, 29, 36, 37, 40, 41, 53, 64, 72, 159–60, 167, 186
 magnesium carbonate 279, 315
 magnesium oxide (magnesia) 48, 49, 53, 76, 81, 83, 85, 88–91, 94, 96, 99, 101–2, 104, 109, 116, 122, 158, 160, 163, 170–2, 183, 186–7, 190–2, 195–6, 199, 235, 237, 245, 264–5, 279–80, 282–5, 290–7, 295, 301, 312, 315–8, 321–6, 337, 350, 359, 367
 Mahilaka, Madagascar 116
 Maidstone, UK 108
 Mai'e Pur, China 93
 Maktalta, al-Raqqa, Syria 271
 malachite 168
 Malaga, Spain 23, 253, 269
 Malkata, Egypt 160, 165, 169, 170, 179–181, 200
 Mamluk 70, 116
 Mamluk caliphate 253, 269–70, 280, 292, 294–7, 299, 302, 304, 350
 Mancetter, UK 248
 manganese 36, 42, 50, 67, 68, 73, 74, 75, 76, 159, 163, 165, 172, 188, 210, 264–5
 manganese oxide 42, 43, 48, 158, 166, 172–5, 189, 265, 287–9, 353
 Mantai, Sri Lanka 59, 115, 299
 Manutention, Lyon, France 228–9, 236, 246–7
 Marco Polo 116
 Maresha, Israel 211–2
 Mari, Syria 127–8, 130, 132
 Mariconda, Italy 89, 90, 125, 175–6, 183, 188–193, 199
 Mark Anthony 208
 Marlik, Iran 134–5
 Marseilles, France 228, 246
 marvered decoration 280
 marvering 5, 20
 Mayen, Germany 96
 Mecca, Saudi Arabia 252
 Medina 252, 255, 269
 Megiddo, Israel 143
 meku 139, 168
 Melle, France 111
 Meroitic Sudan 89
 Meskani, Iran 72
 Meskene, Syria 16
 Mesopotamia 7, 10, 85, 88, 92, 309, 317–8, 323–5, 330, 346, 348–50, 355, 357, 359, 361–2
 Metal hoard 150, 153
 metamorphic rocks 57, 319, 331, 333
- mica 60, 61
 Midi, France 197–8
 millefiori 257, 261, 265, 277
 Minet el-Beida 138–9
 Mishlab, al-Raqqa, Syria 271
 mishna 211
 Misr, Iraq 254
 Mitanni 349
 mixed-alkali glass 90–2, 94, 123–6, 167, 172–6, 183–201, 315, 323–5
 mixing of glass 282, 284, 288, 291–2, 298–9, 303, 315, 319, 327, 334–5, 337, 341–2, 344, 346, 353–4, 358, 360–1
 Mohammad 252
 moil 229, 270, 358
 monazite 58, 309
 Mongol 262
 Montagnana, Italy 151, 153
 Monte Lecco, Italy 65
 Moorgate, London, UK 229
 Morgantina, Sicily 246
 mosaic glass vessel 134–6, 139, 142–3, 147–8, 156–7, 209–10, 231, 233, 235, 242–3, 320
 Moscoti di Cingol, Italy 150
 mosque lamp 257, 269–70, 277, 280, 293–6, 304
 mould-blown vessel 204
 moulding 2, 13, 18, 236–40, 243–5, 249, 251, 260, 266, 363
 muff window glass 105
 mummification 51
 Murad II, mosque 256
 Murano, Italy 1
 Murcia, Spain 253, 269, 349
 Murex shell 131
 Mursili 128–9
 Muslim 94, 98, 109, 252, 254–5, 259, 263, 266–7, 269, 271, 277
 Mutisalah beads 371
 Mycenaean Greece 7, 130, 144, 150, 153–4, 158, 160, 164–7, 170–3, 176–8, 181, 199, 349, 355
 Mycenaean glass 318, 323–5, 349, 355
- Nabataeans 207
 naga plant 156
 Nahr Na'man 203
 Nāir Muhammad ibn Qulāun 270
 Narbonne, France 23
 Narim-Sin 128
 Nasir al-Din al-Tūsī 267
 natrofairchildite 45
 natron 13, 16, 51, 52, 66, 365–6
 natron glass 46, 51, 64, 80, 81, 83, 88–103, 110, 112, 115–6, 118, 121–2, 184–5, 187, 194, 203–4, 212, 222–3, 228, 231, 235, 237, 239, 241–3, 245–6, 248, 280–4, 286–92,

INDEX

- 297, 300–4, 307–10, 315, 329–331, 333, 346–9, 351–4, 356, 358–9, 361, 365, 367, 369
naturalis historia 51, 52, 250
 Nawar 128
 Nazimaruttash, king 143
 Nefertiti 132
 Němčice, Moravia 227
 Neo-Assyrian 212
 neodymium 43, 176–9, 201, 309, 318–9, 331, 340
 neodymium isotopes 65, 98, 115, 163, 175, 180, 199, 330–1, 333, 335–6, 362, 369
 neogene 33, 337
 nepheline 54, 310
 nepheline syanite 54
 Nesikhons 92
 network former 2
 network modifier 2
 network stabiliser 3, 27
 neutron activation analysis 116
 New Kingdom (Egypt) 160, 163, 166, 199
 New Mexico 5
 niccolite 72
 nickel 49, 70, 159, 163, 166, 172, 188
 nickel oxide 174–5
 Nile river 61, 331–2, 352, 354, 366
 Nimrud, Iraq 93–4
 Nineveh, Iraq 16, 134, 143–4
 Nippur, Iraq 16, 143–4
 Nishapur, Iran 74, 253, 268, 277, 279, 281, 291, 293–5, 301, 304, 321–2, 350, 359
Noaea micronata 31, 35
 Nuzi, Iraq 42, 132–3, 135, 140–4, 160–2, 164–5, 170–1, 180–1, 202, 323–5, 357
 nyerereite 45
- obsidian 2, 4, 306
 ochre 197
oinchoai 155, 209, 223
 olivine 60
 Olympia, Greece 246
 Oman 330, 338
 Omar b. Abd al-Aziz 255
 oos 53
 opacity 10, 77, 82, 83, 84
 opal 56
 opalisers 77
oppida 156, 226, 353, 359
 optical emission spectroscopy 164
 Orontes River 205
 orthoclase feldspar 65
 ostrich egg shell 153
 Ottoman 116, 256, 297–9, 350
Ouest Embiez I shipwreck 77
 oxidising atmosphere 67
 Oxus River 226
- oxygen 2, 56, 69
 oxygen isotope 166, 330, 333, 342–3, 366
- palace of Niqme-pa, Alalakh, Turkey 137
Palafitte 149, 154
 paleogene 33
 Palestine/Palestinian 128, 130, 137, 144, 147, 205, 208, 210, 212, 225–7
 Palmyra (Tadmur) 208, 267
 Pandemic 370
 paradigm shift 12, 17–19, 156, 364
 pattern-moulded 270
 Pavia, Italy 263
 Peel castle, Isle of Man, UK 102
 Pella (Tabaqat el-Fahil) 206, 212, 233
 pendant 136, 138, 140, 162, 167, 170, 200, 363
 Pendjikent, Tajikistan 112
 Pergamon 205
 Periplus Maris Erythraei 112
 Persepolis 226
 Petra, Jordan 78
 Petronius's *Satyricon* 251
 Peyrestortes, France 236
Pfahlbautonnen mit Spirale bead 188
 Philadelphia (Amman) 206–7
 Phoenician 94, 203, 205–6, 223, 351–2, 356, 359
 phosphorus 36, 46, 64, 186, 191, 302–3, 311, 315
 phosphorus pentoxide 42, 49, 187, 191, 196, 285–6, 297, 312
 pickeringite 71
 Pikrolimni lake, Greece 366
 pillar moulded bowl 234
 Pingba, China 119
Pinus sp. (pine) 48
 Piriform bottle 139, 140, 142–3
Pirotechnica 75
 plagioclase feldspar 329
 plant ash 1, 8, 10, 15, 18, 25, 27, 28, 51, 66, 71, 80, 81, 91, 134, 156, 158, 160, 163, 171, 174–5, 177–9, 182–4, 186, 201, 204, 212, 279, 282–4, 286, 310–12, 314, 315, 364–6, 369–70
 plant ash glass 83, 85–6, 88–9, 91–2, 94, 96, 98–102, 108–9, 112–3, 116–7, 134, 159, 162–3, 165, 167, 170, 172–3, 185–89, 191, 197, 199, 201, 204, 235, 237, 239–40, 261–6, 271, 274, 276–7, 279, 280, 282–4, 286–8, 307–8, 311, 314, 315
 plant ash purification 25, 27, 50, 279, 284, 306, 315–6, 319–20, 326, 360
 plant taste 320
 plant transpiration 328
 plaque 161–2, 166–7, 172–3
- Pliny the Elder 51, 62, 65, 92, 97, 203–6, 211, 222–3, 231, 308, 330, 351, 356
 Po River, Italy 149, 150, 152, 155, 332
 Poggio Civitale, Italy 155
 Poland 184, 195–7
polis 205, 216
 Pompeii 41
 pontil 18
 porcelain 6
 Portland vase 230
 potassium 5, 16, 26, 27, 30, 35, 36, 37, 40, 45, 50, 60, 64, 65, 71, 85, 167, 183–4, 186–8, 197–8, 200, 311–12, 314, 316–8, 322, 324, 360
 potassium carbonate 315
 potassium chloride 23, 35, 45, 315
 potassium feldspar 46, 66, 71, 90, 94, 98, 199
 potassium glass 183–4, 186–7, 189, 196–8
 potassium oxide 36, 42, 45, 48, 49, 53, 66, 80, 81, 85, 88–92, 94, 96–9, 101–104, 107–8, 111–3, 117, 122, 124–6, 158–60, 164, 170–2, 182–3, 189, 191, 193–8, 235, 249, 282, 296–300, 312, 315, 321, 367
 potassium sulphate 28
 potassium-lime glass 124
 Poviglio, Italy 183, 185, 188, 198
 Prato di Frabulino, Italy 183, 188
 priest 128, 132
 priestess 128
 primary glass production (glassmaking) 132–4, 139, 141, 146–8, 155, 158, 163, 165, 167–9, 172–3, 180–2, 199, 200–1, 204, 209, 210, 222, 226, 228–32, 235, 238, 242, 251, 262–3, 266–8, 274–7, 279–80, 282–4, 286, 289–90, 292, 294, 296, 300, 302, 304–305, 307–11, 313–4, 316–7, 327–32, 335–6, 338, 343–5, 337, 348–9, 351–4, 356–7, 359–61
 production centre 163–4, 184, 191, 194, 197–202
 proto-geometric period 167, 173
 proton-induced X-ray emission (PIXE) 13, 163
 Proto-villanovan 151, 152, 154, 155
 provenance 165, 170, 177–8, 306–7, 309–14, 320–1, 326–8, 333–5, 338, 340, 345, 347, 349–55, 359–60
Pteridium aquilinum 48
 Ptolemy I 205–6, 209
 Ptolemy IV 222
 Ptolemy V 222
 Puglia, Italy 150–51
 Pylona cemetery, Rhodes 166
 pyrite 10

INDEX

- pyrolucite 75
 pyroxene 61, 329
- Qadisiyya quarter, Baghdad, Iraq 267
 Qal'at Sem'an 282,
 Qamasar, Iran 73
 Qantir-Piramesses, Egypt 18, 165,
 169, 200, 317, 349
 Qasr al-Banāt, al-Raqqa, Syria 267
 Qasr al-Hayr al-Sharqi, Syria 28, 280,
 282–3
 Qasr al-Seghir, Morocco 280–1
 Qatna 129
 Qom process 14, 15
 Qom, Turkey 28
 quartz 13, 14, 15, 43, 54, 56, 57, 61,
 90, 134, 142–3, 145, 156, 181–2,
 184–5, 187, 198–9, 263–4, 276, 284,
 309, 330, 332–3, 339, 355, 360–1,
 365
 quaternary 33
 quaternary basalt 34
 Queen Nefertiti 13
Quercus sp. (Oak) 48, 106
 Qumrān, Israel 248
- Ra's al-Hadd 338–9, 343
 ramelsbergite 72
 Ramla, Israel 238, 262
 Raphana 206
 rare earth anomaly 117
 Ras Shamra, Syria 357
 Rasāfa, Syria 356
 Rathgall, Ireland 89, 91, 175–6, 186,
 192–4, 199
 Ravenscroft 111
 Raya, Egypt 96, 295, 297, 300–2
 recrystallisation 186
 recycling 44, 248–50, 307, 320, 334,
 361
 reducing atmosphere 67, 68
 reh 53, 54, 66, 115, 310
 Reims, France 228
Rhantarium epapposum 28
 Rhodes 88, 138, 209–10, 214–5, 223,
 225–6, 246, 352, 359
 rhyolitic rocks 60
 rhyton 131
 Rightly Guided Caliphs 252
 ritual 1, 364
 Rochetta 24
 rod glass 143–4
 Roman 4, 76, 77, 78, 81, 83, 88, 94–6,
 120, 351
 Rome, Italy 204, 206, 229, 247,
 249–50, 370
 Rosedale, UK 104
 Rosetta, Egypt 263
 rubidium 48, 104, 328
 Rūm (Byzantines) 255
- Rupar, India 112
 Ruscino, France 235–240, 243–4
- Sa Huyna culture, Vietnam 125
 safflorite 72
 Sagalassos, Turkey 54, 96
 saggar 16
 sagging 211–3, 226–7, 245
 Şah Malek Paşa Camii, Turkey 256
 Sahara desert 6
 Sainte, France 247
 Sākinu 132
Salicornia 23, 24, 28, 29
Salicornia kali 30
Salsola 30, 35, 37, 38, 39, 40, 41, 43,
 47, 160, 182, 311–4, 321–5, 360
Salsola europaea 173
Salsola fruticosa 172
Salsola jordanicola 31, 32, 32, 36, 44,
 46, 311–2
Salsola kali 24, 32, 35, 40, 42, 173
Salsola soda 24, 172, 262
Salsola sueda 32, 262
Salsola tragus 24
Salsola vermiculata 23, 25, 32, 35, 36,
 42, 44, 46, 173
 saltpetre 186
 Samaria 206, 208
 Samarium 330
 Samarkand, Uzbekistan 112, 296
 Sāmārra, Iraq 74, 253, 256, 359
 Samudera-Pasai, Indonesia 115
 Sandrakatsky, Madagascar 116
 sandstone 60
 Sanguinaire shipwreck, Corsica 227,
 359
 Santa Maria de Pedralbes church,
 Barcelona, Spain 101
 Saqal-tam, China 121
 Sar Dheri, India 112
 Sargon 127
 Sarmin, Syria 262
 Sasanian 76, 88, 204, 212, 260, 265–6,
 282, 284–6, 289, 291, 293–5, 303,
 308–9, 321–4, 326, 349–50
 scanning electron microscopy 13, 163,
 190, 245
 scarab 132
 scaraboïde 140
 sceptre 139
 scratch decorated 281, 292, 296–7,
 300–1, 304, 350, 359
 Scythopolis: See Beth She'an
 seal 167
 seashell 28, 46, 329
 seaweed 6, 106–107
 secondary geological provenance
 332
 secondary glass production
 (glassworking) 139, 141, 143,
 145–7, 153, 155, 163, 201, 242, 245,
 247, 266–8, 269, 272, 274, 292, 343,
 349, 352
 Seleucia (Tell Umar), Iraq 87, 88, 205
 Seleucid 205–6, 209, 215–6
 Seleucos I (Nicator) 205
 Seljuqs 253, 258
 semiprecious stone 146, 148, 156–7,
 368
 Sepphoris, Israel 208, 231
 Serçe Limani shipwreck 74, 253, 270,
 276–7, 290, 293–5, 301–2, 335,
 346–7, 358
 Severianus 370
 Severus Alexander 208
 Shahr-i-Banu, Afghanistan 112, 299
 Shamshi-Adad 128
 Shechem, Israel 208
 Shikohabad, India 53
 short glass 100
 Sidon, Lebanon 51, 63, 204–5, 210,
 240
 Siena, Italy 101
 Sigtuna, Sweden 110
 silica 1, 2, 5, 6, 8, 10, 15, 17, 18, 22,
 44, 54, 56, 57, 59, 60, 62, 75, 77, 84,
 88, 92, 94–5, 102, 104, 109–13,
 119–121, 123–6, 364, 366–7
 silica tetrahedra 56, 68
 silicon 2, 27
 silk road 88, 91, 109, 112, 120, 122,
 126, 197, 254, 268, 358–9, 368
 silver 70, 72, 76, 111, 168, 172
 sinter 21, 142
 Siraf, Iran 281
 skutterudite 70, 72, 188
 slag 5, 6, 8, 188
 Sàone River, France 247
 soap 85, 262–3, 265, 268–9, 364
 soapstone 306,
 soda-alumina glass 113–15, 117, 121
 sodium 2, 5, 27, 41, 54, 60, 186, 189
 sodium carbonate 44, 52, 53, 72, 262,
 313, 315, 333
 sodium chloride 23, 24, 29, 45, 52, 53,
 92
 sodium fluorosilicate 122
 sodium oxalate 44
 sodium oxide 30, 36, 42, 45, 66, 100,
 161, 170, 194, 198
 sodium phosphate 79
 sodium sesquicarbonate 52, 187
 sodium sulphate 23, 53
 Solkhat, Crimea 269, 349
 spacer bead 144, 147
 specialisation 84, 307, 351, 355
 sphalerite 169
 spinel 73
 Sri Lanka 114, 298–300
 St. Jean de Garguier, France 236
 St. Maria Assunta, Torcello, Italy 11,
 101

INDEX

- stamnoi 209
 Staré Hradišco, Moravia 79
 Stato's tower 208
 stibnite 77, 78
 stoke hole 217
 stoneware 6
 Strabo 52, 63, 203–5, 210–11, 222, 229–30
 striking glass 77, 80, 147, 157
 strontium 14, 42, 49, 61, 64, 104, 115–6, 238–41, 249
 strontium isotope 26, 72, 103, 115, 163, 175–6, 178–9, 180, 199, 200–1, 294, 301–2, 313, 328–30, 332–9, 343, 349, 351, 353–4, 358, 361–2, 369
 strontium oxide 300
Sueda 32
 Sulaiman 73
 sulaimani 73
 sulphur 50, 70, 74, 159, 172
 sulphur trioxide 30, 48, 78
 Sultan Mehmed I mosque complex, Turkey 256
 Sumer 127–8
 Sumerian 132–3
 sūq al-marzuqīn, Aleppo, Syria 267
 Susa, Iran 202
 Syriac texts 304

 Tabriz, Iran 73, 253, 256
 Tacitus 63
 talc 7, 13
 Talmasi, Iran 72
 Tamarisk 28
Tamarix meyeri 28
Tamarix tetrandra 28
 Tang dynasty 122, 126, 358
 tank furnace 18, 69, 95, 97, 100, 114, 209, 214–222, 229–31, 269–76, 371
 Taposiris Magna, Egypt 231, 247–8
 Tārīkh 255
 Tashkent, Uzbekistan 296
 Tchoga Zanbil, Iran 143, 160, 172
 Tebtynis, Egypt 242
 Tel Mevorakh, Israel 144
 Tel Yin'am, Israel
 Tell abu Ali, al-Raqqa, Syria 271, 273–4
 Tell abu Sarbut, Jordan 116, 297–9, 350
 Tell al-Fakhar, Iraq 134
 Tell al-Fakhariya, Syria 130
 Tell Anafa, Israel 210–11, 233, 246
 Tell Ashara-Terqa (Syria) 164
 Tell Asmar (ancient Eshnunna), Iraq 134
 Tell Aswad, al-Raqqa, Syria 273
 Tell Atchana, Turkey: *See* Alalakh
 Tell Bellor, al-Raqqa, Syria 271, 275, 325

 Tell Brak (Nagar), Syria 8, 16, 42, 85–6, 89, 127, 129, 134–5, 137, 139–40, 143, 156, 159–62, 164, 170–1, 176, 179–81, 323–5, 357
 Tell Dan, Israel 160
 Tell el Amarna, Egypt 18, 61, 85, 86, 89, 140, 161, 164–5, 167–9, 171, 176–7, 179–181, 200, 323–5, 349, 352, 357
 Tell el-Ashmunein, Egypt 241, 352
 Tell el-Rimah, Iraq 16, 160, 172
 Tell Fukhar, al-Raqqa, Syria 271, 294–5, 325, 336, 342
 Tell Judeideh, Syria 133–4
 Tell Rimah, Iraq 134–6, 142, 160, 172
 Tell Zujaj, al-Raqqa, Syria 271, 274, 289, 325, 335–6, 342
 Terqa (Tell Ashara), Syria 135
Terra sigillata shaped vessels 236–240, 244, 246, 250, 369
Terramare 150, 155, 198
 tertiary 33
 tertiary limestone 241
 tesserae 78, 80, 81, 229, 231–2, 254–5, 259, 277, 280, 293–5, 302, 304, 345, 350, 359, 370
 Tetrapolis 205, 212
 textile 131
 Thasos, Greece 91, 144
 Thebes, Greece 161, 167, 171–3, 175, 181
 Theologos, Greece 192–3, 196
Theophilus presbiter 21, 67, 255
 thermal ion mass spectrometry (TIMS) 26
 Thessaloniki, Greece 366
 Thisbe, Greece 166
 thorium 60
 Tiberius 208, 233
 Ticino, Italy 204
 Tigranes 207
 Tigris River, Italy 182, 266, 268, 301, 332
 tile 256
 time of flight-secondary ion mass spectrometry (ToF-SIMS) 169, 200
 tin 43, 44, 70, 77, 188, 367
 Tiryns 166
 titanium 61, 96, 180, 183
 titanium oxide 172, 249, 300
 titanomagnetite 13
 Torcello, Italy 59, 93, 100–1
 trace element 83, 85, 88, 102–3, 159, 165, 171, 173, 178–9, 181–3, 185, 199–201, 279, 302, 304, 312, 318, 330–1, 349, 351, 355, 359, 361
 trade 209, 211–12, 227–233, 246, 249–50, 306–8, 320, 330, 332, 348–9, 356–61
 trade wind beads 114

Tradelière shipwreck, France 227, 249
 transition temperature 5, 17, 19
 transmission electron microscopy (TEM) 77
 Trentino, Italy 149, 151
 trianite 70
 tridymite 56, 184–5, 189, 198
 Trinitapoli, Italy 183, 198
 tripod 161
 Tripoli, Syria 262
 trona 13, 51, 52, 53, 187, 310
 tube 172, 213–5
 tube-blowing 250
 Tulinids 253
 turquoise 1, 10, 156, 306, 368
 Tuthmosis II 147
 Tuthmosis III 147 165, 168–9
 Tuthmosis IV 165 169
 Tuttul (Raqqqa), Syria 127–9
 Tyre, Lebanon 61, 168, 210, 256, 267–8, 274, 280, 290, 292, 295, 301, 335, 338–9, 343–5, 349

 Üç Serefeli mosque, Turkey 256
 Ugarit, Syria 16, 128, 135–6, 160, 163, 163, 164, 338, 357
 Ukhadir, Syria 256
 Ulu Burun shipwreck, Turkey 131, 161, 166, 170–1, 181, 355, 357
 Umayyad caliphate 94, 252–4, 256, 259–261, 266, 280–2, 292, 304, 330, 351, 353
 Umbria, Italy 151
ummānu 132
 Untashgal, king 144
 Ur, Iraq 127–8, 133, 143
 uranium 72, 115–6, 122
 Urkesh 128
 Urshu 128
 Ūshnan: *See* Keli
 Uttar Pradesh, India 114, 122

 Val d'Adige, Italy 149
 Valle d'Aosta, Italy 149
 Valli Grande Veronesi, Italy 154–55
 vanadium 62
 varec (kelp) 186
 Veh Ardašir, Iraq 88
 Veii, Italy 152
 Venetians 24, 27, 40, 76, 77, 101–2, 107–9, 262–3, 277, 316, 321, 358
 Veneto 90, 101, 149, 151, 153
 Venice, Italy 253, 262, 277
 Vergina, Greece 246
 Verucchio, Italy 152
 vessel 2, 14, 15, 16, 20
 Vicofertile, Italy 183, 185
 Vienne, France 246
 Viking 94, 102, 110, 255

INDEX

- Villamarzana, Italy 151, 153–4
 Villanovan 94, 151–152, 154
 viscosity 5, 244–5
Vitrum blancum 102, 107–9, 111
 vizier 132
 Volturno River, Italy 62
 Vopiscus 370
- Wadi el Tur, Egypt 300–2
 Wadi el Natrun, Egypt 51, 92, 231, 247–8, 300, 310, 331, 356, 366
 Wady Qirud 147, 168
 Warring States dynasty 94, 123
 Wasshukkani 130
 Weald, United Kingdom 104
 Western Zhou dynasty 122
 Wijnaldum, the Netherlands 81
 William of Tyre 268
 winding 2, 20
- window glass 106, 257, 267, 270, 291, 302–3, 307, 336, 338, 341–4, 349–50, 370
 wine 264
 Wingerode, Germany 107
 wollastonite 13
 wood ash 50, 51, 74, 102–7, 109, 111, 309
 Woolwich (UK) sands 108
 workshop 334
- X-ray diffraction spectroscopy (XRD) 26, 30, 32, 44, 45, 54, 77, 315
 X-ray fluorescence spectroscopy (XRF) 30, 42, 65, 115, 162, 163, 241, 300
- Yamkhad (kingdom of) 128–9
 Ya'qubi 254
 Yāqūt 267
- yttrium 58
 Yuan dynasty 123
- Zagros mountains, Iran 129
 Zakik, Egypt 231, 248
 Zanjan, Iran 73
zatte rippenschale 235, 242
 Zengids 253
 Zhalainuer tomb, Inner Mongolia 121
 Zhongyang dong, Korea 121
 ziggurat 144
 Zimrilim, king 132
 zinc 42, 43, 44, 48, 57, 70, 71, 73, 74, 104, 159, 166, 169, 172, 188
 zinc oxide 159
 zircon 58, 59, 60, 64, 238, 309
 zirconium 61, 62, 88, 96, 115, 180, 183, 238–9, 241–3, 248–9, 318