

Index

- Aachen 271, 274, 275
Carolingian Palace Chapel at 9
Abbesses of Essen 147–57
see also Adalwig, Gersid, Hathwig,
Mathilde, and Wigburg
Acre 5, 103, 104, 105, 110
European communities in 105
Viscounts of 103, 104, 110
Adalwig, Abbess 149
Ågedal, Norway 51, 56
Agerskov, Denmark 53
Agincourt, Battle of 214
Agraffen, *see* clasp wrist.
Agricola, Georgius 2, 333, 334, 347, 348,
350, 352, 353, 354, 371, 388–9, 395,
22.4–22.6
see also De Re Metallica
Albertus Magnus 351
Albizzi, Maso degli
arcosolium tomb of 173–5
alchemy 350
Alcuin 138
life and legacy of 31, 38
Aldhelm 25
De Lorica 25
Alexandria 164
Alfonso XI 329
Alfred jewel 67
alloys 3, 23, 26, 36, 39, 40, 85, 126, 137,
194, 210, 308, 335–8
Spanish treatise on 327–43
Alnwick Castle 73
altars 134, 138, 139, 170, 171, 172
altar vessels 125, 127, 128
see also chalice, paten
Altenberg, Germany
Cistercian church of, 10, 267–276,
16.1–16.4
Altfrid, Bishop of Hildesheim 148
Álvaro Alonso Barba 338
amber 15, 19, 53–8
amethyst 101, 102
Amlaíb, Viking king of Dublin 74
amulets 18, 68, 101, 107, 109
anchorites 136
anchors 271, 275, **16.1**
Andrew, Saint, *see* Saint Andrew
anelli (iron rings) 317, 319
Angelico, Fra 167
Angevins 104
Anglo-Saxon metalwork 4, 15–47, **1.1–7**,
2.1–3
annulets 39, 260, 261
L'Anse aux Meadows, Newfoundland 184,
199, 200
antler 82, 92
Antonio da Paderno, 318, 319
anvils 64, 128, 184
appliqué 127
Aquinas, Thomas 106
Arabic numerals 330
archers and archery 207
see also arrowheads
arches 255, 268–75, 318–20
doubleau arches 270
architecture 2, 10–11, 131–40, 245–324
Irish early medieval 131–40
metal use at
Altenberg 267–76, **16.1–16.4**
Avignon 297–313, **18.1–18.4**
Lincoln 257–60, **15.1, 15.3**
Milan 302, 312, 317–22, **19.1, 19.2**
Rochester 260, **15.4**
Salisbury 258–61, 279–91, **15.2**,
17.1–17.9
Worcester 259–61, **15.5**
seen by Villard de Honnecourt 245–9,
14.1–3
Ardagh, Co. Limerick 126
Ardagh Chalice 72, 126, 127, 131, **8.1, 8.2**
Arezzo, Italy 164
Aristotle 347
Armagh, Ireland 136
Cathedral Hill 129
arms and armor
see armor, arrowheads, chain mail,
helmets, quarrel bolts, swords,
and weapons

- armor 26, 208, 214–15
 Arrhenius, Birgit 58
 arrowheads 2, 8, 11, 207–16, **12.1**
 arrow shafts 207
 armorsmiths 209
 Arundell archive 208
 Ascension Day 152
 Aschersleben, Saxony 54
 ashlar blocks 268, 271
 assaying 327, 351, 389, **20.1–20.3**
 process described 338–42
 Spanish treatise on 327–43
 Åsum, large bracteate from 49
 Athassel Abbey, Co. Tipperary 138
 Augsburg, Germany 356
 Aurel, Marco 331
 austenite 215
 Avignon, France 313
 Papal Palace in 11, 297–313, **18.1–18.4**
- Bailey, Richard 39, 41, 256
 bainite 210, 215
 baldrics 5, 114, 115, 117, **7.2**
 Balduccio, Giovanni di 170
 Balducci Pegolotti, Francesco 328, 330, 332
 Baltic region 81, 270
 Bamburgh, England 35–7
 Banagher, Co. Derry 134
 Bangor, Co. Down 136
 Barcelona, Spain 329
 bargeboards 134
 bars 197, 302, 304, 305, 311
 barra 304, 306
 of iron 184, 193, 194, 196, 197, 258, 273, 274, 304, 340
 basalt 189–92
 Basel, Switzerland 347
 Cathedral, treasury of 6
 Basire, James 115
bastoni (iron window rods) 317, 319, 320
 Bath Stone 223
 Bavaria 108
 Dukes of 155, 156
 beads 18, 19, 36, 52–8, 83, 188
 “spacer” beads or tubes 54, 57
 Beaufort, Cardinal 257
 Beauvais, France 297, 312
 Becket, Thomas, *see* Saint Thomas Becket
 Belgsá, Iceland 198, 200
 bellows nozzle 191; *see also tuyères*
 iron 190
 Benedict, Saint, *see* Saint Benedict
 Benedict XII, Pope 303
- Benson of York 258
 Bent, George 173
 Benty Grange 21
Beowulf 16, 24–6
Bergbüchlein 12, 347–62, 387, **21.1–21.5**
 Bergisches Land 267
 Berg, earls of 267
 Bernard of Clairvaux, *see* Saint Bernard
 Berward, Bishop of Hildesheim 7, 355
 Bible
 citations 106
 New Testament 107
 Bifrons, England 54, 55
 Bird’s mouth joint 256
 Biringuccio, Vannoccio 333, 339, 347, 351, 388
 Birka, Sweden 67, 81, 83, 85
 Black Prince, *see* Edward the Black Prince
 blacksmiths 25, 42, 56, 91, 137, 186, 197, 202, 210, 246, 310, 311, 319, 372, 376
 Blair, John 138
 blooms 193, 196, 198–200, 310
 blåsturjärn 193
 jellujärn 193
 Boarstall horn 114
 bodkin points 207–8, 214, 217, **12.1**
 see also arrowheads
 Boehm, Barbara 7
 bog iron 198
 bog ore 8, 189, 190, 196, 199
 bogs 189, 190, 193
 peat 189
 sedge 189
 Bohemia 11, 108, 353, 355, 368–9, 378–80, **22.1**
 Bologna 171
 tomb of St. Dominic 170
 Bolton, H. C. 388
 bolts 284, 286, 289
 bone 3, 15, 20, 26, 51, 129, 172, 339, 340
 books 152, 327, 329, 332, 333, 343
 account books
 libri munitionum 318, 321
 libri ferramentorum 318–20
 Book of Kells 65
 Canterbury Bible 36
 Gospel of Abbess Theophanu **9.4**
 Lindisfarne Gospels 32
 Stowe Missal 131
 textbooks 256
 Borgarfjörður, Iceland 187
 Borghi, Pierro 331
 boric acid 87, 88

- Borre style 38, 72, 84
 Bourges, France 268
 Bourke, Cormac 65
 Bowen, J. Atherton 282, 283, 285
 bowmen 207
 bowstaves 207
 bracteates 5, 49–59, **3.1, 3.2, 3.3, 3.4**
 loops on 50–54
 conveying of status and belief 57, 59
 brass shaft rings 260–62, **15.5**
 Brendan, Saint, *see* Saint Brendan
 brick 91, 228, 268, 318
 Brinch Madsen, Helge 81, 84, 85, 86, 88
 Bristol, England 219–35, **13.1–13.7, 13.10**
 Augustinian Abbey 220
 Brandon Hill Spring 219, 221
 Carmelites' Friary Pipe, (St. John's
 Conduit) 219–35, **13.1–13.7**
 Church of St John the Baptist 219, 220,
 231, 232
 seal of the city 116
 Britain 33, 34, 127, 135
 British Museum, London 108, 113, 114,
 127
 brooches 5, 15–26, 34, 43, 51, 53, 55–9,
 64–6, 71–3, 83–93, **1.2, 1.3, 1.6, 5.5,**
 5.6, 5.7, 5.9
 as indicators of status 65
 bird brooches 55
 cruciform brooch 21, **1.3**
 Frankish 55
 Jutlandic square-headed brooch 55
 Kentish disc brooch 20, 22, 23, 55, **1.2**
 Kingston Brooch 19, 23
 kite brooches 5, 64, 65, 66, 67, 68,
 73, **4.1, 4.2, 4.3, 4.4, 4.5, 4.6**
 with almond-shaped head 66–73
 with lozenge-shaped head 66
 moulds for 81–99, **5.5–10**
 oval brooches 81–8, 93, **5.4**
 penannular and pseudo-pennannular type
 64, 68, 70, 71
 Pentney brooches 36
 ring brooch **6.3**
 role in society 82
 safety-pin brooches 19
 “Tara” Brooch 72
 “Bronze Age” 1, 369
 brocading 21, 23
 bronze 3, 7, 8, 19, 22, 55, 56, 65, 81, 83,
 87, 126, 150, 153, 163, 168–70, 173,
 175, 248, 279
 Shrine of the Three Martyrs, 163–76,
 10.1
- Brough of Birsay, Scotland 84
 Brugge (Bruges), Belgium 379
 Brunelleschi, Filippo 167
 Brunschwig, Hieronymus 347
 buckles 15, 18, 19, 21, 22, 53, 55, 56, 59,
 114
 Bueri, Piccarda 163
 bullion 16, 137
 “burning” lead 231
 Butterfield, Andrew 174
 Byland, abbots of 108
 Byzantium 22–3, 113, 133, 150–53, 165
- calfskin 137
 Camaldolese Order 166, 167
 Cambell, Marian 25
 Cambrai, France 103, 247
 Canada 88, 91
Canterbury Bible 36
 Canterbury, England 256
capsae (iron sockets) 317, 319–20, 322
 capstones 279, 288
 carbon 87, 92, 210, 215, 268, 274, 308,
 310
 carbonates 307
 Carboniferous strata 224
 Carcassone, France 312
 Carlisle, England 35, 41
 Carmelite monks 8, 219, 220, 225, 234,
 235
 Carmelites' Pipe, Bristol, England
 219–35, **13.1–7**
- Carolingian dynasty 147, 154
 carpenters 246
 Carr, Christopher 57–8
 carving 113, 127, 129
 Caselli, Fausto Piola 300
 Cashel, Co. Tipperary 132, 134
 Cormac's Chapel 132, 134
 casting 5, 23, 81–93, 127, 152, **5.8, 5.10**
- Castletown, Scotland 86
 cement 255, 262, 318
 cemeteries 19, 22
 ceramic 190, 191, 192, 199
 chains 19, 51, 117, 302
 chain mail 8, 16, 25
 chalices 125, 126, 127, 128, 131, **8.1, 8.2,**
 8.3, 8.4
 see also Ardagh Chalice, Derrynaflan
 Chalice, Gauzelin Chalice, Lough
 Chenale Chalice, Trewhiddle
 Chalice, Ursus Chalice
- chalk 152, 230
 champlévé, false 23

- Chapelot, Jean 301
 charcoal 64, 87, 88, 91, 92, 186, 188, 190,
 193, 196, 199, 202, 340
 birch 188, 190
 Charlemagne, Emperor 274
 Charles I d' Anjou 104
 Charles V, Emperor 369
 Charles the Fat, Emperor 148
 charms 108, 109, 110
 "Charon's obols" 52, 53
 Chartres, France 247, 268
 Chaucer, Geoffrey 115
 Chesters, England 256
 chip-carved metalwork 33
 chisels 9
 Christianity 6, 65, 81, 83, 105, 107, 110,
 125, 128, 131, 139, 154, 164, 185,
 354, 389
 Christian III, King of Denmark 371
 chromium 3
cire-perdue, *see* lost-wax casting
 cisterns 256
 Città di Castello, Italy 169–70
 clamps 245, 248, 268, 269, 302–7, 311,
 317, 318
aspa 306
grampon 306
 weights of 307
 clasps 15, 16, 17, 21, 24, 53, 56, 59, 114
 wrist clasps 21, 55, 56, 58, 152
clausura 171, 173
clavellae (iron clasps) 317–18
 clay 41, 82, 84, 86, 87, 88, 89, 90, 91, 92,
 128, 191, 192, 200, 201, 259–60,
 328
 silty 191, 192
see also pottery
 Clement VI, Pope 298, 299, 301, 303–4,
 312
 Clephane family 113
 Clephane Horn 113
 Cleveland Museum of Art 249
 Constantinopolitan Virgin in 153
 Clevis 281, 285, 287
 Clipsham stone 279
 cloaks 21, 26, 65
 fasteners 64
 cloisonné 19, 23
 Clonfert Cathedral, Co. Galway 134, 135
 Clonmacnoise, Co. Offaly 129, 136, 137,
8.7
 cathedral of 135
 brooch from **4.3**
 monastery of 66
 clothes, *see* textiles
 coal 90
 coinage 43, 52, 55, 105, 137
 Spanish treatise on alloying and
 assaying of 327–43
 collars 39
 Cologne, Germany 10, 151, 267, 271, 275
 Cathedral 267
 Gero Crucifix 151
 compasses (magnetic) 3
 conduits
 in Bristol, England 219–35, **13.1–13.10**
 Conques, France
 reliquary of Saint Foy 6
 Conrad II, Emperor 156
 Constable of Queenborough Castle 116
 Constantine the Great, Emperor 6, 155
 Constantino da Vaprio 322
 Constantinople 113
 Hippodrome 113
 cope (top of mould) 90, 92, 255
 Copernicus, Nicholas 347
 copper 3, 8, 19, 20, 23, 26, 36, 39, 40, 108,
 126, 137, 169, 170, 194, 330, 332,
 335, 336, 338, 340, 343, 350
 Corbridge, England 256
 Corfe, England 261
Corpus Vitrearum 245
 corrosion 4, 24, 36, 208, 297, 308
 Corsini, Amerigo, Archbishop of Florence
 165
 Cortona Cathedral 171
 Cossa, Baldassare 166, 169
 costume ensemble 50, 55–7
 Cottam, England 44
crannog (artificial island dwelling) 126,
 129
 cremation 50, 51, 58
 Crew, Peter 195, 196
 Cromwell, Thomas 222
 Crook, John 257
 crosses
 first Cross of Abbess Mathilde 151,
 154–5, **9.2**
 Irish high crosses 65, 130
 second Cross of Abbess Mathilde 156,
 157, **9.3**
 True Cross 150
 Crossgrove, William 348
 crucibles 83, 87, 88, 128, 339
 crucifixions 248, **14.4**
 Crusader Kingdom 5, 103, 104
 crystal 19
 balls 22, 23

- Egyptian rock-crystal 150, 157
 Cyprus 103, 104, 105

 Dalum, Norway 54, 56
 D'Antioche, Marie 103, 104
 Danelaw 32, 41
 Daniel (character in *Bergbüchlein*) 349, 362
 decoration 57, 66, 83, 113, 164, 167, 168, 171, 172
 abstract geometric shapes used in 39, 49
 animals used in 36–40, 57, 58, 67–72, 102, 104, 105, 114, 115, 117
 chased 65
 depictions of people 114, 117
 knotwork patterns 73
 methods of 23, 49
 of metal 16, 18, 21
 de Flouri, Guillaume, *see* Guillaume de Flouri
 de Flouri, Jean, *see* Jean de Flouri
 deforestation 189
 de Honnecourt, Villard, *see* Villard de Honnecourt
 Deira, England 37, 39, 44
Delg Aidechta
 brooch of the *familia* of Columba 65
 Delphi, Greece 256
De Lorica, *see* Aldhelm, *De Lorica*.
 de' Medici family
 see Medici family
 de Newton, John, *see* Neweton, John de
 Denmark 50–55, 72–88, 108
 De Paor, Liam 136
 de Picquigny, Heloïse, *see* Heloïse de Picquigny.
 Derbyshire
 brooch from 23
De Re Metallica, by Georgius Agricola 2, 12, 352, 353, 371, **22.4–22.6**
 Derrynaflan, Co. Tipperary 126
 Derrynaflan Chalice 126, 127, 131, **8.3, 8.4**
 Derrynaflan Paten 70, 127, 128, 129
 dies 82, 84, 85, 86, 92, 128
 used in stamping 49, 53, 54, 55, 57
diners de plata barcelonesos 329
 direct process 312
 Dissolution of the Monasteries 222, 232, 258
 Djurgårdsång, Sweden 56
 Dodwell, C. R. 24
 Dommasnes, Liv Helga 51

 Donatello 169, 174
 Doultling Stone Limestone 223
 Dover Buckland, England 52
 Draper, Peter 261
 dress 15, **5.2**
 see also cloaks, costume ensemble, jewelry, textiles
 dress-accessories 33, 40, 42, 43, 59
 headdress 21
 hairpin 56
 see also brooch, jewelry
 drinking
 cups 24
 horns, metal edged 21
 drystone churches 131, 132
 Dublin, Ireland 5, 63, 64, 66, 67, 68, 74, 81, 138
 Christchurch Place 66, 138
 Parliament Street 63
 Temple Bar West 63–74
 kite brooch from **4.1, 4.2, 4.6, 4.10**
 Site C 64
 Site D 64
 St Patrick's Cathedral 138
 ductility 3
 Durham, England 256

 earth 131
 crust, distribution of metal in 19
 earthenware 228
 Edward III, king of England 115–16
 Edward VI, king of England 116
 Edward the Black Prince 103
 Egbert, Archbishop of Trier 155
 Eiffel Tower, *see* Paris, Eiffel Tower
Einzeliedlungen 129
 Elbern, V. H. 126
 electrum 3
 elephant tusks 113
 Elizabeth I, Queen of England 223
 Ellis, A. S. 224
 embossing 84
en délit shafts 10, 258, 259, 260, 263, 269, 275
 enamel 113–17, 150, 152, 155, 156
 England 16, 32–3, 39, 40–42, 50, 51, 52, 53, 56, 81, 108, 114, 115, 116, 117, 138, 208, 256, 270, 279, 362
 Anglian 41, 42
 Anglo-Saxon 4, 15, 16, 17, 20, 21, 22, 24, 26, 31, 32, 33, 34, 42, 43, 58, 67, 69, 130, 138, 211, 220
 Anglo-Scandinavian 38, 41, 67
 engraving 21, 65, 104, 113, 115, 127

- Entzelt, Christoph 351, 354
 epilepsy 5, 106, 109, 110
 Epiphany 165
 Ercker, Lazarus 333, 339, 351, 354,
 20.1–20.2
 Erfurt, Germany 356
 Erzgebirge 368
 Espelund, Arne 195
 Essen, Germany 7, 147–57
 candelabra 150
 Liber ordinaries 152, 153
 Virgin of 7, 147–57, **9.1**
 first cross of Mathilde **9.2**
 second cross of Mathilde **9.3**
 gospel of Theophanu **9.4**
 Ethelred II, King of England 220
 Eucharist 125, 128, 131, 133
 Eucharistic vessels 126–40, **8.1–8.4**
 see Ardagh Chalice, Derrynaflin
 Chalice,
 paten
 Eugenia, Saint, *see* Saint Eugenia
 Eugenius IV, Pope 166, 169
 Eustathius, Bishop of Thessalonica 113
 Eve-Mary typology 153
 Exeter, England
 Cathedral 257, 261–2

 fabric, *see* textiles
 Fachs, Modestin 334
 “False cloison” technique 73
fastigium 6
 Faversham, England, brooches from 116,
 1.6, 1.7
 Ferdinand I, King of Austria and Bohemia
 12, 368, 370, 378, 379
 Ferguson, John 388
 Fernández del Castillo, Juan 335
 Fernando IV, king of Castile 329
 ferrite 210, 215
 Festa del Perdono 165
 fiber 26
 Fibonacci 329, 330
 fibulae 56, 155
 cross-shaped 55
 see also brooches
 filigree 23, 63–74, 127, 128, 152, 153, **4.7,**
 4.8, 4.9, 4.10
 fillet 19, 22
 Finglesham, England 51, 55
 fire pit 90
 firesteel 19
 fittings
 household 184
 for oxcart 317
 Fixborough, England 42, 44
 Flann Sinna, Irish king 135
 Florence, Italy 163–75
 Baptistery 7, 165, 169, 170
 Cathedral 163, 170
 Orsanmichele 163, 169
 Arte del Cambio niche 168, 169
 St. Matthew (Ghiberti) 168
 San Lorenzo
 Old Sacristy 164
 Santa Maria degli Angeli 163–75, **10.4**
 Shrine of the Three Martyrs
 (Ghiberti) 7, 163–74, **10.1,**
 10.6
 Santa Maria Novella 169
 San Paolino 174
 San Pier Maggiore
 Albizzi chapel 174
 Santa Trinita 174
 Tomb of Onoforio Strozzi **10.5**
 Florentine guilds 163
 Florentine Republic 174
 Flouri, Guillaume de, *see* Guillaume de
 Flouri
 foil 129, 271
 Foix, France 302
 forges and forging 184, 188, 194, 195,
 196, 197, 201
 Foxle, Sir John 115–16
 Foy, Saint: *see* Saint Foy
fractio panis 131
 France 50–52, 81, 101, 105, 138, 168,
 247–8, 270, 362
 Franconia, Germany 156
 Frankfurt, Germany 356
 Fridriksson, Thorbjörn 199–201
 Freiberg, Saxony 348
 Freiburg im Breisgau, Germany
 openwork spire 9
 Freya, Norse deity 83
 Frome, River 222, 224, 228
 Frost-heaving 188
 Fuchs, Leonhard 347
 fuels and fuel production 194–6
 Fugger Family 379
 Fuglesang, Signe Horn 81, 84, 85, 86, 87,
 90
 Fulda, Germany 153, 154
 furnaces 3, 128, 191–3, 196, 198, 199,
 200, 201, 313, 328, 333, 375
 blast furnaces 25
 for lead pipe 229, 230
 for iron 188–98, 312, **11.4, 11.5**

- for assaying 338, 340, **20.2–20.3**
 for smelting 190, 368
 shaft furnace 312
- Galogano hoard 127
- Gandersheim, Saxony
 convent at 148, 149, 155, 156
- Gandersheim Casket 33
- garnet 19, 23, 55, 101
- Garranes and Garryduff I, Co. Cork 128
- Gaspar de Tejada 331, 336, 337
- Gaul, Merovingian 138
- Gawain, Sir 115
- Gay-Lussac, Joseph Louis 332, 338
- gemstones 137, 152, 153, 355
 intaglio 104–5
- Gerberga, sister of Henry the Quarreler
 155, 156
- Germanic World 11–12, 18, 50, 69, 72,
 108, 147, 153, 212, 270, 273, 354,
 358–62, 367–9
- Gero, Archbishop of Cologne 151
- Gerswid, Abbess 148
- Ghiberti, Lorenzo 7, 163–76
Catasto report 167
Commentaries 163, 167–9
Shrine of the Three Martyrs 163–76,
10.1, 10.6
- Giffard, Bishop of Worcester 259, 261
- gilding 20, 23, 55, 56, 117, 126, 127, 169,
 170, 248, 261
- Gilmour, B. B. J. 212
- Giorgio di Lorenzo Chiarini 332
- Giovanni Antonio da Uzzano 332
- girdle hangers 17–19, 22
- Glasgow, Scotland 91, 110
Registrum 110
 Glasgow School of Art 82
 University of 82
- glass 9, 15, 18, 19, 23, 53, 54, 55, 56, 57,
 58, 65, 127, 188, 245, 248, 273, 274
 stained 245, 268, 271, 319
- glaziers 246
- Gloucestershire, England 208
- glue 152
- Gnezdovo, Russia 83
- gold 2, 3, 19–26, 40, 49, 50, 54, 55, 57,
 64–7, 72, 73, 83, 101, 102, 108, 113,
 115, 116, 126, 127, 137, 152, 155,
 169, 331–3, 349, 350
 assaying of 335
 coinage 328
 “decorated gold” 16
 foil 63, 72, 73
 goldsmith 105, 116, 169, 334
 “red” 20
 “Golden Age” 44, 70, 71, 72
 Golden Calf 65
 Golden Virgin of Essen 147–57, **9.1**
- Golmsberg (Gullnes), Norway 371
- Gombrich, Ernst 163
- Goslar, Germany 368
- Gowan, Margaret 63
- Gottesgab (Bozi Dar), Bohemia 371
- Gothic era 9, 10, 11, 245, 246, 248, 257,
 267, 268, 272–5, 313
- Gourdon vessel 127, 128
- gout 5, 109, 110
- granules 69, 71, 72
- graves and grave goods 4, 15–22, 33, 42,
 50, 51, 53–8, 72, 82, 108, 126, 139,
 147, 164, 169, 170, 172, 184, 256,
 257, **1.1, 1.4, 1.5**
 Anglo-Saxon 15–30
 evaluations of 22–4, 51–3
 gender differences in 17, 82
 perceived value and significance 19, 22
 “princely graves” 23
- Greeks 9, 106, 154
- Green Knight, the 115
- Greenland 81
 ice cap 188
- Gregorio, Goro di 170
 Tomb of St Cerbonius **10.2**
- Grelutóttir 199, 200
- Grimfridus vessel 127
- Grohne, E. 107, 109
- grout 255
- Gual Camarena, Miguel 331, 336, 337
- Gudme, Denmark 55
- Guido, Margaret 19
- Guilders 273
- Guillaume de Flouri 5, 102–8, 110
 signet ring of **6.1**
- Gutenberg 347
- Gyland, Norway 51, 54, 56
- haematite 186
- Hadrian’s Wall 256
- Hahn, Walther von 358
- Hale, England 40
- Halliday, M. A. K. 358
- Háls, Iceland 187–202, **11.1–11.6**
- Hamlin, Anne 136
- hammers and hammering 128, 184, 308,
 311–12, 343
- hammer scale 193
- Hand II 247

- handweaving, *see* weaving, hand
- Harbison, Peter 132, 136
- Hardouin, Seigneur of Fontaines Guerin 116
- Hartlepool 41
- Haselberg, Johann 353, 355
- Hathwig, Abbess 149, 154, 157
- Hauck, Karl 55
- Hauge, Norway 51, 54
- Hauksbók* 197
- Hawkes, S. C. 51, 54–5
- hearth 64, 184, 193, 375
- Hebrew 106
- Hedeby, Denmark 81
- Heiðarvíga saga* 202
- hektespenner*, *see* clasps, wrist
- Helena, mother of Constantine 155
- Helgö, Sweden 81, 88
- helium 2
- Hell 110
- helmets 16, 21, 25
- Heloïse de Picquigny 103
- Henbury, England 220
- Henri de Lusignan 105
- Henry the Quarreler 155
- Henry II, Emperor 149, 156
- Henry III, Emperor 150, 156, 157
- Henry VIII, King of England 220, 258
- heraldry 64, 104, 105, 114
- Hermann, Archbishop of Cologne 156
- Hermanns-Auðardóttir, Margrét 199, 200, 201
- Hexham, England 127
- Heyman, Jacques 287, 288, 290, 297
- Hiberno-Viking culture 64, 68, 70, 71
- Hildesheim, Germany 7, 153
- hinges 270, 297, 299, 302, 317
- hoards 16, 49–54, 56, 126
- Hohenmemmingen, Germany 55
- Holy Land 101, 103, 110
- Holy Nail 150, 156
- Holywell Row, England 19
- Homer 113
- Honnecourt, Villard de, *see* Villard de Honnecourt
- hooks 317
- hooked-tags 39
- Hoover, Herbert 389
- Horní Slavkov, *see* Schlackenwald
- horns 5, 15, 113–17, **7.1, 7.3, 7.4**
 - bell of 113, 114
 - bugle 115
 - Clephane Horn, 113
 - Horn of Ulf 116
 - hunting 5, 113–17
 - Savernake Horn 5, 113–17, **7.3, 7.4**
 - used for signaling 116
 - walrus ivory horn 116
- Housesteads, Roman Fort 256
- Hove, Norway 51
- Hughes, Kathleen 136
- Hugues III de Lusignan 103
- Humber, River 35–6, 42–4
- Humberside 44
- Humic floor 199
- Hungary 50, 54, 247, 378
- hydraulic engineering 8
- hydrogen 2
- hydroxides 307
- Iceland 8, 81, 83,
 - iron production in 183–202, **11.1, 11.8**
- icons 134
- Iglau (Jihlava, Czech Republic) 368
- Île-de-France 268
- imitatio Romae* 130
- inclusions 210, 311
- Industrial Revolution 1
- ingots 42, 337
- inhumation 50, 51, 52, 58
- inlay 36, 42, 127
- Iliad* 113
- Imola, Giovanni da 171
- Inis Cealtrea, Ireland, church at 135
- ink 245
- Innocent VI, Pope 302, 303
- inscriptions 101, 105, 108, 109, 110, 150, 154, 167, 168, 169, 172, 174, 175, 246
- “Insular” cultural province 33
- intaglio 101, 102, 104, 105, 108, 110
 - gems 104, 105
- interlace 4, 36, 37, 38, 39, 69, 70, 83
 - median-incised 39
- Ireland 5, 6, 63–74, 125–31, 133–40
 - dioceses of 137
 - Dublin, 63–5
 - brooch from 63–74, **4.1–10**
 - high crosses 65, 130
 - liturgical vessels 6, 125–31, **8.1–4**
 - see also* eucharistic vessels
 - missionary period 125
 - National Museum of 63, 66, 73
 - oak wood of 135
- iron 2, 3, 8–11, 19, 21, 23, 25, 26, 83, 90, 128, 183–202, 209–16, 268, 270, 271, 273, 275, 289, 291, 299–302, 307, 311, 312, 313, 317–22, 340, 350, 376

- carbide 210, 215, 216
 cast 25
 cast pipes 233
 display of status 184
 dowel 275
 ferritic 213, 218, **12.2**
 importation of 197
 lantern hooks 226
 nails 248, 317, 321
 ore 184, 196, 199, 307
 oxide 189, 196
 phosphoric 211
 production in Iceland 183–202, **11.7**,
11.8
 raw 184, 192, 196, 199
 rods 245
 smelters 183, 196, 197, 198, 202, 372,
 377
 smiths 183, 186, 194, 197–202
 working 184, 194, 198–202, 279–99, 307
 wrought 210, 269, 289
 as bars 273
 as clamps 269, 274, 275, 317
 at Altenberg **16.1**
 at Avignon 297–313
 at Milan, 317–22
 in Salisbury spire 279–91,
17.2–17.9
 material properties 308
 “Iron Age” 1, 51, 196, 198
 Islam 128
 Islington, England 229
 Issendorf, Saxony 56
 Italy 2, 7, 101, 103, 105, 108, 113, 128
 138, 149, 176, 270, 362
 ivory 5, 113–17, 150, 157
- Jáchymov, *see* Joachimsthal
 Jacobo Maliocho 320
 Jansson, Ingmar 81, 84, 85, 86, 87
 Jarrow, England 41
 jasper 108
 Jean de Flouri 103
 Jean de Loubières, *see* Jean de Louvres
 Jean de Louvres 300, 312, 313
 Jerusalem, Kingdom of 103, 104
 Jessop, Oliver 212, 214
 jet 19, 22
 jewelers 82, 86, 87, 88, 335
 jewelry 2, 4, 16, 17, 23, 24, 40, 49–61, 84,
 184, 187
 “dress” 55, 56
 moulds for oval brooches 81–99,
5.5–10
- Scandinavian 49–61, **3.1–5**
 symbols of wealth 50, 51, 57, 58
see also bracteate, brooch, clasp,
 necklace, pin, ring
 jewel 128, 337
 Alfred Jewel 67
 lozenge-shaped 65, 67
 Jews, mystic traditions of 5, 107, 109, 110
 Joachimsthal (Jáchymov, Czech Republic)
 353, 368, 370, 378–9
 Jóhannesson, Jón 186
 John (Lackland), King of England 259
 John XXI, Pope, 106; *see also* l’Espagnol,
 John
 John XXII, Pope 304
 John XXIII, Pope 166
 joints in masonry 9–10, 226, 255–63,
 272–4, 282–9
 Jones, Peter N. 215
 Juan de Arfe y Villafaña 333–4, 336–7
- Kabbala 5, 109, 110
 Kaiserwald Mountains (Slavkovsky les)
 369, 372
 Kalbe, Ulrich Rülein von, *see* Rülein von
 Kalbe, Ulrich
 Kälder, Gotland 52
 Karlsbad (Karlovy Vary) 369
 Kaupang, Norway 81
 Kells, Co. Meath 129
 see also Book of Kells
 kettles 197
 keys 18, 22, 83, 90, 91, 302, 317
 Key (Quay) Pipe, Bristol 221
 Kidson, Peter 246
 Kildare, Ireland, church of 133
 Kilmacduagh, Ireland, cathedral of 134
 kilns 90, 91
 King of the Beasts 115
 symbol of royal authority 115, 117
 Kingston Brooch 19, 23
 Kinnitty, Co. Offaly 130
 kinship 130
 Klebs, Arnold Carl 388
 Knappius (character in *Bergbüchlein*) 349
 knives 18, 19, 26, 90, 92, 194, 211
 Koch, Manfred 352, 388
 Kongsvad Å, Denmark, bracteates from **3.4**
 Konrad von Megenberg 351
 Krautheimer, Richard 163, 167, 171, 172
 Krupp steel works 147
 Kulm (bishop of) 273
 Kutteneberg (Kutná Hora, Czech Republic)
 370

- Labande, Léon Honoré 299
 Lackalänge, Skåne⁷³
 Lagore Crannog, Co. Meath 128, 129, 130
 Motif piece from **8.5**
 Lamm, Kristina 81, 88
 “Landnám tephra” (bi-chromatic volcanic ash layer) 188, 190, 192
 Laon, France 247, 268
Landnámabók (the *Book of Settlements*) 197, 201
 Lapi, Isabella 171
 Larsen, Jan Henning 200
 latches 108, 297, 302
 Lateran Basilica, *see* Rome, Lateran Basilica
 Latin 133, 154, 332, 350, 354, 367
 Lausanne, Switzerland 247
 Lauterbach 368, 369
 law governing tin mining, 367–81
 Lawrence, William Scott 233
 l’Espagnol, Pierre, 106, *see* also John XXI
 lead 2, 3, 8, 9, 10, 65, 82, 84, 85, 92, 127, 226, 228, 229, 256, 258, 259, 260, 268, 272, 274, 289, 300–302, 318, 328, 333, 338, 340, 342, 350
 as a conduit pipe 219–29, **13.8, 13.9**
 as cramp, dowel 255–62, 272, 302, 306
 as joint 255–73, 275, **15.1–15.5, 16.2**
 as pads 259
 as rods 268
 leaf-vein channels for 257
 plugging 256
 yoting 283
 leather 15, 114, 115, 228
 braided cord 51
 Lebanon, (Tyre) 101, 103
 Leeds
 Royal Armouries 211, 212
 Leipzig, Germany 356
 Leland, John 259, 261
 Lemanaghan, Co. Offaly 136
 Lempe, Johann Friedrich 354
 León, Spain 343
 Collegiate of San Isidoro 327
 Leonardo of Pisa, *see* Fibonacci
 Liège, Belgium 301
 “lightning” 342
 Lilla Howe, England 35, 38, 40
 lime mortar 255, 272
 lime 226, 300
 Lincoln, England
 Cathedral 257, 259, 260, **15.1, 15.3**
 Lindisfarne, England 256
Lindisfarne Gospels 32
 linen 87, 92
 lion of Cyprus¹⁰⁵
 litharge (lead oxide) 341
 liturgy 135, 138, 139, 166
 Irish performance of 131, 134
 Liudolf 148, 149
 Liudolfings 147, 148, 149, 151, 155
 Luitgard, daughter of Otto the Great 156
 livestock 197, 339
 loam-clay 84, 92, 272
 Lombard majuscule 102, 104
 Lønborg, Bjarne 81, 87, 89, 90
 London, England 208, 229
 British Museum 103, 113–14, 127
 Tower of 208
 Westminster Abbey 261, 301
 Long, Pamela 362
 loom 20
 lost-wax casting 83, 84, 86
 Lothair III, Emperor 108, 110
 Lough Kinale, Co. Longford 126
 Lough Kinale chalice and paten 126, 131
 Louis the German, Emperor 148
 Lucca, Italy 8, 164, 171, 172, 175
 Church of San Frediano 171
 Trenta Chapel 171, **10.3**
 Lucretius 347
 Lugtrudis, Saint, *see* Saint Lugtrudis
 Luke, Gospel of 106
 Lusignan family 103, 104, 105

 Macrofossils, birch 190
 Madonna and Child 7, 147, 156, 157
 Madonna on the Milan situla 153
 Mael Sechnaill, Irish king 130
 Máelshechnaill mac Domnaill, later Irish king 137
 magic 101, 104, 106, 109, 110
 Maglemose, Gummersmark 56
 magnetism 3
 mail, coat of 16, 25
 malleability 3
 mandorla 154
 manganese 307
 Manning, C. 133, 136
 manure 88
 manuscripts 137
 marble 8, 170, 172, 175, 176, 256, 258, 259, 261, 317, 318
 Marco da Carona 318–21
Maria regina (celestial queen) 153, 154
 Marsus, Saint, *see* Saint Marsus
 Martensite 210, 215
 Martens, Irmelin 192

- Martin V, Pope 166, 169
 Mary as the New Eve 153
 Masaccio 167
 masks
 in metalwork decoration 64
 for battle 25
 masonry 245, 248, 253–63, 268, 269, 272, 273, 274, 275, 282, 286, 302, 307, 312
 ashlar blocks 268, 271
 lead joints in 255–63
 masons 246, 247, 255, 258, 260, 262
 Massa Marittima, Italy, cathedral at 170
 Tomb of St Cerbonius **10.2**
 materials
 see bone, metal, stone, wood
 Mathesius, Johann 354
 Mathilde, Abbess 7, 147, 149, 150, 151, 154, 155, 156, 157
 matrix 82, 85
 Maurice, Elector of Saxony 371, 378
 Mayer, Conrad 378
 Meaux, France 247
 Medici family 8, 163, 168, 169, 172, 175
 Cosimo de' 8, 163, 165, 166, 167, 168, 169
 Giovanni de' 165
 Giovanni di Bicci de' 164
 Giovanni di Cosimo de' 164
 Grand Duke Ferdinando I de' 173
 Lorenzo de' 8, 163, 165, 166, 167, 169
 Piero de' 164
 Mediterranean Sea 3, 5, 81, 128, 331
medri (iron templates) 317–19
 Mellifont Abbey 126
 melting points 26, 338
memoriae 132, 139, 147
 Mendels, Judica 348
 Mendip Hills, England 229
menstir (Irish communion sets) 126
 merchants 101, 103
 Mercia 33
 mercury 349, 350
 Metafrastes, Simeon 166
 Metallica, band 2
 metals
 definitions of 2–3
 detection of 32, 33, 34, 37
 ferrous 24, 208, 210, 255, 307
 mass-produced 41, 86
 noble 24
 non-ferrous 41, 42, 84, 87, 93, 193
 properties 2–3
 sheet-metal 49
 as status symbols 15, 16, 42, 43, 49
 see also bog ore, chromium, copper, electrum, iron, lead, manganese, mercury, silver, steel, tin, titanium
 “Metal Ages” 1, 12
 metallographic investigations 8, 207, 209, 212, 297, 307–8
 of arrowheads 207–16
 of tie rods 307–8
 metallurgy 200, 211, 212, 310, 332, 334, 343, 347, 350, 353, 355, 367
 Meyerpeck, Wolfgang 371
 Michelly, R. 107, 109
 microstructure 8, **12.2, 12.3, 18.1**
 Middeldorf, Ulrich 174
 Middle Ages 1, 3, 6, 8, 9, 11, 12, 93, 109–10, 137, 152, 297, 312
 Mide, kingdom of 137
 Migration Period 49–61
 Miguel de Eleyzalde 331
 Miguel Jerónimo de Santa Cruz 331
 Milan, Italy 171
 Cathedral 11, 302, 312, 317–22, **19.1, 19.2**
 San Eustorgio 170
 Mill Hill, Deal, England, grave goods 21, 22, **1.4**
 millefiori 23
 Millerd, Jacobus 224
 mining 8, 10, 11, 12, 348, 350, 351, 352, 353, 355
 of tin 367–81, **22.2, 22.3**
 mining/metallurgical literature 347–63, 387–401
ministerium 126
 mints and minting 328, 329, 332, 334, 335, 337
 missal 135
 mitre 169
 models 42, 82, 84, 86, 87, 90, 92
 Modena, Italy 7
 Molloy, Peter 388
 Monaco, Lorenzo 167
 Monasterboice, Co. Louth
 Muiredeach's cross 65, 67
 Monkton, England 52
 Moray, Earl of 5, 115
 Morimond, Burgundy 267
 Morris, R. K. 138
 mortar 131, 132, 255, 257, 258, 259
 setting of 255
 Moses 65
 Møsstrand, Norway 200

- moulds 26, 42, 66, 83–93, 128, 134, 267, 283, 375
 Viking-Age 81–99
 piece-moulds 41, 82, 83, 86, 87, 92, **5.3**
 mounts and mounting 39, 40, 43, 58, 72, 114, 115, 129, 169, 268, 270, 271, 274
 Moylough belt-shrine 71
 Moynagh Lough Crannog, Co. Meath 128
Muldenfaltensstil, “trough-fold style” 249
munitio 318
 Munster, Sebastian **22.1**
 muntins 271
 mythological creatures 83

 nails 9, 194, 300, 302, 305, 312, 317, 321
 nail, holy 150
 Nancy, France 128
 Gauzelin Chalice 128
 Naples, Italy 105
 Narbonne, France 312
 naturalism 37
 navigation 3
 necklaces 52, 53, 55
 Neumann bands 211, 216
 Newfoundland
 L’Anse aux Meadows 184, 199, 200
 Newton, John de 116–17
 Nielson, Niels 198
 Nicolas de Biard 246
 niello 21, 36–9, 65
 nital 213, 215, 308
 Norfolk, England 44
 Norman Kings 220
 Nørre Hvam, Norway, pendant from 57, **3.5**
 Norse 68, 82, 83, 84, 85, 92, 184, 185, 190, 195
 Gods 83, 184
 Northumberland
 Duke of 73
 Northumbria 4, 31–44
 strap-ends from **2.1–2.3**
 Norway 50, 51, 52, 56, 57, 185, 192, 193, 196, 198, 200, 201
 Novgorod, Russia 81
 Noyon, France 268
 Nuremberg, Germany 380

 Obermöllern, Saxony 54
 Oberweschen, Saxony 56
 Octavian 321, 322
 Oda, wife of Liudolf 148
 Óðin 184

 Ó Floinn, Raghnaill 137
 Ólafsson, Guðmundur 199
 Old English 20, 21, 25, 109, 358
 oliphant 5, 113–21, **7.1–4**
 Olympia, Temple of Zeus 256
 oratories 131, 133
 ores 4, 26, 184, 190, 194, 196, 197, 199, 307, 312, 349, 351, 354, 355, 358, 359, 372, 373, 374
 in Iceland, 183–202
 organic materials 51, 84, 88, 92
 Orkneys 72
 Orlando, Don 173
 Ormsstaðir, Iceland 199, 200
 ornamentation 25, 31–47, 58, 65, 68, 70, 72, 85, 127, 128
 Orton Scar, England 71
 Osborn, Alan 234, 234
 Otto, Duke of Swabia 149, 151, 155, 156
 Otto, son of Liudolf 149
 Otto I, Emperor 149, 154, 156
 Otto II, Emperor 149, 150, 155, 157
 Otto III, Emperor 149, 154, 157
 øvre Tøien, Norway 54, 57
 bracteates from **3.3**
 oxidation 338
 oxygen 3, 87, 88, 307

 Pacioli, Luca 331
 Padua, Italy 176
 Pagani, Georgio 320
 pagans 33, 83, 185
 palm cup 19
 Paoletti, John 163, 164
 Papal Palace in Avignon, *see* Avignon, Papal Palace
 paper 245
 parchment 109
 Paris, France
 Bibliothèque nationale de France 246
 Eiffel Tower 9
 Musée d’art et d’histoire du Judaïsme 109
 Musée national du Moyen Âge 101
 Notre-Dame cathedral 268
 Sainte-Chapelle 245, 269, 271, 275
 paten 125, 126, 131
 Patrick, Saint, *see* Saint Patrick
 pearlite 210, 215, 216, 309
 peat 88, 89, 90, 190
 Pedro III, king in Barcelona 329
 pendants 19, 49, 53, 54, 55, 58, 64, 84, 156, **1.7, 3.5**
 pendant bosses 255

- crowns 134
- meanings of rank and ethnicity 57
- penitents 136
- Pennines 41
- Persia 128
- Pettus, John 354
- pewter 82
- Philip II, King of Spain 334
- Phillips, Derek 259, 260
- phosphorous 210, 307
- Picardy 103
- Pieper, Wilhelm 348
- piers 247, 261, 263, 268, 270, 271, 272
 - compound 269
 - core 259
 - crowns 270
- pilgrims and pilgrimage 132, 136, 138, 139
- Pilis, Hungary 247
 - Cistercian church of 247
- pins 23, 26, 64, 65, 90, 126, 127
 - fasteners 23
 - head 40
 - hooks 92
 - split 274
 - straight 55
- pipes 2, 9, 10, 302
 - in Bristol, England 219–35, **13.1–13.10**
- Piristi, Aldo 234
- Pisa, Italy
 - Camposanto 171
 - Cathedral 7
- Pisano, Andrea 7
- Pisano, Nicola 170
- pitch 262
- pit-houses 188, 189, 193, 194, 200
- pits 188, 190, 198
 - charcoal-burning 190, 196, 200
- plaster 297
- plastics 1
- plated vessels 24
- plate armor 8
- Platten (Horní Blatná, Czech Republic) 370, 371
- Pliny the Elder 347, 351, 352
- plumbery 262
- plumbing iron 231
- polish and polishers 24–6
- pollici* (iron pegs) 317, 318
- Poppleton, Upper 34, 35, 36, 37, 38, 44
- Porchester Castle 262
- porphyry column 149, 151
- pottery 15, 17, 19
- Prague, Treaty of 370
 - prayers 106, 109
 - “precious metals” 4, 16, 56, 125, 137, 150
 - Price, Francis 281, 282, 287
 - Price, William 258, 259
 - printing press, invention of 11
 - processional cross 150
 - Prose Edda* 184
 - Prometheus Verlag 369
 - Purbeck shafts 258, 259, 260, 261, 262
 - Purification of the Virgin, feast of 150, 152, 154
- quarrel (crossbow bolt) heads 208, 214, 217, **12.1**
- quartz 88
- quenching 210
- Quercia, Jacopo della 171
- Radiocarbon dates 188, **11.3**
- Randolph, Thomas, Earl of Moray 5, 115
- Raschas, Gérard le 104
- rath* (ringfort) 126, 129
- Rauða-Björn, (Ore-Björn) 197, 198, 201
- Ravenna, Italy 149
- Ravlunda, Sweden, bracteate from **3.1**
- Raynoldus 273, 274, 275
- raw materials 83, 127, 129, 130, 137, 187, 189, 339
- recycled material 42, 64
- Redgrove, John 234
- Regensburg, Germany Cathedral, 301
- Reims, France Cathedral, 245–8, **14.1, 14.3**
- relics 139, 163, 164, 165, 166, 167, 169, 170, 171, 174, 175, 176
- reliquaries 2, 6, 7
 - in medieval Ireland 127–8
 - in medieval Essen 150, 157
 - in Renaissance Florence 163–76
- Renaissance 2, 7–8, 11–12, 163–76, 347–48, 362
- resin 152, 262
- Revsgård, Denmark, bracteate from **3.2**
- Rhine Valley 268
- Ribe, Denmark 81, 83, 84, 88
- Ricardo de Santo Florano 321
- Richard II, King of England 115
- Rievaulx Abbey 258
- rings 24, 101–11, 114, **6.1, 6.2**
 - arm 16, 53
 - elite 108
 - finger 40, 53
 - signet 5, 101–10
 - “Thebal signets” 107–10

- of Guillaume de Flouri 101–11
- Robert of Beverly 261
- Robert the Bruce 115
- Rochester, England
 - Castle 260
 - Cathedral 260, **15.4**
- Rodríguez, Antonio 331
- Roelcke, Thorsten 357
- Roger de San Severino 104
- Rößlin, Eucharius 351
- Rome, Italy 6, 135, 138, 139, 149, 164, 171
 - Catacombs 174
 - Priscilla catacomb 152
 - Lateran Basilica 6
- Roman Empire 1, 9, 41
- Roman liturgy 138
- Roman numerals 330
- Romans 9, 24, 55, 154, 256, 378
 - gold and silver of 16
 - medallion 51
- Romanesque 7, 132, 137, 262, 267
 - Burgundian 270
 - Rhenish 270
- Roscrea, Co. Tipperary 135
- Roussillon, France 302
- Royal Armouries, Leeds, *see* Leeds, Royal Armouries
- Royaumont, France 267
- rubble 268, 318
- Rudhart, Has 351, 354
- Rülein von Kalbe, Ulrich 12, 347–62, 387
 - see also Bergbüchlein*
- Ruskin, John 297
- Russia 81
- rust 9, 24, 271
 - rust proofing 9
- Ryther, England 44
- Sagas 202
- St Albans, England 257
- Saint Andrew 155, 169, 170
- Saint Benedict 321
- Saint Bernard of Clairvaux 135
- Saint Brendan 222
- St Briavels, Gloucestershire 208
- Saint Carbonius 170, 171, 172, 176
 - Tomb in Massa Marittima **10.2**
- Saint Dominic 170, 172, 176
- Saint Eugenia 164
 - Greek *vitae* of 166
- Saint Foy 6
- Saint Gall, *Libri Confraternitatum* 149
- Saint Hyacinth 163, 164, 165, 166
 - Greek *vitae* of 166
- St Joachimsthal, *see* Joachimsthal
- Saint John the Baptist 165, 169, 170, 248, 249
- Saint Leonard's Place 38
- Saint Lutrudis, 7, 150, 157
- Saint Luke 176
- Saint Malachy of Armagh 135, 136
- Saint Marsus 7, 150, 157
- Saint Nemesius 163, 164, 165
- Saint Patrick 125
- Saint Peter 155
- Saint Peter Martyr 170, 176
- Saint Philip 170
- Saint Pinnosa 157
- Saint Protus 163, 164, 165, 166
 - Greek *vitae* of 166
- Saint Richard 171, 172, 175
 - Tomb in Lucca **10.3**
- Saint Thomas Becket 256
- Saint Walberg 157
- Saint Zenobius 163, 169
- Saints, cult of 6, 110, 132, 139, 155
- Salands, Gotland 52
- Salisbury, England
 - Cathedral 10, 258, 260, 261, 279–91
 - lead joints **15.2**
 - spire 279–91, **17.1–17.9**
 - Trinity Chapel 261
- Salzman, L. F. 262
- Saminiato de Ricci 332
- Sancho IV, King of Castile 328, 329
- sand 84, 88, 91, 92, 339
- sandstone 223
- sarcophagi 164, 170, 172, 174
 - all'antica* 168
- Sarre, England 53, 54
- Savernake Forest 117
- Savernake Horn 5, 113–17, **7.3, 7.4**
- Saxony 11, 12, 54–6, 136, 147, 148, 347, 348, 370
- Saxony, Lower 332
- Scales Moor, England 40
- Scandinavia 4–5, 49–61, 67, 68, 72, 81, 82, 83, 137, 185, 188, 191, 198, 200
 - jewelry from 49–61, **3.1–5**
- scarf 21
- Schlick, Earl 379
- Schmalkalden League 368
- Schönfeld 368, 369, 372
- Schretzheim, Germany 54
- Schreittmann, Ciriacus 334
- Scott, George Gilbert 262

- Schlackenwald, Bohemia 12, 367, 368, 369, 370, 378, 379, 380, 381
tin mining at 367–81, **22.2, 22.3**
- Schönebeck, Saxony 55
- Scotland 40, 84, 86, 114, 115
- scythes 184, 197
- seals 101, 102, 104, 108, 110, 116, 195
- sedes sapientiae* (throne of Divine Wisdom) 153
- segn* (standard) 16
- Segovia, Spain 334
- Selkirk, Scotland 40
- Selvamonda, Italy
Camaldolese church of San Salvatore 164
- Senlis, France 268
- Sens, France 302
- serpents 69, 71, 72,
ornament **4.9**
- Sessa Aurunca, Italy
Church of S. Maria in Comedia 105
- setting of mortar 255
- Seymour, Edward, Earl of Hertford 115
- Sharpe, Richard 133
- Shemoneh esreh* (Jewish prayer) 107
- shield 18, 25, 52, 114
- Shimadzu microhardness tester 213
- shrines 128, 139, 170, 171, 173, 175
- Shrine of the Three Martyrs* (Ghiberti) 167–76
- sickles 184
- Sievern, Schleswig 51, 55
- Sigal, Mme Laurence 109
- Silastaðir, Iceland 184
- silica 311
- silicates 216
- silicon 1
- silk 25, 115
- silt 201, 226, 233
- silver 2, 3, 6, 8, 11, 16, 19, 21, 22, 34–40, 43, 51, 55, 56, 65, 67, 68, 71, 83, 84, 85, 108, 113–17, 125–8, 137, 152, 169, 170, 194, 197, 330–43, 349, 350, 370
assaying of 327–9, 332, 334, 338, 339
coinage 328
foil 127
smithing 82, 334, 335
Spanish treatise on assaying of 327–43
spoons 22, 23
- Simeon of Durham 256
- Simpson, Linzi 63
- sinter (limescale deposit) 225
- siphon 225
- Skara, Sweden 56
- Skellig Michael, Co. Kerry 132, **8.6**
- slag 64, 210, 216, 187, 188, 190, 191, 192, 193, 194, 195, 196, 198, 199, 201, 375
- slate 268
- smelting 184, 186, 188, 189, 190, 192–6, 199, 201, 202, 216, 351, 355, 368, 375, 389, **11.8, 22.6**
- Smith, Cyril Stanley 339
- smithing debris 188
- Snorri Sturluson, Icelandic chieftain 184
- soapstone 82
- Setesdal, Norway 201
- soldering 72, 262
- Solari, Guineforte 321
- Sollari, Vincenzo 320
- Sophia, daughter of Otto II 149, 156
- Søtvet, Norway 51
- South Newbald, England 43, 44
- spalling 255
- Spain 81, 327–43
- Spanish treatise on alloying and assaying of silver coinage 11, 327–43
- Speed, John 221
- Sperling, Christine 163, 164, 174, 175
- spindle whorls 51, 53, 56
- spires 9, 10, 245
at Salisbury, 279–91, **17.1–9**
- Spring, Roy 289
- spure 90, 91
- spurs 52
- stamps and stamping 54, 71, 84, 127, 128
counter-stamps 102
single-sided technique 49
- stangoni* (iron tie rods) 317, 319–20, 322
- steel 8, 11, 210, 211, 214, 215, 218, 274, 308, 310, 311, **12.3**
- Stenholts Vag, Denmark 54
- Stolfi, Don Casimiro 164
- “Stone Age” 1
- stone 9, 11, 26, 31, 131–7, 173, 190, 192, 198, 200, 201, 245, 248, 255–62, 271, 272, 274, 279, 283, 285, 289, 300, 313, 317
ashlar blocks 268, 271
cutters 317–322
“Redland” and “Redcliffe” 223
- Trias 223
as monuments 297
as pipe material 228
“precious stones” 108
semi-precious stones 126
volcanic 274

- working 255, 262, 268, 286, 288
- Stowe Missal
- Tract on the Mass* 131
- strainer, wine 126
- straps 114, 273, 274
- strap-ends 34–44, **2.1**, **2.2**, **2.3**
- comma-shaped terminals 40
- folded-sheet 42
- “king sized” 35
- “looping palmette” 35, 40
- with animal head terminals 34, 35
- with split attachment heads 34, 35
- strap-tags 55
- Strasbourg, France 312
- Straubing, Germany 52
- Strozzi, Onofrio
- arcosolium tomb of 173–5, **10.5**
- string and stringing 54, 55
- studs 55, 65, 66, 127
- Stürtz, Martin 353, 354
- sulphur 3, 349, 350, 357
- Sutton Hoo, England 23–4
- Suzuki, Seiichi 57
- Swarzenski, Hanns 248
- Sweden 50, 56, 67, 72, 81–8
- Switzerland 6, 247, 347
- swords 16, 18, 19, 20, 24, 25, 39, 40, 43, 52, 310
- pommel and grip 39, 40
- Styx, River 52
- Táin Bó Cúailgne*, 65; *see also* brooches
- talc 230
- talisman 106
- tallow 262
- tannery 258
- vats 258
- Tattershal Thorpe, England 42
- Taupin, Jean-Louis 297
- technical literature 11, 325–401
- teint järn*, *see* bars, of iron
- Telemark, Norway 371
- templates 42, **14.1**
- Temple Bar, Dublin 5, 63–80
- kite brooch from 63–74, **4.1**, **4.2**, **4.6**, **4.10**
- Temple Local History Group, *see* TLHG
- terra cotta 91, 300
- Tewksbury, England 222
- textiles 15, 17, 21, 56, 82, 86–90, 92, 155, 312
- Thames, River 116
- Theophanu, Abbess 7, 147, 150, 156, 157
- Gospel book of **9.4**
- Theophilus 332, 339
- Theophrastus 347, 351
- Theotokos* (mother of God) 153
- Thomas de Rogeriis 103, 105
- ring of **6.2**
- Three Martyrs, shrine of 163–79, **10.1**, **10.6**
- Tiberius Bede* 36
- tie-bars, lead 256
- tie-beams 270, 271, **16.1–2**
- tie-rods 245, 269, 270, 302, 307, 311, 312, 319, **18.2–18.4**
- timber 131, 135, 245, 248, 288, **14.2**
- tin 2, 3, 8, 82, 92, 300, 302, 350,
- mining of 367–81, **22.2–22.6**
- sulfurous and arsenical tin ore 374
- tinning 126
- titanium 3
- TLHG 219, 234, 235
- Tomaso da Bernadigio 320
- tongs 128, 184
- tools 26, 49, 83, 84, 85, 86, 87, 92, 128, 184, 187, 193, 194, 197, 201, 376
- Tower of London, *see* London, Tower of
- Traversari, Ambrogio (Camaldolese monk) 165, 166, 167, 171, 173
- Vitae patrum* 166
- Trenta, Lorenzo 171, 172
- Tresor de Venerie* 116
- Trewhiddle chalice 127
- Trewhiddle Style 4, 34–44
- Triassic Rocks 224
- triblet 231
- Trient (Trento, Italy) 368
- Trier, Germany 155
- Triparty de Chuquet 331
- True Cross 150
- Tuam Cathedral, Co. Galway 138
- Tuamgraney, Co. Clare 134
- tuath* (small tribal kingdom) 130
- turf 199, 200, 201
- silt-based 192
- Tuscany, Italy 164
- tuyéres* (clay bellows nozzles) 128, 190, 191, 199
- tweezers 20, 21
- Tylecote, R. F. 210, 212
- Tyre, Lebanon 101, 103
- “utilitarian metals” 4
- Ulger, Bishop of Angers 108, 110
- Ulrich Rülein von Kalbe, *see* Rülein von Kalbe, Ulrich
- Ulster, Ireland 132, 136

- Museum, Gracey Collection cup 126
 University of Leeds, *see* Leeds, University of
 “Ursus” chalice 127
- vane rod 287, 288, 290
 Várpalota, Hungary 54
 Vasari, Giorgio 168, 169, 175
 Vatican archives 304
 Vaucelles, France Cistercian church of 247
 vaults 248, 255, 257, 262, 269, 321
 Venice, Italy San Marco, treasury of 128
 Verrocchio, Andrea 164
 Vesalius, Andrea 347
 vessels 6, 16, 19, 25, 56, 125, 128, 339
 Vester Vedsted, Jutland 73
Via Latina 164
 vice-grips 128
 Vienna, Austria 380
 Villard de Honnecourt 10, 245–9,
 14.1–14.4
 Vikings 4, 8, 31, 43, 63, 68, 72, 74, 81, 82,
 83, 88, 93, 126, 129, 130, 137, 211
 Viking Age 32, 39, 63, 67, 69, 81, 82, 86,
 92, 93, 128, 129, 137, 183–7,
 190–202,
 trade centers in **5.1**
 brooch fragment from 63–74, **4.1–10**
 iron production in Iceland, 183–202,
 11.1–8
 mould-making techniques 81–99,
 5.5–10
 Vincennes, France
 Château de 301, 312
 Vingtain, Dominique 298
 Viollet-le-Duc, E. E. 297
 Virgin 65, 110, 136, 155, 248, 249
 Golden Virgin of Essen 147–57, **9.1**
 virginity 155
 von Kalbe, Ulrich Rülein, *see* Rülein,
 Ulrich
- Waltham Abbey, England 233
 Walton, Steven 1
 war-shirt 25
 water 92, 221, 339
 Waterford, Ireland 67
 waterwheels and waterpower 372
 wax 82, 84, 85, 86, 87, 90, 129, 262
 beeswax 84, 87, 92
 weapons 8, 16, 18, 25, 26, 40, 51, 52, 184,
 187, 197
 see also arrowheads, quarrel bolts, and
 swords
 weaponsmiths 209
 Weare, G. E. 221
 weaving
 beater 20–21
 hand 25
 weights (dinerals) 327, 334, 336, 339
 Weland, smith of northern mythology 25
 welding 283, 284, 308, 310, 311
 Wessex, England 43
 Westness, Orkneys 72
 Westminster Abbey, England 261, 301
 Wharram Percy, England, 42
 Whitby, England 40–43
 White, Hugh 232
 Whithorn, England 41
 wicker 131
 Widman, Johan 331
 Wigburg, Abbess 149
 Wiglaf 25
 Wikbold of Doppelstein 273
 William, Earl of Gloucester 222
 William de Rothwell 208
 Williams, Alan R. 212
 Willigelmo 7
 Wilsdorg 353, 354
 Wilson, David M. 33
 Winchester, England 257, 262
 Castle 262
 Cathedral 257
 windows 9–10, 268, 271, 273, 274, 299,
 319
 bars 10, 268, 271, 274, 275, **16.2–16.4**
 bastoni 319
 jams 273, 275
 tracery 9, 10, 258–74, 319
 wires 3, 51, 69, 71, 85
 beaded wire 69, 72, 73
 spiral-beaded wire 69, 72, 73
 Wixom, William D. 249
 Wobst, H. Martin 21, 22
 Wolff, Arnold 272
 Wollaston, England 21
 women 16–24, 51–8, 82, 133, 136, 173
 as patrons 147–62
 as laborers 374–5
 wood 3, 9, 20, 26, 131, 134, 135, 136, 137,
 186, 190, 192, 199, 200, 208, 248,
 270, 274, 282, 289, 291, 297, 300,
 317, 368, 370
 as material for pipes, 228, 229, **13.10**
 as material for templates 230
 woodcut print 349, 351, 356, 371
 wool (tweed) 87, 115
 Wooperton, England 39

- Worcester, England 220
 Cathedral 259, 261, **15.5**
 World War II 147, 225, 227
 Worms, Germany 356
 Wörrstadt, Germany 55
 Wren, Christopher 287, 290
 Wyrcestrer, William 223, 224

 X-ray 36, 231

 York, England 34, 37, 41, 67, 84, 138, 260
 Alma Sophia 138
 Coppergate 39, 41, 73
 Minster 37, 116, 258

 St Mary Bishopshill Senior 38
 Station Road 41
 Wharram Percy 42
 Yorkshire, England 39–44, 258
 Young, Sir John 223

 Zagreb, Croatia Mimara museum 116
 Zealand, Denmark 54
 Zeno da Campione 319
 Zimmermann, Samuel 334
 zinc 3, 338
 zoomorphic ornament 23, 37, 39, 40
 Zwentibold of Lotharingia 148
 Zwickau, Germany 356, 371