A
adjustable triangles, 7, 26
aerial view, 34, 92, 115
altitude, 170
analytical drawing, 234–236
angles, drawing, 26
angle of view, 117, 119
arcs, drawing, 28
architect’s scales, 12
architectural drafting. See drafting
architectural drawing systems.
See drafting
architectural presentations, 202–203.
See also presentation drawings
arrows, 249
assumed north, 51, 82
atmospheric perspective, 87, 88, 167
axial lines, 34, 92
axis of symmetry, 71
axonometric projections, 30, 31, 34, 35, 91
azimuth, 170
B
background, 228
for building elevations, 87, 165
and cone of vision, 111
for freehand drawing, 228
and landscaping elements, 198
base drawings, 93
bearing, 170
Bézier, Pierre, 28
Bézier curves, 28
BIM (building information modeling), 44–46
binocular vision, 37
blur, perspective, 89
boxes, presentation drawing, 207, 213
break lines, 19
broken lines, 70
brushes, drafting, 11
building elevations, 80–89
in architectural presentations, 206
arrangement and orientation, 82
defined, 81
materials, representing, 84–85
scale and detail, 83
spatial depth cues, 86–89
tonal values in, 16
trees in, 197
building information modeling (BIM), 44–46
building materials, representing, 84–85
building sections, 47, 70–78.
See also section drawings
C
C (center of vision), 110
CAD. See computer-aided design/drafting
cars, 193
CAV (central axis of vision), 109
ceiling plans, 62
centerlines, 19, 52
center of vision (C), 110
central axis of vision (CAV), 109
charcoal pencils, 221
circles
in paraline drawings, 98
in perspective drawings, 143
shadows cast by, 175
tangent, 28
circle templates, 9
circulation diagrams, 250
clear, in architectural presentations, 202
clip planes
in floor plan, 51
for section drawings, 70
cold press illustration boards, 16
color. See tonal values
columns, 52
compasses, 8
composition (freehand drawing), 226–231
counter-aided design/drafting (CAD).
See also digital drawing
analytical drawing, 235
Bézier curves, 28
defined, 45
defined, 44
digital layers, 15
computer-aided design/drafting (CAD)  
(continued)  
digital line weights, 20  
digital templates, 10  
floor plans, 56–57  
furniture element libraries, 192  
line weights, 20  
manipulating perspective views with, 118  
paraline views with, 104–105  
poché with, 75  
projection systems, 30, 31, 34  
3D site models, 65  
wireframe model, 235  
concept diagrams, 252, 254  
condensed typefaces, 209  
Condominium Unit No. 5, Sea Ranch, California, 103  
cone of vision, 111, 119  
construction drawings, 44  
construction sections, 69  
context, 186–200  
buildings in, 224  
furniture in, 191–192  
landscaping in, 194–199  
people in, 186–190  
reflections in, 200  
in section drawings, 79  
vehicles in, 193  
continuity, in architectural presentations, 203  
continuity of outline, 88  
contour drawing, 168, 232–233  
contour interval, 64  
contour line, 64, 65  
convergence, 112  
crosshatching, 151, 156  
cubes, 236  
curved lines, 28, 175  
curved surfaces, 32  
curvilinear shapes, 98  
cutaway views, 102  
cut elements, 177  
D  
dashed lines, 19, 21  
in floor plans, 59  
for phantom views, 103  
for section cuts, 70  
in site plans, 63  
deep. See spatial depth  
design drawings, 44, 207  
design sections, 69, 72  
detail  
in architectural drawings, 42  
in building elevations, 83  
in building sections, 78  
in digital drawings, 43  
in expanded views, 100  
in floor plans, 60–61  
in freehand drawings, 221, 222, 242  
for interior elevations, 90  
with vehicles, 193  
diagonal point (DP), 125, 128  
diagonal point method, 123, 128  
diagonals, method of, 138  
diagramming  
design issues addressed by, 250–251  
elements of, 248  
in freehand drawing, 246–255  
and parti, 252–253  
principles of, 254–255  
relationships, 249  
digital drawing, 10. See also computer-aided design/drafting (CAD)  
colors and tonal values, 154  
detail, 43  
diagramming, 246  
experimentation with, 41  
floor plans, 51–52, 56–57  
guides, 10  
layers, 15  
lighting, 160–161  
lines, 10, 18  
line quality, 21  
line weights, 20  
measurements with, 137  
multiplication, 25  
paraline views, 104–105  
presentation drawings, 215, 216  
scale, 13, 43, 60  
shade and shadows, 154, 172–173  
shapes, 27  
stylus for, 5, 18  
subdivision, 25  
templates, 10  
tonal values, 154, 169  
transformations, 27  
digital images  
figures, 190  
furniture elements, 192  
trees, 199  
digital presentations, 216  
digital stylus, 5, 18  
digital templates, 10  
digital typography, 209  
digital viewpoints, 118  
digital walk-through, 39  
dimetric projection, 35  
dimetric view, 31, 34  
distorted perspective views, 118  
distortion  
and cone of vision, 111  
in elevation obliques, 96  
and perspective variables, 119  
doors, 53, 58  
dots, 153  
DP (diagonal point), 125, 128  
drafting, 18–28  
general principles for, 22  
techniques (See drafting techniques)  
drafting brushes, 11  
drafting film, 14  
drafting powder, 11  
drafting tape, 14  
drafting techniques  
analytical drawings, 235  
angles, 26  
Bézier curves, 28  
crosshatching, 151  
curved lines, 28  
digital multiplication, 25
digital shapes, 27
digital subdivision, 25
digital transformations, 27
drawing lines, 18–22
general principles, 22
hatching, 150
modeling, 158
parallel lines, 23
pencil technique, 22
perpendicular lines, 23
scribbling, 152
shapes, 26, 27
stippling, 153
subdivisions, 24, 25
tonal values, 149–155
drafting triangles. See triangles
drawing from observation, 218–222
drawing guides, 6–10
drawing ink, 4
drawing leads. See leads, drawing
drawing programs. See computer-aided design/drafting (CAD); digital drawing
drawing surfaces, 14–16
drawing systems, 30–48
and communication of design ideas, 40–48
multiview drawings, 32–33
paraline drawings, 34–36
perspective drawings, 37–39
pictorial systems, 31
projection drawing, 30
scale and detail in, 42–43
drawing tools and materials, 2–16
aids, drawing, 11
guides, drawing, 6–10
leads, 3
pencils, 2
pens, 4–5
scales, drawing, 12–13
surfaces, drawing, 14–16
elevations, 80–90
building, 80–89
(See also building elevations)
defined, 80
interior, 90
elevation obliques
characteristics of, 93
creating, 96
defined, 36
orientation of, 31
for paraline drawings, 34
elevation view, 96, 174–176
ellipse, 143
engineer's scales, 13
erasers, 11
erasing shields, 11
expanded views, 100–101
experiential view, 38, 40, 108, 122
exploded views, 100
exterior perspectives, 168
F
Falling Water (Frank Lloyd Wright), 135
figures, human. See people, drawings of
fill, digital shape, 27
film, drafting, 14
floor plans, 51–61
in architectural presentations, 206
CAD, 46
characteristics, 51
digital plans, 51–52
doors in, 58
drawing, 52–53
plan cut for, 54
and plan obliques, 36
poché, 55
scale and detail, 60–61
section drawings vs., 69
and site plans, 68
spatial depth, 55
stairs in, 59
tonal values with, 163
trees in, 196
windows in, 58
fly-through, digital, 39
foreground
for building elevations, 87, 165
and cone of vision, 111
in freehand drawing, 228–230
and interior perspectives, 169
and landscaping elements, 198
foreshortening
and axonometric projections, 35
in paraline drawings, 36
in perspective drawings, 114, 116
formal diagrams, 251
fountain pens, 5
four-center method, paraline circle drawings, 98
framing, 213, 226
free-form shapes, 98
freehand drawing, 218–255
analytical approach to, 234–236
and building a drawing, 237–242
composition in, 226–231
contour drawing, 232–233
diagramming in, 246–255
from observation, 218–222
parti in, 252–253
subjects for, 222–225
travel sketching, 243–245
French curves, 8
“front and back” clipping planes, 51, 70
front view, orthographic projection, 33
furniture, 53, 191–192, 206
G
gel pens, 5
geometric shapes, analytical drawing, 236
GL (ground line), 110, 137
global illumination, 161
GP (ground plane), 110
grades, graphite lead, 3
graphic images, 204
graphic primitives, 27
graphic scales, 63, 208
graphic symbols, 204, 208
graphite leads, 3
edges, modeling, 158
efficiency, in architectural presentations, 202

ARCHITECTURAL GRAPHICS / 261

INDEX
INDEX

grid lines, 19
grids (presentation drawings), 212, 214
ground line (GL), 110, 137
ground plane (GP), 110
guides, drawing, 6–10

H
hand drawing, digital drawing vs., 41
hand lettering, 210
hatching, 150, 151, 156
head, human, 188
highlights, 159
“hither and yon” clipping planes, 51, 70
horizon line (HL), 110, 115
horizontal cut, 51
horizontal limit, freehand drawing, 230
horizontal plane, 166
hotpress illustration boards, 16
human figures. See people, drawings of

I
illumination, 161
illustration boards, 16
image-processing software, 190, 199
inclined lines, 10, 140–142
ink, 4
interior elevations, 90
interior perspectives, 169
interior spaces, 222
International Organization for Standardization (ISO), 4
isometric drawings, 36, 93–95, 98
isometric projection, 35
isometric view, 31, 34

K
Klee, Paul, 257

L
landscaping, 63, 194–199
law of simultaneous contrast, 149
leads, drawing
  for compasses, 8
  for hatching, 150

and line weights, 20
taper of point, 22
types and grades, 3
lead holder pencils, 2
lettering, presentation drawing, 204, 209–211
light, 89, 159–161
light rays, paraline views, 178
light values, 159
lines, 18–21
  in analytical drawing, 234
  Bézier curves, 28
  curved, 28
  in diagramming, 249
drawing, 18
drawing leads and, 3
  in freehand sketches, 221
  in orthographic projection, 32
  parallel/perpendicular, 23
  (See also parallel lines)
in presentation drawings, 207
quality of, 21
technical pens and, 4
types of, 19
weights, 20
line-and-tone technique, 154, 221
linear perspective, 107, 108
  in freehand drawing, 238
  shadows in, 181
line quality, 21
line weights
  for building elevations, 86
  defining plan cut with, 54
  defining section cut with, 72
digital, 20
  for digital floor plans, 56
drawing lead choices for, 20
  in floor plans, 54
  and limitations of CAD/BIM technologies, 46–48
  in section drawings, 164
  for spatial depth cues, 86–88
local illumination, 161
lowercase lettering, 209

M
masking tape, drafting tape vs., 14
materials
  building (See building materials)
drawing (See drawing tools and materials)
measuring line (ML), 123, 136
measuring point (MP), 130–132
mechanical pencils, 2, 20. See also pencils
method of diagonals, 138
method of triangles, 139
metric scales, 13
middle ground, 228
  for building elevations, 87
  and cone of vision, 111
  for freehand drawing, 228
  and landscaping elements, 198
ML (measuring line), 123, 136
modeling, 158
monocular vision, 108
Moore, Lyndon, Turnbull, Whitaker (MLTW), 103
MP (measuring point), 130–132
multiplication, digital, 25
multiview drawings, 32–33, 50–90
  axonometric projection vs., 35
ceiling plans, 62
elements of, 31
elevations, 80–90
floor plans, 51–61
perspective drawings vs., 38, 40
plans (in general), 50
point of view in, 40
sections, 69–79
shade and shadows in, 171

N
negative shapes, 233
nibs, fountain pen, 5
nonaxial lines, 34, 92
nonphoto blue leads, 3
north, assumed, 51, 82
north arrows, 208
objective view, 38
objects, buildings as, 223
oblique projection, 34, 93. See also elevation obliques: plan obliques
defined, 30, 36
orientation of, 31
perspective projection vs., 109
observation, drawing from, 218–222. See also freehand drawing
one-point perspective, 122–127
characteristics of, 31
grid construction, 123–127
perspective variables with, 118, 121
orientation, 206
of building elevations, 82
of interior elevations, 90
in site plans, 66
orthographic projection
axonometric projection vs., 35
defined, 30
elevations (See elevations)
interior elevations, 90
for multiview drawings, 31–33
(See also multiview drawings)
people in, 186
sections, 69
spatial depth cues in, 86
of straight line, 176
outline, continuity of, 88
overlap, 88, 114

P
page layout programs, 215
paraline drawings, 34–36, 92–106
in architectural presentations, 206
circles and freeform shapes in, 98
constructing, 97–99
cutaway views, 102
digital views, 104–105
elements of, 31
elevation obliques, 96
expanded views, 100–101
experiential vs. objective views, 38
isometric, 94
people in, 186
perspective drawings vs., 38
phantom views, 103
pictorial characteristics, 34
plan obliques, 95
point of view in, 40
sequential views, 106
shade and shadows in, 178–180
small-scale objects in, 39
spatial depth cues in, 99
tonal values in, 166
trees in, 197
types of, 34
views in, 100–106
parallel lines
and convergence, 112
for crosshatching, 151
drawing, 23
in drawing programs, 10
for hatching, 150
inclined, 140
and lines oblique to picture plane, 113
in oblique projection, 36
in paraline drawings, 34, 92, 93
in perspective drawings, 37, 121
and perspective measurements, 137
in reflections, 145
shadows cast by, 176
and two-point perspective, 129
parallel rules, 6
parti, 252–253
pencils, 2
for contour drawing, 232
for freehand drawing, 221
gauging line lengths/angles with, 239
hand technique for, 18
hatching with, 150
stippling with, 153
pencil sharpeners, 22
people, drawings of, 186–190
activity, 189
in architectural presentations, 206
in building sections, 71
digital figures, 190
in freehand drawing, 239
furniture with, 191
proportion, 188
in section drawings, 77
size, 186
spatial depth, 187
vehicles with, 193
perspective blur, 89
perspective drawings, 37–39, 108–146
in architectural presentations, 206
CAD, 48
circles in, 143
digital viewpoints, 118–119
elements in, 110–111
elements of, 31
inclined lines in, 140–142
linear perspective in, 108
measurements in, 137–139
multiview drawings vs., 40
one-point perspective in, 121–131
people in, 187
pictorial characteristics, 37
pictorial effects, 112–114
point of view in, 40
projection in, 109
reflections in, 143–145
section perspective in, 128
shade and shadows in, 181–184
stairs in, 142
tonal values in, 167
two-point perspective in, 121, 129–136
types of perspective in, 121
variables in, 115–120
perspective-plan view, 127
perspective projection, 109
  defined, 30, 37
  and inclined lines, 140
  for perspective drawings, 31
perspective view, 133, 226, 238
phantom line, 103
phantom views, 103
photographs, 190, 199
photorealism, drawbacks of, 190, 199
Piazza San Marco (Venice), 162
pictorial zones, 87
picture plane (PP), 109
placement, graphic symbols, 208
plans, 50
planar corners, 99
plan cut, 54, 56
plane figures, shadows cast by, 175
planes
  and angle of view, 117
  and building elevations, 81, 82
  in elevation obliques, 96
  in orthographic projection, 32, 50
  in paraline drawings, 93, 99
  in plan obliques, 95
  and reflections, 145
  of section cuts, 69
plan obliques
  characteristics of, 93
  for circles and freeform shapes, 98
  creating, 95
  defined, 56
  isometric drawings vs., 93–95
  orientation, 31
  for paraline drawings, 34
plan view
  furniture in, 192
  and orthographic projections, 50
  shade and shadows in, 174–176
plastic leads, 3
plotters, 21, 42, 43
poché, 55
  digital, 75
  for digital floor plans, 56
  in section drawings, 73
point of view (architectural presentations), 202
point of view (observer’s)
  in digital views, 41
  and measuring point method for
two-point perspective, 130
multiview drawings, 40
and one-point perspective
  grid construction, 124
paraline drawings, 40
perspective drawings, 40
in perspective drawings, 38, 115
  and two-point perspective
drawings, 135
  and two-point perspective grid, 134
polygonal figures, shadows cast by, 175
positive shapes, 233
posts, 52
pounce powder, 11
powder, drafting, 11
PP (picture plane), 109
presentation drawings, 204–216
drawing relationships in, 206
  elements of, 204–205
  formats for, 212–216
  graphic symbols in, 208
  lettering in, 209–211
  visual sets in, 207
presentation software, 216
printers, 21, 42, 43
profile, shadow’s, 179
programmatic diagrams, 250
projection systems, 31
project titles, 211
property lines, 19
proportion, human figures, 188
protractors, 8, 26
pure-tone drawings, 153, 155
Q
quality, line, 21
R
ray casting, 160, 173
ray tracing, 161
rectangles, subdividing, 138
rectilinear objects, 121
reflected ceiling plans, 62
reflections, 144–145, 200
regulating lines, 234–235
relative proximity, 249
relative size, 249
rendering context. See context
rendering tonal values. See tonal values
roof plans, 63
rule of thirds, 231
S
sandpaper, as pencil sharpener, 22
sans-serif typefaces, 209
scale
  for architectural drawings, 42
  for building elevations, 83
  for building sections, 78
  for digital drawings, 43
  for expanded views, 100
  for floor plans, 54, 60–61
  graphic, 63, 208
  for interior elevations, 90
  landscaping to establish, 194
  for multiview drawings, 66
  and one-point perspective
    grid construction, 124
scales, drawing, 12–13
scribbling, 152, 156
section arrows, 208
section cuts, 70–72
  and building elevations, 81
  for complex and irregular forms, 77
  defining, 72
  digital, 70
section drawings, 69–79
  building, 70–78
  defined, 69
  digital poché, 75
  digital sections, 70
  with graphics software, 70, 75–76
  poché, 73–75
  scale and detail in, 77
section cuts, 70–72, 77
site sections, 79
spatial depth, 73–74
tonal values in, 164
trees in, 197
section lines, 70
section perspective, 128
sequence of subject matter,
architectural presentations, 205
sequential views, 77, 106
serif typefaces, 209
shade and shadows, 170–184
defined, 154, 159, 170
digital, 172–173
in freehand drawings, 241
in multiview drawings, 171
in paraline views, 178–180
in perspective views, 181–184
plan vs. elevation views of, 174–176
in site plans, 177
as spatial depth cue, 89
shade line, 170
shadow line, 170, 174, 184
shadow plane, 170
shapes, drawing, 26
side view, orthographic projection, 33
sight lines, 30, 37
and cone of vision, 111
defined, 109
in linear perspective, 112, 114
and perspective projection, 109
and perspective view of circles, 143
and reflections, 144
simultaneous contrast, law of, 149
single-view drawings, 35, 92.
   See also paraline drawings
site diagrams, 250
site plans, 63–68
drawings, 67–68
scale and orientation in, 66
shade and shadows in, 177
topography in, 64–65
site sections, 79
size, projected, 114
sizing (freehand drawing), 231
sketching, See freehand drawing
slide shows, 216
smart guides, 10
solids, shadows cast by, 176
solid lines, 19
SP (station point), 109
spatial depth, 86, 88–90
   in building elevations, 86
   in elevations, 80
   extending, 139
   in floor plans, 54, 55
   and one-point perspective, 122
   in orthographic projection, 32, 86
   in paraline drawings, 99
   in section drawings, 72, 73
   subdividing, 138
   tonal values to enhance, 165
   spatial edges, 99
   squares
   and perspective view of circle, 143
   and shadow of circle, 175
   subdividing, 138
stairs, 59, 142
station point (SP), 109
stippling, 153, 156
straight line, shadow cast by, 174, 176
stroke, digital shape, 27
stylus, digital, 5, 18
sun angle, 170
sunlight, 170–172
surface lines, 99
surfaces, drawing, 14–16
system diagrams, 251
T
   tangents, 28
tape, drafting, 14
technical pens, 4
techniques, See drafting techniques
templates, 9, 10
text, on presentation drawings, 211.
   See also lettering
texture, 157
texture perspective, 89, 169
3D CAD programs
   analytical model, 235
digital layers, 15
modeling of solids, 45
paraline views, 104–105
perspective views, 118
projection systems, 30, 31, 34
site models, 65
wireframe model, 235
3D modeling programs
   analytical model, 235
colors and tonal values, 154
digital layers, 15
floor plans, 51
lines, 99
paraline views, 104–105
perspective measurements, 137
projection systems, 30, 31, 34
section drawings, 70
serial vision, 39
shade and shadows, 172–173
site models, 65
wireframe model, 235
three-point perspectives, 31, 118, 121
titles, 211
tonal values, 148–184
   in architectural drawings, 162–169
   in building elevations, 88
   conveying light with, 159–161
   creating, 149–155
   for floor plans, 55–57
   in freehand drawings, 241
   of landscape elements, 195–198
   and modeling, 158, 160–161
   in presentation drawings, 207
   in section drawings, 73, 74
shade and shadows
   (See shade and shadows)
in site plans, 67
and texture, 157
value scale, 156
tools, See drawing tools and materials
tooth, 3

topography, 63–65
top view, orthographic projection, 33
tracing paper, 14, 22, 126, 133
transformations, 27
travel sketching, 243–245
trees, 194–199
trial layouts, 215
triangles (drawing guide), 7
  for drawing angles, 26
  for drawing shadows in perspective views, 183
  for elevation obliques, 96
  for hand lettering, 210
  for lettering, 210
  for parallel/perpendicular lines, 23
  for plan obliques, 95
trimetric projection, 35
trimetric view, 31, 34
trucks, 193
T-squares, 6
2D CAD programs, 10, 45
2D drawing programs
  colors and tonal values with, 154
  digital templates in, 10
  paraline views with, 104–105
2D vector-based drawing programs, 10, 27
two-point perspectives, 129–136
  characteristics of, 31
  grid construction for, 132–134
  measuring point method for, 130–131
  perspective variables with, 118, 121
  shade and shadows in, 183–184
typefaces, 209

U
unity, in architectural presentations, 203
urban spaces, 224, 225
utility lines, 19

V
vanishing point (VP), 112, 136
vanishing point for an inclined set of lines (VPI), 140–142
vanishing trace (VT), 141
Vanna Venturi House, Philadelphia, 54
vector-based drawing programs, 10, 45
vector drawings, 43
vector images, 27
vehicles, drawings of, 193
vellum, 14
Venturi, Robert, 54
vertical limit, freehand drawing, 230
vertical measuring line (VML), 124, 130, 132
views (in paraline drawings), 100–106
  cutaway, 102
  digital, 104–105
  expanded, 100–101
  phantom, 103
  sequential, 106
vision, 148
visual weight, graphic symbols, 208
VML (vertical measuring line), 124, 130, 132
VP (vanishing point), 112, 136
VPI (vanishing point for an inclined set of lines), 140–142
VT (vanishing trace), 141

W
walk-through, digital, 39
walls
  edge view, 171, 174
  in floor plans, 52
  in interior elevations, 90
water, 200
white space, 207
windows, 53, 58
window sills, 58
wooden drawing pencils, 2
worm’s-eye view, 34, 92, 115
Wright, Frank Lloyd, 135