THE ARCHEOLOGY OF GILA CLIFF DWELLINGS

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Tucson, Arizona August 1986

Publications in Anthropology 36
TABLE OF CONTENTS

LIST OF FIGURES ................................................. xv
LIST OF TABLES ................................................ xvii
ACKNOWLEDGEMENTS ........................................... xix
INTRODUCTION by Keith M. Anderson ....................... xxi

Chapter 1. SUMMARY by Keith M. Anderson ............... 1

Chapter 2. SETTING AND ENVIRONMENT by Don P. Morris and Keith M. Anderson .......... 9

Chapter 3. AREA SURVEY by Don P. Morris ............... 13

  Aim of the Project ......................................... 13
  Acknowledgements ........................................... 13
  Methods ................................................... 14
  Survey Results ............................................. 14
     Chipping Areas - Eight Sites ......................... 15
     Pithouse Villages - 31 Sites ......................... 15
        Georgetown Phase Sites ......................... 16
        Three Circle Phase ............................. 16
     Cliff Shelters - 25 Sites ......................... 16
     Habitation Unit Sites ............................... 16
     Storage Unit Sites ................................ 16
     Work Unit Sites ..................................... 16
     Burial ................................................ 16
     Masonry Units - 32 Sites ......................... 17
       Pueblo Sites ....................................... 18
       Checkdams - Three Sites ......................... 18
       Pictograph Areas - Five Sites .................. 18
       Rock Wall - Two Sites ............................ 19
       Ceremonial Unit - One Site ..................... 19
     Historic Dwellings - Three Sites ................ 19

  Conclusions and Summary ................................ 19

Chapter 4. HISTORY OF RESEARCH by Don P. Morris and Keith M. Anderson ............... 21

  U.S. Army Visit ........................................... 21
  Adolph Bandelier's Visit, 1884 ......................... 21
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploration and Discovery of an Infant Burial by H. B. Ailman, 1877</td>
<td>22</td>
</tr>
<tr>
<td>Excavations by Charlie Steen, 1942</td>
<td>23</td>
</tr>
<tr>
<td>Reconnaissance and Stabilization by Roland Richert, 1955</td>
<td>23</td>
</tr>
<tr>
<td>Stabilization and Excavation by Doc Campbell, 1962</td>
<td>26</td>
</tr>
<tr>
<td>Excavation by Gordon Vivian and Dee Dodgen, 1963</td>
<td>26</td>
</tr>
<tr>
<td>Excavations by Don Morris, 1968</td>
<td>31</td>
</tr>
<tr>
<td>Excavations by Ronald and Pamela Everhart, 1970</td>
<td>33</td>
</tr>
<tr>
<td>Summary</td>
<td>33</td>
</tr>
<tr>
<td>Chapter 5. ARCHITECTURE by Don P. Morris and Keith M. Anderson</td>
<td>37</td>
</tr>
<tr>
<td>Description by Don P. Morris</td>
<td>37</td>
</tr>
<tr>
<td>Setting</td>
<td>37</td>
</tr>
<tr>
<td>Structures</td>
<td>38</td>
</tr>
<tr>
<td>Cave 1, Rooms 36-39</td>
<td>38</td>
</tr>
<tr>
<td>Cave 2, Rooms 1-8</td>
<td>40</td>
</tr>
<tr>
<td>Cave 3, Rooms 9-16, 35</td>
<td>40</td>
</tr>
<tr>
<td>Cave 4, Rooms 17-25, 28, 40-41</td>
<td>44</td>
</tr>
<tr>
<td>Cave 5, Rooms 26-27, 29-34</td>
<td>44</td>
</tr>
<tr>
<td>Cave 6</td>
<td>47</td>
</tr>
<tr>
<td>Construction Details</td>
<td>49</td>
</tr>
<tr>
<td>Masonry and Walls</td>
<td>49</td>
</tr>
<tr>
<td>Roof and Ceilings</td>
<td>50</td>
</tr>
<tr>
<td>Room Size</td>
<td>51</td>
</tr>
<tr>
<td>Interior Room Features</td>
<td>51</td>
</tr>
<tr>
<td>Tree-Ring Dates</td>
<td>54</td>
</tr>
<tr>
<td>Construction Sequence</td>
<td>56</td>
</tr>
<tr>
<td>Indications of Multiple (Earlier) Occupancy</td>
<td>57</td>
</tr>
<tr>
<td>Room Descriptions</td>
<td>57</td>
</tr>
<tr>
<td>Room 1, Cave 2</td>
<td>57</td>
</tr>
<tr>
<td>Room 2, Cave 2</td>
<td>59</td>
</tr>
<tr>
<td>Room 3, Cave 2</td>
<td>60</td>
</tr>
<tr>
<td>Room 4, Cave 2</td>
<td>61</td>
</tr>
<tr>
<td>Room 4A, Cave 2</td>
<td>62</td>
</tr>
<tr>
<td>Room 5, Cave 2</td>
<td>63</td>
</tr>
<tr>
<td>Room 6, Cave 2</td>
<td>64</td>
</tr>
<tr>
<td>Room 7, Cave 2</td>
<td>65</td>
</tr>
<tr>
<td>Room 8, Cave 2</td>
<td>66</td>
</tr>
<tr>
<td>Room 9, Cave 3</td>
<td>67</td>
</tr>
<tr>
<td>Room 10, Cave 3</td>
<td>68</td>
</tr>
<tr>
<td>Room 10A, Cave 3</td>
<td>70</td>
</tr>
<tr>
<td>Room 11, Cave 3</td>
<td>70</td>
</tr>
<tr>
<td>Room 12, Cave 3</td>
<td>71</td>
</tr>
<tr>
<td>Room 13, Cave 3</td>
<td>72</td>
</tr>
</tbody>
</table>
Chapter 6. POTTERY by Keith M. Anderson

<table>
<thead>
<tr>
<th>Room</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room 14, Cave 3</td>
<td>73</td>
</tr>
<tr>
<td>Room 15, Cave 3</td>
<td>73</td>
</tr>
<tr>
<td>Room 16, Cave 3</td>
<td>74</td>
</tr>
<tr>
<td>Room 17, Cave 4</td>
<td>75</td>
</tr>
<tr>
<td>Room 18, Cave 4</td>
<td>77</td>
</tr>
<tr>
<td>Room 19, Cave 4</td>
<td>78</td>
</tr>
<tr>
<td>Room 20, Cave 4</td>
<td>79</td>
</tr>
<tr>
<td>Room 21, Cave 4</td>
<td>80</td>
</tr>
<tr>
<td>Room 22, Cave 4</td>
<td>81</td>
</tr>
<tr>
<td>Room 23, Cave 4</td>
<td>82</td>
</tr>
<tr>
<td>Room 24, Cave 4</td>
<td>83</td>
</tr>
<tr>
<td>Room 25 (bottom)/25A (top), Cave 4</td>
<td>84</td>
</tr>
<tr>
<td>Room 26, Cave 5</td>
<td>85</td>
</tr>
<tr>
<td>Room 27, Cave 5</td>
<td>86</td>
</tr>
<tr>
<td>Room 28, Cave 4</td>
<td>88</td>
</tr>
<tr>
<td>Room 29, Cave 5</td>
<td>89</td>
</tr>
<tr>
<td>Room 30, Cave 5</td>
<td>90</td>
</tr>
<tr>
<td>Room 31, Cave 5</td>
<td>91</td>
</tr>
<tr>
<td>Room 32, Cave 5</td>
<td>92</td>
</tr>
<tr>
<td>Room 33, Cave 5</td>
<td>93</td>
</tr>
<tr>
<td>Room 34, Cave 5</td>
<td>94</td>
</tr>
<tr>
<td>Room 34A, Cave 5</td>
<td>95</td>
</tr>
<tr>
<td>Room 35, Cave 3</td>
<td>95</td>
</tr>
<tr>
<td>Room 36, Cave 1</td>
<td>96</td>
</tr>
<tr>
<td>Room 37, Cave 1</td>
<td>97</td>
</tr>
<tr>
<td>Room 38, Cave 1</td>
<td>98</td>
</tr>
<tr>
<td>Room 39, Cave 1</td>
<td>98</td>
</tr>
<tr>
<td>Room 40, Cave 4</td>
<td>99</td>
</tr>
<tr>
<td>Room 41, Cave 4</td>
<td>100</td>
</tr>
<tr>
<td>Summary and Interpretation</td>
<td>101</td>
</tr>
<tr>
<td>Summary</td>
<td>101</td>
</tr>
<tr>
<td>Building and Occupation Sequence</td>
<td>105</td>
</tr>
<tr>
<td>Use of Space, in Comparison with Other Tularosa Phase Sites</td>
<td>106</td>
</tr>
<tr>
<td>Settlement Population</td>
<td>111</td>
</tr>
</tbody>
</table>

Chapter 6. POTTERY by Keith M. Anderson
CONTENTS (continued)

| Page |
|-------------------|-------------------|
| Chupadero Black-on-white | 121 |
| Subglaze Ladle Bowl | 123 |
| Lugs and Handles | 123 |
| Unusual Vessel Shapes | 123 |
| Ceramic Pipe | 123 |
| Worked Sherds | 123 |
| Pot Mend | 125 |
| Chronological Inferences | 125 |

Chapter 7. STONE ARTIFACTS by George A. Teague

| Introduction | 131 |
| Descriptions | 131 |
| Manos | 132 |
| Definition | 132 |
| Number | 132 |
| Shape in Plan View | 132 |
| Size of Whole Specimens | 132 |
| Material | 132 |
| Metate Type | 132 |
| Stages of Wear | 132 |
| Remarks | 133 |
| Hands tones | 133 |
| Definition | 133 |
| Number | 133 |
| Shape | 133 |
| Size Range of Whole Specimens | 133 |
| Material | 134 |
| Remarks | 134 |
| Abraders | 134 |
| Pestle | 134 |
| Metates | 134 |
| Definition | 134 |
| Number | 135 |
| Size of Whole Specimens | 135 |
| Material | 135 |
| Remarks | 135 |
| Mortars | 135 |
| Groundstone Balls | 136 |
| Groundstone Axes | 136 |
| Definition | 136 |
| Number | 136 |
| Average Dimensions | 136 |
| Material | 136 |
| Remarks | 137 |
| Straightening Tools | 137 |
CONTENTS (continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decorative Items</td>
<td>137</td>
</tr>
<tr>
<td>Beads</td>
<td>138</td>
</tr>
<tr>
<td>Pendant</td>
<td>138</td>
</tr>
<tr>
<td>Tesserae</td>
<td>138</td>
</tr>
<tr>
<td>Obsidian Disc</td>
<td>138</td>
</tr>
<tr>
<td>Stone and Mineral Specimens</td>
<td>138</td>
</tr>
<tr>
<td>Malachite Nodules</td>
<td>138</td>
</tr>
<tr>
<td>Crystals</td>
<td>138</td>
</tr>
<tr>
<td>Fossil</td>
<td>139</td>
</tr>
<tr>
<td>Chalcedony Concretions</td>
<td>139</td>
</tr>
<tr>
<td>Tabular Chalcedony Specimen</td>
<td>139</td>
</tr>
<tr>
<td>Geodes</td>
<td>139</td>
</tr>
<tr>
<td>Obsidian Nodules</td>
<td>139</td>
</tr>
<tr>
<td>Galena Specimen</td>
<td>139</td>
</tr>
<tr>
<td>Iron Oxide Specimens</td>
<td>139</td>
</tr>
<tr>
<td>Other Stone Specimens</td>
<td>140</td>
</tr>
<tr>
<td>Pigment Processing Tools</td>
<td>140</td>
</tr>
<tr>
<td>Painted Stones</td>
<td>141</td>
</tr>
<tr>
<td>Miscellaneous Groundstone</td>
<td>141</td>
</tr>
<tr>
<td>Building Material</td>
<td>141</td>
</tr>
<tr>
<td>Cores</td>
<td>142</td>
</tr>
<tr>
<td>Core Tools</td>
<td>142</td>
</tr>
<tr>
<td>Flakes</td>
<td>142</td>
</tr>
<tr>
<td>Irregularly Flaked Pieces</td>
<td>143</td>
</tr>
<tr>
<td>Edge-damaged Flakes</td>
<td>143</td>
</tr>
<tr>
<td>Retouched Flakes</td>
<td>143</td>
</tr>
<tr>
<td>Edge-trimmed Flakes</td>
<td>144</td>
</tr>
<tr>
<td>Unifacial Tools</td>
<td>144</td>
</tr>
<tr>
<td>Bifacial Tools</td>
<td>146</td>
</tr>
<tr>
<td>Type 1</td>
<td>146</td>
</tr>
<tr>
<td>Type 2</td>
<td>146</td>
</tr>
<tr>
<td>Type 3</td>
<td>146</td>
</tr>
<tr>
<td>Type 4</td>
<td>147</td>
</tr>
<tr>
<td>Biface Preforms</td>
<td>147</td>
</tr>
<tr>
<td>Denticulates</td>
<td>147</td>
</tr>
<tr>
<td>Drills and Perforators</td>
<td>148</td>
</tr>
<tr>
<td>Drill Type 1</td>
<td>148</td>
</tr>
<tr>
<td>Drill Type 2</td>
<td>148</td>
</tr>
<tr>
<td>Drill Fragments</td>
<td>148</td>
</tr>
<tr>
<td>Perforator Type 1</td>
<td>148</td>
</tr>
<tr>
<td>Perforator Type 2</td>
<td>148</td>
</tr>
<tr>
<td>Projectile Points</td>
<td>149</td>
</tr>
<tr>
<td>Type 1</td>
<td>149</td>
</tr>
<tr>
<td>Type 2</td>
<td>149</td>
</tr>
<tr>
<td>Type 3</td>
<td>149</td>
</tr>
<tr>
<td>Type 4</td>
<td>151</td>
</tr>
<tr>
<td>Type 5</td>
<td>151</td>
</tr>
</tbody>
</table>
CONTENTS (continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 6</td>
<td>151</td>
</tr>
<tr>
<td>Type 7</td>
<td>152</td>
</tr>
<tr>
<td>Type 8</td>
<td>152</td>
</tr>
<tr>
<td>Type 9</td>
<td>152</td>
</tr>
<tr>
<td>Type 10</td>
<td>152</td>
</tr>
<tr>
<td>Type 11</td>
<td>153</td>
</tr>
<tr>
<td>Projectile Point Fragments.</td>
<td></td>
</tr>
<tr>
<td>Data Integration</td>
<td>153</td>
</tr>
<tr>
<td>Introduction</td>
<td>153</td>
</tr>
<tr>
<td>Culture-Historical Affiliations</td>
<td>154</td>
</tr>
<tr>
<td>Material Types and Sources</td>
<td>156</td>
</tr>
<tr>
<td>Technology</td>
<td>157</td>
</tr>
<tr>
<td>Intrasite Spatial Distributions</td>
<td>158</td>
</tr>
<tr>
<td>Conclusions</td>
<td>160</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>161</td>
</tr>
</tbody>
</table>

Chapter 8. BONE ARTIFACTS by Gloria J. Fenner

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilitarian Objects.</td>
<td>163</td>
</tr>
<tr>
<td>Awls.</td>
<td>163</td>
</tr>
<tr>
<td>Scrapers</td>
<td>166</td>
</tr>
<tr>
<td>Antler Tine Tools</td>
<td>167</td>
</tr>
<tr>
<td>Flakers</td>
<td>167</td>
</tr>
<tr>
<td>Miscellaneous Tools</td>
<td>167</td>
</tr>
<tr>
<td>Summary</td>
<td>168</td>
</tr>
<tr>
<td>Socioreligious Artifacts</td>
<td>169</td>
</tr>
<tr>
<td>Whistle/Flute</td>
<td>169</td>
</tr>
<tr>
<td>Die</td>
<td>169</td>
</tr>
<tr>
<td>Tubes</td>
<td>169</td>
</tr>
<tr>
<td>Summary</td>
<td>170</td>
</tr>
<tr>
<td>Ornaments</td>
<td>170</td>
</tr>
<tr>
<td>Beads</td>
<td>170</td>
</tr>
<tr>
<td>Unclassified Artifacts</td>
<td>171</td>
</tr>
<tr>
<td>Altered Claw</td>
<td>171</td>
</tr>
<tr>
<td>Unidentified Objects.</td>
<td>171</td>
</tr>
<tr>
<td>Miscellaneous Worked Bone</td>
<td>172</td>
</tr>
<tr>
<td>Discussion</td>
<td>172</td>
</tr>
</tbody>
</table>

Chapter 9. SHELL ARTIFACTS by Gloria J. Fenner

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ornaments</td>
<td>175</td>
</tr>
<tr>
<td>Beads</td>
<td>175</td>
</tr>
<tr>
<td>Pendants.</td>
<td>176</td>
</tr>
<tr>
<td>Tinklers</td>
<td>178</td>
</tr>
<tr>
<td>Bracelets</td>
<td>178</td>
</tr>
<tr>
<td>Chapter 10: WOOD, REED, AND GOURD ARTIFACTS by Gloria J. Fenner</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Utilitarian Objects</td>
<td>183</td>
</tr>
<tr>
<td>Atlatl</td>
<td>183</td>
</tr>
<tr>
<td>Darts</td>
<td>183</td>
</tr>
<tr>
<td>Arrows</td>
<td>185</td>
</tr>
<tr>
<td>Digging Stick</td>
<td>187</td>
</tr>
<tr>
<td>Trowel</td>
<td>187</td>
</tr>
<tr>
<td>Burreed Sticks</td>
<td>188</td>
</tr>
<tr>
<td>Spatulate Tools</td>
<td>189</td>
</tr>
<tr>
<td>Lap Board(?)</td>
<td>189</td>
</tr>
<tr>
<td>Fire Drill Hearth</td>
<td>189</td>
</tr>
<tr>
<td>Stake</td>
<td>190</td>
</tr>
<tr>
<td>Potrests</td>
<td>190</td>
</tr>
<tr>
<td>Gourd Containers</td>
<td>191</td>
</tr>
<tr>
<td>Summary</td>
<td>191</td>
</tr>
<tr>
<td>Socioreligious Objects</td>
<td>191</td>
</tr>
<tr>
<td>Pahos</td>
<td>191</td>
</tr>
<tr>
<td>Reed Cigarettes</td>
<td>199</td>
</tr>
<tr>
<td>Tablitas</td>
<td>200</td>
</tr>
<tr>
<td>Miniature Bow(?)</td>
<td>202</td>
</tr>
<tr>
<td>Split-stick Wand</td>
<td>202</td>
</tr>
<tr>
<td>Pith Cylinder</td>
<td>202</td>
</tr>
<tr>
<td>Juniper Berry Skewer</td>
<td>203</td>
</tr>
<tr>
<td>Cut Reed Section</td>
<td>203</td>
</tr>
<tr>
<td>Dice</td>
<td>204</td>
</tr>
<tr>
<td>Summary</td>
<td>204</td>
</tr>
<tr>
<td>Ornaments</td>
<td>205</td>
</tr>
<tr>
<td>Beads</td>
<td>205</td>
</tr>
<tr>
<td>Pendant</td>
<td>205</td>
</tr>
<tr>
<td>Unclassified Artifacts</td>
<td>205</td>
</tr>
<tr>
<td>Cut Reeds</td>
<td>205</td>
</tr>
<tr>
<td>Wood Cylinders</td>
<td>206</td>
</tr>
<tr>
<td>Unidentified Objects</td>
<td>206</td>
</tr>
<tr>
<td>Miscellaneous Worked Wood</td>
<td>207</td>
</tr>
<tr>
<td>Summary</td>
<td>207</td>
</tr>
<tr>
<td>Discussion</td>
<td>208</td>
</tr>
</tbody>
</table>

| Chapter 11: CORDAGE AND CLOTH.                                | 211  |
| Wild Fiber Cordage                                            | 211  |
| Cord Size                                                     | 212  |
CONTENTS (continued)

Knots Included .......................... 213
Soft, Noncotton Fiber ................. 213
Wool Yarn .............................. 213
Raw Material ........................... 213
Loosely Twisted Fiber ................. 213
Knotted Cord Artifacts ................. 213
Probable Netting Fragments .......... 214
Braided Fiber ......................... 216
Animal Cordage ......................... 216
Sinew Cord ............................. 216
Hair Cord ............................... 216
Composite Cordage ..................... 217
Cotton Cordage ......................... 217
Cotton Yarn ............................ 217
Cotton Cord ............................. 219
Cloth .................................. 219
Noncotton Cloth ....................... 219
Cotton Cloth ............................ 219
Covering of Infant Burial ............. 220

Chapter 12. FIBROUS ARTIFACTS by Gloria J. Fenner ................. 223

Utilitarian Objects ..................... 223
Carrying Net ............................ 223
Needle ............................... 223
Potrest ............................. 224
Fiber Knots ............................ 224
Fibrous Raw Material ................. 226
Summary ................................ 226
Socioreligious Objects ................. 226
Leafy Bundles ......................... 226
Unclassified Artifacts ............... 227
Unidentified Objects .................. 227
Discussion ............................. 227

Chapter 14. FEATHER ARTIFACTS by Gloria J. Fenner ................. 235

Utilitarian Objects ..................... 235
Trimmed Feathers ...................... 235
Feather Wrapping from Textiles .......... 235
Socioreligious Objects ................. 235
Pahos ................................ 235
Unclassified Artifacts ............... 240
Perforated Feather .................... 240
Discussion ............................. 240

xii
Chapter 15. **FAUNAL REMAINS** by Charmion R. McKusick .......................... 245

<table>
<thead>
<tr>
<th>Animal Group</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish, Amphibians, and Reptiles</td>
<td>245</td>
</tr>
<tr>
<td>Birds</td>
<td>245</td>
</tr>
<tr>
<td>- Dabbling Ducks</td>
<td>245</td>
</tr>
<tr>
<td>- Mergansers</td>
<td>248</td>
</tr>
<tr>
<td>- Vultures</td>
<td>248</td>
</tr>
<tr>
<td>- Hawks and Eagles</td>
<td>248</td>
</tr>
<tr>
<td>- Quail</td>
<td>249</td>
</tr>
<tr>
<td>- Turkeys</td>
<td>249</td>
</tr>
<tr>
<td>- Coots</td>
<td>250</td>
</tr>
<tr>
<td>- Doves</td>
<td>251</td>
</tr>
<tr>
<td>- Parrots</td>
<td>251</td>
</tr>
<tr>
<td>- Roadrunners</td>
<td>252</td>
</tr>
<tr>
<td>- Owls</td>
<td>252</td>
</tr>
<tr>
<td>- Woodpeckers</td>
<td>252</td>
</tr>
<tr>
<td>- Jays and Crows</td>
<td>253</td>
</tr>
<tr>
<td>- Wrens</td>
<td>253</td>
</tr>
<tr>
<td>- Bluebirds</td>
<td>253</td>
</tr>
<tr>
<td>- Sparrows</td>
<td>254</td>
</tr>
<tr>
<td>Mammals</td>
<td>254</td>
</tr>
<tr>
<td>- Hares and Rabbits</td>
<td>254</td>
</tr>
<tr>
<td>- Rodents</td>
<td>259</td>
</tr>
<tr>
<td>- Coyotes and Foxes</td>
<td>261</td>
</tr>
<tr>
<td>- Bears</td>
<td>262</td>
</tr>
<tr>
<td>- Ringtails and Raccoons</td>
<td>262</td>
</tr>
<tr>
<td>- Cats</td>
<td>262</td>
</tr>
<tr>
<td>- Deer, Elk, and Pronghorn</td>
<td>262</td>
</tr>
<tr>
<td>Summary - Mammals</td>
<td>266</td>
</tr>
<tr>
<td>Possible Special Use Areas</td>
<td>267</td>
</tr>
<tr>
<td>Summary - Birds</td>
<td>268</td>
</tr>
</tbody>
</table>

Chapter 16. **MODERN MATERIAL CULTURE** by George A. Teague .................. 273

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>273</td>
</tr>
<tr>
<td>Artifacts</td>
<td>273</td>
</tr>
<tr>
<td>- Cartridge Cases</td>
<td>273</td>
</tr>
<tr>
<td>- Bullet</td>
<td>274</td>
</tr>
<tr>
<td>- Wooden Objects</td>
<td>274</td>
</tr>
<tr>
<td>- Paper Wrapping Fragments</td>
<td>274</td>
</tr>
<tr>
<td>Distributions</td>
<td>274</td>
</tr>
<tr>
<td>Conclusions</td>
<td>275</td>
</tr>
</tbody>
</table>

Appendix. **PLANT REMAINS** by Karen R. Adams and Lisa W. Huckell ....... 277
<table>
<thead>
<tr>
<th>CONTENTS (continued)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods</td>
<td>278</td>
</tr>
<tr>
<td>Results</td>
<td>279</td>
</tr>
<tr>
<td>Gynnosperms</td>
<td>281</td>
</tr>
<tr>
<td>Agave/Yucca</td>
<td>283</td>
</tr>
<tr>
<td>Lithospermum</td>
<td>285</td>
</tr>
<tr>
<td>Opuntia</td>
<td>285</td>
</tr>
<tr>
<td>Helianthus annuus</td>
<td>286</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td>287</td>
</tr>
<tr>
<td>Quercus</td>
<td>297</td>
</tr>
<tr>
<td>Gramineae</td>
<td>297</td>
</tr>
<tr>
<td>Zea mays</td>
<td>299</td>
</tr>
<tr>
<td>Cobs</td>
<td>299</td>
</tr>
<tr>
<td>Cupules</td>
<td>303</td>
</tr>
<tr>
<td>Ears</td>
<td>303</td>
</tr>
<tr>
<td>Caryopses</td>
<td>303</td>
</tr>
<tr>
<td>Tassels</td>
<td>304</td>
</tr>
<tr>
<td>Shanks</td>
<td>304</td>
</tr>
<tr>
<td>Culms</td>
<td>304</td>
</tr>
<tr>
<td>Leaves</td>
<td>304</td>
</tr>
<tr>
<td>Roots</td>
<td>305</td>
</tr>
<tr>
<td>Juglans</td>
<td>305</td>
</tr>
<tr>
<td>Leguminosae</td>
<td>305</td>
</tr>
<tr>
<td>Gossypium hirsutum</td>
<td>310</td>
</tr>
<tr>
<td>Proboscidea sp.</td>
<td>311</td>
</tr>
<tr>
<td>Mirabilis</td>
<td>312</td>
</tr>
<tr>
<td>Prunus</td>
<td>312</td>
</tr>
<tr>
<td>Datura meteloides</td>
<td>313</td>
</tr>
<tr>
<td>Unknown Seeds</td>
<td>314</td>
</tr>
<tr>
<td>Epidermis</td>
<td>314</td>
</tr>
<tr>
<td>Quids</td>
<td>315</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>316</td>
</tr>
<tr>
<td>Wood</td>
<td>317</td>
</tr>
<tr>
<td>Summary</td>
<td>317</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>323</td>
</tr>
</tbody>
</table>

REFERENCES.  

xiv
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.1</td>
<td>Caves 2-5, Gila Cliff Dwellings, from across Cliff Dweller Canyon</td>
<td>2</td>
</tr>
<tr>
<td>Figure 1.2</td>
<td>Site plan</td>
<td>3</td>
</tr>
<tr>
<td>Figure 2.1</td>
<td>Distribution of sites in Gila Cliff Dwellings National Monument and vicinity, recorded by Morris' survey in 1968</td>
<td>10</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>West Fork of the Gila River, at its junction with the Middle Fork. Taken from the TJ Ruin</td>
<td>11</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>Steen's 1942 map</td>
<td>24</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>1963 excavation in Cave 3</td>
<td>27</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>Cave 3 after 1963 excavation</td>
<td>27</td>
</tr>
<tr>
<td>Figure 4.4</td>
<td>1963 excavation in Room 17 using motor-driven screen</td>
<td>28</td>
</tr>
<tr>
<td>Figure 4.5</td>
<td>1963 excavation in Cave 3</td>
<td>28</td>
</tr>
<tr>
<td>Figure 4.6</td>
<td>1968 excavation of Cave 1</td>
<td>32</td>
</tr>
<tr>
<td>Figure 4.7</td>
<td>Infant burial outside Room 27, covered with twilled mat. 1968 excavation</td>
<td>34</td>
</tr>
<tr>
<td>Figure 4.8</td>
<td>Infant burial wrapped in cloth</td>
<td>34</td>
</tr>
<tr>
<td>Figure 5.1</td>
<td>Cave 1, Rooms 36-39</td>
<td>39</td>
</tr>
<tr>
<td>Figure 5.2</td>
<td>Cave 2, Rooms 1-8</td>
<td>41</td>
</tr>
<tr>
<td>Figure 5.3</td>
<td>Front of Cave 2</td>
<td>42</td>
</tr>
<tr>
<td>Figure 5.4</td>
<td>Caves 3 and 4</td>
<td>43</td>
</tr>
<tr>
<td>Figure 5.5</td>
<td>Cave 5 from Cave 4</td>
<td>45</td>
</tr>
<tr>
<td>Figure 5.6</td>
<td>Caves 4 and 5</td>
<td>46</td>
</tr>
<tr>
<td>Figure 5.7</td>
<td>East end of Cave 5</td>
<td>47</td>
</tr>
<tr>
<td>Figure 5.8</td>
<td>Cave 6</td>
<td>48</td>
</tr>
<tr>
<td>Figure 5.9</td>
<td>Example of masonry construction</td>
<td>49</td>
</tr>
<tr>
<td>Figure 5.10</td>
<td>Room size</td>
<td>52</td>
</tr>
<tr>
<td>Figure 5.11</td>
<td>Cave 5 pictographs</td>
<td>58</td>
</tr>
<tr>
<td>Figure 6.1</td>
<td>Pottery</td>
<td>115</td>
</tr>
<tr>
<td>Figure 6.2</td>
<td>Pottery bowls</td>
<td>116</td>
</tr>
<tr>
<td>Figure 6.3</td>
<td>Sherds: Tularosa Black-on-white design elements</td>
<td>117</td>
</tr>
<tr>
<td>Figure 6.4</td>
<td>Sherds: Tularosa Black-on-white design elements</td>
<td>118</td>
</tr>
<tr>
<td>Figure 6.5</td>
<td>Sherds: Tularosa and Mimbres Black-on-white sherds.</td>
<td>119</td>
</tr>
<tr>
<td>Figure 6.6</td>
<td>Exotic sherds</td>
<td>122</td>
</tr>
<tr>
<td>Figure 6.7</td>
<td>Worked sherds and lugs</td>
<td>124</td>
</tr>
<tr>
<td>FIGURE</td>
<td>DESCRIPTION</td>
<td>PAGE</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Figure 7.1</td>
<td>Flaked stone tools</td>
<td>145</td>
</tr>
<tr>
<td>Figure 7.2</td>
<td>Projectile points</td>
<td>150</td>
</tr>
<tr>
<td>Figure 8.1</td>
<td>Bone artifacts</td>
<td>164</td>
</tr>
<tr>
<td>Figure 9.1</td>
<td>Shell pendants</td>
<td>177</td>
</tr>
<tr>
<td>Figure 10.1</td>
<td>Wood artifacts</td>
<td>184</td>
</tr>
<tr>
<td>Figure 10.2</td>
<td>Pahos</td>
<td>193</td>
</tr>
<tr>
<td>Figure 10.3</td>
<td>Pahos</td>
<td>195</td>
</tr>
<tr>
<td>Figure 10.4</td>
<td>Wood artifacts</td>
<td>201</td>
</tr>
<tr>
<td>Figure 11.1</td>
<td>Cord artifacts</td>
<td>215</td>
</tr>
<tr>
<td>Figure 11.2</td>
<td>Fur-wrapped cord and cloth</td>
<td>218</td>
</tr>
<tr>
<td>Figure 13.1</td>
<td>Baskets and matting</td>
<td>230</td>
</tr>
<tr>
<td>Figure 13.2</td>
<td>Sandals</td>
<td>232</td>
</tr>
<tr>
<td>Figure 14.1</td>
<td>Feather pahos</td>
<td>237</td>
</tr>
<tr>
<td>Figure 14.2</td>
<td>Artifact details</td>
<td>239</td>
</tr>
</tbody>
</table>
**LIST OF TABLES**

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Decorated Sherds from TJ Ruin</td>
<td>17</td>
</tr>
<tr>
<td>4.1</td>
<td>Concordance of Current Room Numbers with those Assigned by Steen (1942)</td>
<td>25</td>
</tr>
<tr>
<td>5.1</td>
<td>Miscellaneous Tree-Ring Dates</td>
<td>55</td>
</tr>
<tr>
<td>5.2</td>
<td>List of Rooms and Numbered Spaces</td>
<td>103</td>
</tr>
<tr>
<td>5.3</td>
<td>Room Size in Tularosa Phase Open Pueblos</td>
<td>108</td>
</tr>
<tr>
<td>5.4</td>
<td>Room Size in Hinkle Park Cliff Dwellings</td>
<td>108</td>
</tr>
<tr>
<td>5.5</td>
<td>Room Size in Gila Cliff Dwellings</td>
<td>109</td>
</tr>
<tr>
<td>5.6</td>
<td>Floor Space of Different Use-Categories in Gila Cliff Dwellings</td>
<td>109</td>
</tr>
<tr>
<td>5.7</td>
<td>Proportion of Storage Space to Living Room Space</td>
<td>110</td>
</tr>
<tr>
<td>6.1</td>
<td>Painted and Incised Pottery: All Proveniences - 1963 Excavations</td>
<td>126</td>
</tr>
<tr>
<td>6.2</td>
<td>Tularosa (/Reserve) Black-on-white Design Elements from 1963 Excavations</td>
<td>127</td>
</tr>
<tr>
<td>6.3</td>
<td>Unpainted Pottery: 1963 Excavations</td>
<td>128</td>
</tr>
<tr>
<td>6.4</td>
<td>Pottery from Other Excavations</td>
<td>129</td>
</tr>
<tr>
<td>9.1</td>
<td>Classification of Shell</td>
<td>182</td>
</tr>
<tr>
<td>11.1</td>
<td>Cord Spin and Twist</td>
<td>211</td>
</tr>
<tr>
<td>14.1</td>
<td>Sites with Scarlet Macaw Feathers</td>
<td>241</td>
</tr>
<tr>
<td>15.1</td>
<td>Distribution of Avian Species</td>
<td>246</td>
</tr>
<tr>
<td>15.2</td>
<td>Edible Meat Produced from Avian Species</td>
<td>247</td>
</tr>
<tr>
<td>15.3</td>
<td>Turkey Count</td>
<td>249</td>
</tr>
<tr>
<td>15.4</td>
<td>Distribution of Mammalian Species</td>
<td>255</td>
</tr>
<tr>
<td>15.5</td>
<td>Edible Meat Produced from Mammalian Species</td>
<td>257</td>
</tr>
<tr>
<td>15.6</td>
<td>Meat from Artiodactyls</td>
<td>264</td>
</tr>
<tr>
<td>15.7</td>
<td>Mule Deer and White-Tailed Deer Bone</td>
<td>264</td>
</tr>
<tr>
<td>15.8</td>
<td>Bird and Feather Usage at Gila Cliff Dwellings Compared with Historic Periods</td>
<td>269</td>
</tr>
</tbody>
</table>
**TABLES (continued)**

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 16.1</td>
<td>Plant Taxa Recovered from Gila Cliff Dwellings Deposits.</td>
<td>280</td>
</tr>
<tr>
<td>Table 16.2</td>
<td>Plant Part, Quantity, and Provenience Information on Taxa Recovered from the Gila Cliff Dwellings.</td>
<td>288</td>
</tr>
<tr>
<td>Table 16.3</td>
<td>Maize Cobs from Gila Cliff Dwellings (All Cobs Uncarbonized)</td>
<td>301</td>
</tr>
<tr>
<td>Table 16.4</td>
<td>Sample of Bean Varieties from the Interior of Room 27, Cave 5, Gila Cliff Dwellings.</td>
<td>307</td>
</tr>
<tr>
<td>Table 16.5</td>
<td>Wood Samples from 1963 Excavations Identified by Dr. B. Francis Kukachka.</td>
<td>318</td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENTS

Those who assisted the authors during their work are acknowledged in individual chapters. We are also grateful to a number of people who gave support during the project. Sharon Prell, U.S. Forest Service Historian at Gila Cliff Dwellings, has continuously helped us. At the National Park Service Southwest Regional Office, Ron Ice has been most helpful, and obtained funds to complete the project; Larry Nordby assisted in taking room notes and offered insights into construction details; Vonna Lou Mason typed the manuscript, and Karen Seger edited it. Brigid Sullivan did artifact drawings and the site distribution map. Ice and Steve Lekson read the manuscript and offered useful editorial comment. Our primary debt is, of course, to those whose excavations are reported here, especially Gordon Vivian and Charlie Steen.
INTRODUCTION

by

Keith M. Anderson

Although Gila Cliff Dwellings has been known for over 100 years, and has been protected as a national monument since 1907, its archeology was never systematically reported. Several years ago, four of the authors of this report (Anderson, Fenner, Morris, and Teague) decided to correct this situation, working, as time permitted, with the records and artifacts stored at the monument and in the Western Archeological and Conservation Center. In the final year of report writing, the Southwestern Regional Office of the National Park Service provided some funding for special studies, travel, and report cost. This report is the result of those efforts.

Our purpose is to provide basic information and interpretation of the site and its contents, without elaborate theoretical presumptions. The latter limitation results partly from the uneven quality of the data and their documentation. As chronicled in chapter 4, most investigations of the site have been incidental to stabilization of standing walls. The main excavation effort was done by Gordon Vivian in 1963; limited excavations and tests were done by Charlie Steen in 1942, Roland Richert in 1955, and Don Morris in 1968. Unfortunately, the largest collection (Vivian's) suffered some significant loss of provenience data during cataloguing. As a result, we could not plot distributions of all classes of artifacts within the site, thus limiting our inferences. We cannot specifically locate the two occupations (Archaic, Tularosa phase) within the cave, nor can we separate out these assemblages except for types of known age. Neither is it possible to plot horizontal locations to determine activity loci. Hence the artifacts are treated as a single collection, with the exceptions of a few classes of artifacts for which provenience records still exist.

Aside from these obstacles to a thorough analysis, we felt there was significant benefit to be gained from studying the results of past work at Gila Cliff Dwellings. Our primary goal, since this site is open to the public, was to provide information and inferences useful for
interpretation to those touring the monument. For this purpose alone, description and illustration of the settlement and its artifacts are of value. The same information should be of importance for our second goal, which is to provide data for future archeological research. The well-dated 13th century structures represent the end of the Tularosa phase, which terminates the local Mogollon occupation. The site offers some insights into this time period, and we have pursued as many lines of inquiry as time and money would permit.

Some plant materials have not been identified. We lacked time and resources for this, but this report shows the range of materials in the collections available for future research. All the material described is stored at the monument or at the Western Archeological and Conservation Center.

Because this is primarily a descriptive report, with uneven provenience data, each author has pursued his or her analysis toward the goals or questions that seemed profitable for that class of material. The common goals were basic: to describe and classify the material, to determine (if possible) which occupation they represent, and to offer any inferences that give new insight into Upper Gila prehistory.
Chapter 1
SUMMARY

by
Keith M. Anderson

This project has been a salvage effort to gather the data from past fieldwork at Gila Cliff Dwellings (Figs. 1.1 and 1.2) and offer our inferences from them. If nothing else, the report informs Mogollon researchers of the information available, the extent of past work, and the potential and limitations for further research.

Among the introductory chapters is Morris' 1968 preliminary survey report, previously unpublished, which gives some settlement perspective for the Gila Cliff Dwellings immediate surroundings. His survey shows three things: (1) that change in location of dwelling sites paralleled the general Mogollon trend; pithouses are on ridge crests and hill summits, while later surface masonry buildings tend to occupy lower elevations; (2) prior to occupation of Gila Cliff Dwellings, the study area was probably the northern periphery of Mimbres territory; (3) there were few, if any, sites contemporary with Gila Cliff Dwellings in the immediate vicinity of the West and Middle Forks of the Gila River.

The limits of inference for any archeological data are determined by field techniques and records. We have been keenly reminded of this while working with these collections. Although the Gila Cliff Dwellings have been extensively excavated, field records and cataloging have not all been thorough and reliable. Many artifact proveniences have over the years been obscured or confused. While some specific proveniences are preserved, many are not. Hence, we do not know the location of deposits that precede the cliff dwellings.

Deposits in caves 1 through 5 have been excavated by archeologists between the years 1942 and 1968. There is no record of excavation in cave 6, although it, like the others, probably endured the recreational collection of antiquities common during the 19th and early 20th centuries. National Park Service excavations, conducted as adjuncts to stabilization, followed more or less the techniques employed by contemporary Southwesternists. With few exceptions, trenches or blocks
Figure 1.1 Caves 2-5, Gila Cliff Dwellings, from across Cliff Dweller Canyon. Taken in 1955, before stabilization.
of fill were removed as a unit, with only passing references to stratigraphy. Generally there were few vertical controls for provenience. Gordon Vivian was unique in using a screen; however, judging from objects examined for this report, there was a consistent bias toward keeping only the larger objects for study.

There may still be undisturbed deposits; most likely these are in caves 2 and 6, with possible small pockets near or in rooms in caves 3-5. If future excavations are considered, thorough data recovery should be employed to fill the gaps left by past efforts.

All evidence points to two occupations of the cave. The first was some time prior to A.D. 500; its clearest evidence consists of Archaic-style projectile points, a spear-thrower fragment, spear foreshafts and wooden bunts, and simple pictographs painted on the walls and roof of cave 5. Some perishable objects probably also remain from this occupation: wickerwork and multiple-warp sandals, twig pahos, a netted-ring paho, gourd containers, and a wooden die. There is provenience for all these objects, except the stone points; their distribution was from caves 2 through 6. Since there were few artifacts of any kind in cave 1, we can assume that all caves were used during the Archaic period. Other objects that were common throughout all periods of Mogollon prehistory may have been used by early occupants of the cave, but we cannot tell which ones. Considering the variety of probable early objects, the heavy smoke-blackening that apparently precedes the cliff-dwellings, and the outside hearth near room 27, we infer regular use of the cave by a small group during the preceramic era.

Although provenience records for the collections are not good, and although it is evident that the cave had earlier Archaic or preceramic occupation, it is the judgement of all the authors that artifacts are predominantly from the Tularosa phase occupation of the masonry-walled cliff dwellings. Our guess, if called to quantify, would be that 90 to 95 percent of the assemblage is of this age. So, while we must hedge to some degree, there is a basis for interpreting life in this 13th century cavate settlement. However, our statements must be conditional and qualitative; statistical inferences would be generally unjustified. The Gila Cliff Dwellings apparently are the remains of a rather sudden
immigration of a group of perhaps 8 to 10 families in the 1270s and 1280s. The cultural assemblage, with a few exceptions, fits comfortably with the Tularosa phase of the Mogollon tradition, whose heartland lies to the north. In Morris' 1968 survey of a 2-mile area around the junction of the West and Middle Forks of the Gila River, he found very little evidence of occupation from the Tularosa phase or the preceding Reserve phase.

The ceramic assemblage from the Gila Cliff Dwellings is nearly identical to Tularosa phase collections reported from the Reserve area, and accords with the late tree-ring dates. There is a relatively small percentage of holdovers from the previous Reserve phase. Exotic sherds are few and indicate, as do other classes of artifacts, only limited contact with other areas. Contacts with the east and south are reflected in sherds from a single vessel of Chupadero Black-on-white and a few Cloverdale Incised sherds, probably representing no more than one or two vessels.

Stone artifacts are, similarly, of a standard late Mogollon assemblage mixed with some probable Archaic period objects and some items common to early and late occupations. Local stone was used, and tools were apparently made and refurbished onsite. The unusually high proportion of projectile points is probably a reflection of use of the caves in preceramic times when spear and dart points were a more important element of the toolkit.

Objects of shell, feathers, plant fiber, bone and wood are also of types found in Tularosa phase assemblages elsewhere, although there is more variety of forms and species in shell objects than in contemporary Mogollon sites. It is noted that Casas Grandes had all the same shell forms and species; this, and the presence of Scarlet Macaw feathers and bone, suggests contact with northern Mexico. Some travel or contact eastward is indicated by the bison rib scraper; how close the plains buffalo came to this area, prehistorically, is unknown, but probably at least as close as the plains of San Agustin.

Gila Cliff Dwellings housed 40 to 60 people during the short period A.D. 1270-A.D. 1290 (about a generation). Although the site is unique in layout, all indications are that it did not differ in activities or composition from other Tularosa phase villages. The cliff dwellings are
not arranged in neatly identifiable family units, but kinds and sizes of rooms are the same as contemporary Tularosa phase sites. The proportion of storerooms to living rooms is also the same; apparently the Tularosans commonly employed twice as much space for dwelling rooms as for storage. One distinction is the unroofed work enclosures at Gila Cliff Dwellings; probably these are the equivalent of work space enclosed by compound walls in open pueblos. There are limits to our inferences concerning the sequence of construction, but there are hints that the site grew generally eastward, with granaries and living rooms constructed first, followed by more specialized enclosures and communal rooms. Interestingly, this pattern appears to be duplicated in other Tularosa phase surface pueblos, suggesting that sacred chambers had to wait for establishment of profane shelter.

Because of lack of consistent provenience records, we cannot use artifact location or clustering to infer distinct activity locations within the site or support the use-classification of different rooms. However, on the basis of architectural features, our estimate is that 8-10 rooms were dwellings for nuclear families, 14-16 were for storage, 2 were communal or ceremonial and the rest were for general traffic and use. The few indications from artifacts, by tentative plots of "utilitarian" versus "socioreligious" objects, are that there was no significant demonstrable difference between room types. We looked for indications of distinct assemblages in communal rooms 27 and 17, and found no real difference in esoteric objects between them and living rooms 10 and 10A; roofless enclosure 21 in fact had an unusual number of perishable nonutilitarian materials.

The plants and animals that were harvested and used by the cave occupants are essentially the species present today. The only difference appears to be some aquatic species not now in the immediate area.

The large plant collection probably comes from the Tularosa phase occupation of the cave, when both domestic and wild plants were harvested. Undoubtedly some of these remains were also preserved from the Archaic or preceramic camps in the cave, but since the earlier occupants likely used the same wild plants, the two occupations cannot be separated. One can only say that the local flora was extensively
used for food and manufacture. The plants and their uses were the same as in other Mogollon villages. The cliff dwellings' inhabitants, like contemporary prehistoric Southwestern groups, relied on domesticated plant foods, probably supplemented by wild edible plant seeds and fruits. Corn, the most common domestic plant, is of a late type, confirming again that there was little or no early Mogollon use of the caves.

The provenience of animal and bird remains has been preserved, but the provenience of artifacts (mainly projectile points) that would indicate early occupation has not. Hence, we have no way of knowing what faunal remains come from preceramic use of the caves and what belong with the 13th century village. We can only assume that most of the animal remains are from the Tularosa phase cliff dwellings and draw conclusions about diet and environment accordingly.

Mule deer, creatures of the foothills and valleys, were the predominant meat source. Unlike that of modern deer hunters, the cliff dwellers' prime prey were fat pregnant does, hunted in the spring. They ranged farther afield in the fall and winter to hunt bison and turkey. No meat animals were ignored, and a variety of mammals and birds appear in the faunal assemblage, representing the various habitats of mountains, valleys, open desert, streams and ponds. Ponds may have been created by beaver dams and may account for the remains of marmots, muskrats and some waterfowl.

Domestic animals are rare or absent; dog bones were not positively identified and there are remains of only two domestic turkeys. There is no evidence that turkeys were raised onsite.

It is customary to conclude a report summary with some exhortation, more or less thinly disguised, that "more work needs to be done." While there is a fair amount of analysis we have not accomplished, we resist the urge to fall back on this time-worn ploy. There are, we hope, questions that the Gila Cliff Dwelling collections may answer. But, considering the limitations of proveniences and dating, we are content to let others invent them. Our best recommendation at this time is to ensure that the few deposits presumed still intact are not disturbed until there are seminal research questions that demand excavation within
the Gila Cliff Dwellings. Until then, we recommend that the interpretive story of Gila Cliff Dwellings be augmented by increasing knowledge outside this intriguing site.
The Gila Cliff Dwellings are located on the headwaters of the Gila River. The cliff dwellings, in Catron County, New Mexico, are about 2 miles upstream from the confluence of the West and Middle Forks of the Gila, 32 airline miles north of Silver City, New Mexico. The drainage of Cliff Dweller Canyon occupies most of the 480 acres of this section of Gila Cliff Dwellings National Monument. Immediately east, a broad ridge flanks this steep-walled canyon. To the west more dissected country appears; only occasional flats or canyon floors or ridges are found (Fig. 2.1). The cliff dwellings are in a series of caves in the Gila Conglomerate (see Figs. 1.1 and 1.2), at an elevation of 6,000 feet, in Cliff Dweller Canyon, a small tributary canyon from which a spring-fed stream flows to the West Fork of the Gila, 400 m from the site.

The West Fork of the Gila meanders over gravel bottoms in a valley 115 m to 400 m wide (Fig. 2.2). There are small pockets of apparently stable soil, though rocky and sandy, that were in all likelihood productive locations for farming near the river, downstream from Cliff Dweller Canyon. Equally promising are benches and terraces 12 m to 35 m above the river channel. There is a permanent spring 100 m below the dwellings. The annual precipitation is 17 to 19 inches, and the growing season is about 150 days, with last spring freeze in mid-May and first autumn freeze in mid-October. The year-round flowing streams support a riparian plant community. Vegetation represents an overlap of the Upper Sonoran and Transition zones. Warm south-facing slopes support pinyon and juniper scrub. Ponderosa pine and an occasional Douglas-fir thrive along cooler, wetter streambeds and on northerly slopes. Canyon and river bottoms support walnut, cottonwood, and willow. Grasses, primarily the gramas, were more abundant before the advent of heavy grazing.
Figure 2.1 Distribution of sites in Gila Cliff Dwellings National Monument and vicinity, recorded by Morris' survey in 1968.
Figure 2.2 West Fork of the Gila River, at its junction with the Middle Fork. Taken from the TJ Ruin.
Cliff Dweller Canyon contains a diversity of plant communities within a few minutes walk of the site. Riparian cottonwood and willows line the stream in Cliff Dweller Canyon and the West Fork. The southerly slope below the dwellings supports pinyon and juniper, while the cool north wall provides an environment for Douglas fir and ponderosa pine. Above the cliffs containing the dwellings, flat and gently rolling mesas stretch between the major drainages and westward toward the Mogollon Mountains. The valley bottoms contain considerable flat land, suitable for farming.

Animals present include antelope, mule deer, black bear, beaver, squirrel, mountain lion, coyote, fox, skunk, rabbit, and a host of smaller species. Turkeys, golden eagles, various hawks, and many smaller songbirds are conspicuous. The flat-lying Gila Conglomerate is the most common geological formation in the area. It is overlaid and underlaid by basalt lava flows, with which it intertongues in many localities. Volcanic tool materials, including obsidian, are common in the vicinity.

Water is abundant in the valley of the three forks. One hot spring bubbles forth near the Middle Fork, and there are additional hot springs within the survey area near the Middle Fork and nearby.
In 1968, at the request of the superintendent of Gila Cliff Dwellings National Monument, and with the approval of the Chief, Southwest Archeological Center, the author undertook a comprehensive archeological survey of Gila Cliff Dwellings National Monument and of a circular area, 1 mile in radius from the Gila Visitor Center, located at the junction of the West Fork and Middle Fork of the Gila River. We intended to identify the archeological sites in the area, and to evaluate their interpretive potential and to provide improved protection for them. We expected the survey to provide data for an archeological base map of Gila Cliff Dwellings and to supply helpful information for the Archeological Research Management Plan for the area. This chapter is the preliminary report of that survey, included here to give a general context for Gila Cliff Dwellings.

Acknowledgements

Many individuals aided the survey: William Lukens, William Gibson, Joseph Janes, Ralph Morris, Ronald Everhart, David Field, and Susie Morris all assisted in fieldwork, usually on their own time. Jack Bowen, Betty Bowen, Dawson A. "Doc" Campbell, Roland Richert, Charles Hill, William Hoge, and Garlyn Hoge provided leads and site locations and aided the work in many ways. Without the assistance of these people, many of the sites located in the survey would not have been recorded.
Methods

Most of the survey was done during October 1968 when extremely favorable weather prevailed. We walked over most of the survey area. Broad ridges and gentle slopes were traversed at 15 m to 25 m intervals. We first observed cliffs from a distance to pick out likely site locations which were then visited on foot. Roped climbing was necessary on only one occasion during an investigation of cave 7, just downstream from the Gila Cliff Dwellings.

A surface collection of sherds, artifacts, and chipping waste were made upon discovery of a site. The site's area, vegetation, architecture, soil, details of immovable artifacts, and the amount of vandalism were noted. The site was mapped by pacing and compass if mappable detail existed. Many, but not all, sites were photographed. The sites were numbered using a block of "LA" numbers from the Museum of New Mexico available to personnel at the Gila Visitor Center. After this block of numbers was used, we began a provisional series of numbers, prefixed with the letter "M." LA sites were tagged with a stamped aluminum tag. "M" sites were untagged.

The sites were plotted on stereo paired aerial photographs or upon sheets of preliminary USGS quadrangles, scale 1:24000. Locations were later transferred to fresh copies of those quadrangles. The large-scale and accurate topography of these maps served our needs very well. One hundred and six sites are now recorded in the area (Fig. 2.1). Although this number represents a high percentage of those actually present, it is inevitable that some have been missed. It is hoped that additional sites will be recorded as they are located by Park Service and Forest Service personnel at Gila Visitor Center.

Survey Results

We now know of 106 archeological sites in the area under discussion. The present survey recorded 98; Joseph Janes assigned LA numbers to five of these previously. The TJ site and Gila Cliff Dwellings are well known. Richert (1955, 1956) and Vivian (1956) have summarized information for both of these ruins. The Museum of New
Mexico surveyed and excavated LA 8675 during highway salvage operations in 1966 (Ice 1966). In addition, we located five sites, LA 10029, LA 10030, LA 10040, M 20 and M 22, which are well outside the survey area.

The sites will be discussed and summarized under the categories of chipping areas, pithouse villages, cliff shelters, masonry units, pictograph sites, checkdams, rock walls, ceremonial units, and historic dwellings.

**Chipping Areas - Eight Sites**

These sites all show abundant chipping waste and little or no ceramic material over areas that range from 30 m$^2$ (LA 10022) to 4,500 m$^2$ (LA 10051). The sites are commonly situated on a high ridge with a good view; none seem to be located in areas of particularly abundant raw material. There was considerable variation in the waste material found. LA 10051 and LA 10098 yielded abundant obsidian. Little occurred at LA 10022, LA 10023, LA 10074, and LA 10082.

The chipping waste and artifacts from LA 10082, a site on a high ridge, are strikingly similar to Cochise material, although two sherds of Alma Plain were recovered on the site. Manos from this site are basalt river cobbles unmodified except by use. Other sites yielded no manos; they probably represent workshop areas related to later phases: LA 10022, LA 10023, LA 10051, LA 10052, LA 10074, LA 10082, LA 10098, M-37.

**Pithouse Villages - 31 Sites**

Sites in this series produced sherds, chipping waste, and usually mano or metate fragments. Possible pithouse depressions were usually visible; 22 were counted at LA 10029. This site and LA 10076 contained low rubble walls which appear to be barricades. These sites typically occupy ridge crests or the summits of high hills. Some, like LA 10078, sit on lower benches near water.

A cursory analysis of the sherds shows that 22 sites produced only plainwares. Nine sites showed some Mimbres Boldface Black-on-white. We picked up no red-on-brown sherds, with the possible exception of a
weathered sherd from LA 10089. Excavations would reveal some of this pottery, expand the time range of the sites, and allow a more exact phase assignment. The sites are placed, on the basis of the present analysis, in the Georgetown and Three Circle phases.


Three Circle Phase Sites: LA 10006, LA 10026, LA 10029, LA 10044, LA 10071, LA 10073, LA 10086, M 28, M 32.

Cliff Shelters - 25 Sites

These sites include both storage and habitation units. Significant habitation use is indicated by the area of the site and smoke-blackening of the shelter area. These sites produced insignificant artifact collection and many of them had been badly vandalized and pothunted. Therefore, phase designations are not made.

LA 10067 and LA 10068 are work areas, with only bedrock mortars and grinding grooves present. LA 10048 is a vandalized Apache burial. LA 10056, LA 10057, and LA 10059 produced Apache pottery.

Habitation Unit Sites: LA 10009, LA 10012, LA 10046, LA 10057, LA 10059, LA 10062, LA 10063, LA 10064, LA 10066, LA 10069, LA 10072, LA 10077, LA 10084, LA 10085.

Storage Unit Sites: LA 10010, LAS 10047, LA 10056, LA 10061, LA 10065, LA 10070, M 29, M 30.

Work Unit Sites: LA 10067, LA 10068.

Burial: LA 10048.
Masonry Units - 32 Sites

These range in size from single room units like LA 10081 to a large multiroom site, the TJ ruin (Richert 1955; Vivian 1956). The general lack of wall rubble indicates that many of the rooms are subterranean. Many of the smaller sites, which seem to be most frequent near deep soil on the broader ridges, may be farmhouses.

In contrast to the pithouse villages, most of these sites are located slightly off the summits and crests, with higher elevations uniformly to the west. At least five of the sites, LA 10030, LA 10032, LA 10045, LA 10087, and LA 10088, seem to contain pithouses as well as the masonry structures. This was the case at LA 8675 where a Mangus phase pueblo overlay Georgetown phase pithouses (Ice 1966). Decorated wares, nearly always present, are Mangus Black-on-white or Mimbres Classic. Analysis of the sherds will probably place more of these sites in the Mangus phase than in the Mimbres phase.

The TJ Ruin is probably as significant in the prehistory of the three-fork valley as are the Gila Cliff Dwellings. It likely was the largest site in the valley during the periods preceding the Tularosa phase, and was in a central location on a low bluff overlooking the three-river confluence. As described by Gordon Vivian, the site is greater than 150 m across, with one masonry block about 30 m by 35 m which probably had more than one story. Elsewhere on the bluff are other masonry remains, midden, and sherd scatters indicating substantial occupation.

Roland Richert made a grab-sample of sherds in 1955, which were examined by Emil Haury. Haury's identification of 124 decorated sherds was as follows:

<table>
<thead>
<tr>
<th>DECORATED SHERDS FROM TJ RUIN</th>
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<tbody>
<tr>
<td>Bold Face/Classic Mimbres</td>
</tr>
<tr>
<td>Classic Mimbres</td>
</tr>
<tr>
<td>Bold Face</td>
</tr>
<tr>
<td>Three Circle</td>
</tr>
<tr>
<td>Gila Polychrome</td>
</tr>
<tr>
<td>Bold Face/Three Circle</td>
</tr>
</tbody>
</table>

17
The remaining 13 decorated sherds were divided among St. Johns, affinis Heshotuthla, and Tonto polychromes and North Plains, Reserve, Gallup and Kiatuthlanna Black-on-white (Richert 1955). These indicate a dominant Mimbres occupation, a hiatus during the Tularosa phase, and a limited occupation during the Salado period.

We collected no Tularosa Fillet Rim and no appreciable quantities of Reserve or Tularosa Black-on-white from any of these sites, showing a startling contrast with the Gila Cliff Dwellings. We have seen Tularosa Fillet Rim sherds from an unlocated rockshelter some miles upstream along the West Fork. This apparently is only the third site in the area at which this pottery type is found.


Checkdams - Three Sites

Three series of checkdams were located, indicating an alternative practice to river bottom farming. All were located in small gullies draining flat ridges with appreciable soil. No artifacts were recovered at any of the sites.

Sites: LA 10020, LA 10034, LA 10053.

Pictograph Areas - Five Sites

Red is the most common color used in the pictographs, although some black is occasionally seen. Geometric and life forms are both common. No petroglyphs were noted in the area. LA 10038, done with black pigment, is probably Apache.

Sites: LA 10011, LA 10038, LA 10050, LA 10093, M 36.
Rock Wall - Two Sites

Two isolated wall fragments, each about 2 m long, were noted. Both were found on high ridges and neither seemed to be a room or a portion of a larger site. M 25 could be a windbreak.

Sites: LA 10031, M 25.

Ceremonial Unit - One Site

One ceremonial cave, LA 10040, was located in Little Bear Canyon near its junction with the Middle Fork. Decorated arrow and paho fragments were the most notable finds. One sherd of black-on-white pottery (Tularosa?) was picked up.

Historic Dwellings - Three Sites

Crudging's Cabin (LA 10025), Hufman's Cabin (LA 10024), and an unknown cabin foundation (M 33) were located during the survey. All date from the late 19th century. Crudging's cabin, although lacking a roof, is well preserved. William Crudging, according to his tombstone "waylaid and murdered by Tom Wood, October 8, 1893. Age 37 years 8 months," is buried a short distance behind the cabin. Hufman, also killed a short time later, lies in the unmarked grave beside him.

Conclusions and Summary

Over 100 archeological sites were located within Gila Cliff Dwellings National Monument and a 3 square mile area of the adjoining Gila National Forest. They range in date from a Cochise campsite (1000 B.C.? ) through early pithouse villages (A.D. 100 to A.D. 1000) to small unit pueblos of the Mangus and Mimbres phases (A.D. 1000 to A.D. 1150). Apache sites and historic cabins were also noted. No sites containing ceramics similar to those of the Gila Cliff Dwellings were recorded. No sites containing late wares noted at the TJ ruin were located.
Checkdams, pictographs, a ceremonial cave, and workshops were found in addition to habitation and storage units. A shift in location of sites is indicated. Pithouse villages are more common north of the West Fork and are situated on ridge crests. Mangus and Mimbres units are generally south of the West Fork and are located to the east of the crests, usually on ridges with appreciable soil. Since Hammack (1966) suggests that the small Mangus unit, LA 6537, that he excavated was a seasonal residence for farming, this shift may be related to changing agricultural practices. Note that two of the three series of checkdams located are south of the West Fork.

The data from this survey should assist the Park Service and Forest Service staffs at the Gila Visitor Center to manage more effectively the archeological resources that are their responsibility. Although the area surveyed is rather small, the data recovered indicate a long occupation of the region and allow the formation of several hypotheses which can be tested by future work. In that sense, this survey should be useful for the aims of pure research as well as management.
Chapter 4
HISTORY OF RESEARCH

by
Don P. Morris and Keith M. Anderson

U.S. Army Visit

Although fur trappers worked the upper Gila area during the 1830s, there is no mention of the Gila Cliff Dwellings in any surviving accounts. U.S. Army troops, stationed near Fort Bayard, however, did visit the site during this period (McFarland 1967:4-18).

Adolph Bandelier's Visit, 1884

Adolph Bandelier visited Gila Cliff Dwellings in January, 1884 (Lange and Riley 1970). The first archeologist to record visiting the site, he noted "Very little pottery, visitors having picked it up. ... The place, as it is, is now rifled" (Lange and Riley 1970:196). Although Bandelier's final report (1892:360; Hough 1907:31) states that roofs "of the pueblo pattern" were intact at the time of his visit, his journal states, "The roofs, I am told, were like the pueblo, but the Apache tore them down." He noted the presence of a possible irrigation ditch at the mouth of Cliff Dweller Canyon (Lange and Riley 1970:196). The remains of irrigation ditches were also noted near the Gila Hot Springs in early historical accounts (McFarland 1967:21).

In 1907, when Gila Cliff Dwellings National Monument was established, Bandelier had published the only site description. Much of the impetus for the establishment of the monument came from a local rancher, Hugh Hodge, who was a cousin of Theodore Roosevelt (McFarland 1967:11).
In an undated excerpt from the memoirs of H. B. Ailman (found in the archives of the Western Archeological and Conservation Center), the 1877 exploration, collecting of artifacts and discovery of an infant burial was described as follows.

Destination headwaters of the Gila River, 30 miles north (from Georgetown) and equally as far from any other settlement. Here the river is formed by three respectful sized creeks. Following the west or large one up 2 or 3 miles we came upon a fine specimen of an old Cliff Dwellers village situated as was their custom in some crevis [sic] where there is a good protection afforded by a wide projecting overhead ledge of rock. In this case from floor to roof was about 8 or 9 feet. Their walls were of small flat stone laid in common mud, no door or window frames and walls lack 20 inches of connecting with the roof, this to give the smoke a chance to escape. They had their fireplaces in the center of the apartment. Searching for relics, the only thing we could find was corncobs, very small, 4 or 5 inches long and only in thickness about like your largest finger. A fair sample of these I took with me. This dwelling was easy 200 feet up a steep hill from the creek. The conclusion was protection, why they selected such sites.

The next season came around and another party from our town made a trip to these same ruins. Prowling around from one apartment to another, passing through a so-called door, discovered a loose stone. Pulling it out disclosed a cavity. Further investigation disclosed a package. Curiosity excited, further investigation disclosed the last resting place of a young infant, apparently only a few days old, thoroughly dried up, weighing only a few ounces, face quite distinguishable and a little tuft of hair still on the back of its head. Later it fell into the hands of a friend of mine who photographed it, making several pictures, one of which is within my reach as I write. The remains were sent to the Smithsonian Institute where they are now supposed to be on exhibition.
The Smithsonian Institution received what is presumed to be the same infant burial from Gila Cliff Dwellings on September 11, 1912. Its appearance was reported by Hough. The child was dressed in a sleeveless rabbit fur jacket and "a waist garment in the form of a band made of pretty downy feather" (1914:33). The whereabouts of the infant between its discovery in 1877 and its arrival in 1914 in the Smithsonian Institution may be partly explained by its value as a curio. There is an 1884 report of the burial being displayed in a store window in Silver City.

Excavations by Charlie Steen, 1942

In 1942 Charlie R. Steen, the first Park Service archeologist to work at Gila Cliff Dwellings, stabilized walls in cave 2 and in cave 3. To collect a sample of sherds, he trenched room 10 along the south wall and dug north-south in the middle of room 17. Steen (1942:2) stated: "... with the exception of one Mesa Verde Black-on-white sherd, all those found were of Tularosa wares. Tularosa Black-on-white, Reserve Plain (most rims with fillet) and corrugated wares were the types found." He inferred "The entire ruins has been churned by pothunters." After further analysis, Steen concluded (1942:5) that the ruin was built about A.D. 1000, abandoned, and then reoccupied about 1300, the last occupation being quite short. Except for the maps showing the location of his trenches (Fig. 4.1) no field notes survive from this project. His room numbers are related to the current room numbers in Table 4.1.

Reconnaissance and Stabilization by Roland Richert, 1955

Roland Richert of the Southwest Archeological Center supervised comprehensive stabilization of the site in 1955. Although no excavations were undertaken, Richert conducted an informal survey of the immediate vicinity of the dwellings, including a surface collection from the TJ (Heart Bar) site (WACC files). Richert also collected surface sherds from six other sites. At this time, Custodian "Doc" Campbell apparently proposed expanding the monument to include this site, as a
Figure 4.1 Steen's 1942 map. Trenches in Room 1 (now Room 10) and Room 7 (now Room 17) are shaded.
Table 4.1

CONCORDANCE OF CURRENT ROOM NUMBERS WITH THOSE ASSIGNED BY STEEN (1942)

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<td>shown as three</td>
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<td>rooms--15, 16, 17)</td>
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<td>32</td>
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<td>23</td>
<td>33</td>
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</table>
counter to a Park Service prospectus that contemplated abandoning the site in the face of increasing visitation.

Gordon Vivian (1956) visited some of these sites the following year, concluding that the area contained a "... unique and valuable sequence of Mimbres prehistory," covering a time span greater than that known for any other NPS area. Vivian also remarked, "The Cliff Dwellings themselves exhibit prehistoric rebuilding, which hints of a reoccupation." This remark, not further explained, may refer to some of the wall abutments in cave 2.

Stabilization and Excavation by Doc Campbell, 1962

In 1962, custodian Dawson ("Doc") Campbell built a wall between the west wall of room 31 and the overhanging cliff face to hold a large rock slab in place. The slab had cracked and posed a threat to visitors and the wall. Prior to stabilization, Campbell dug a trench to bedrock to provide a solid foundation. The trench was 4 feet long, 18 inches wide, and 4 to 16 inches deep. Campbell stated that "... this fill, except for a very small portion, had been disturbed by pothunters in the past." (Campbell 1963). Nevertheless, by careful screening, he did recover sherds, stone tools, cordage, bone and plant remains. Some of this material is stored at the Western Archeological and Conservation Center and descriptions are included in this report.

Excavation by Gordon Vivian and Dee Dodgen, 1963

Gordon Vivian and Dee Dodgen excavated at Gila Cliff dwellings from October 15 to November 17, 1963, employing a crew of five to six Apache laborers from San Carlos, Arizona (Figs. 4.2-4.5). Photographs of the project show that shovels and trowels were used for the excavation, and all material passed through a gas engine-powered sifting screen "operated 8 hours a day for approximately a month," implying that screening was standard procedure. The screen was hardware cloth, probably quarter-inch. Some material from rooms was screened through finer screens. The crew backfilled the rooms after excavation (Vivian 1963).
Figure 4.2 1963 excavation in Cave 3. North end of Trench 2 or 3.

Figure 4.3 Cave 3 after 1963 excavation. Lower (south) portions of trenches 2, 3, and 4. Trenches marked by chalkline.
Figure 4.4 1963 excavation in Room 17 using motor-driven screen.

Figure 4.5 Map showing Gordon Vivian's 1963 excavation in Cave 3.
Vivian and Dodgen excavated 33 rooms in caves 2, 3, 4, and 5, and
cave 6 was "adequately sampled and screened." Some material outside
room 9 was excavated. It is not known whether this was material
redeposited from the interior of room 9 or from inside cave 3.

The excavations in cave 3 were done in seven 12-foot (3.66 m) wide
north-south trenches (see Fig. 4.5), apparently beginning in room 9,
extending north in trench 2, and then moving east and west to adjacent
strips. The only features recorded were a patch of "heavy clay" floor
at the highest elevation of trench 2 and a partial human burial and
turquoise and shell in trench 4 at the west end of the cave. The floor
remnant was of clay and coarse sand, 0.4 foot to 0.8 foot (12 cm to
24 cm) thick, 4 feet (1.2 m) wide and 7 feet (2.1 m) long. Refuse below
the floor was 30 cm to 50 cm deep and "contained quite a few twigs."

The trench deposits are recorded as dust, sand and vegetable debris
of irregular depth, intermixed with rocks (see Fig. 4.3), and showing no
stratigraphy or clear depositional features. Most fill was shallow
(0-30 cm), with occasional deeper pockets, up to 82 cm, usually in
cracks or depressions in the bedrock. Deepest levels were:

Trench 1: 46 cm-76 cm between slabs in north
   section
Trench 2: 70-76 cm in north half (presumably near
   the crumbled edges of the floor remnant)
Trench 3: 76 cm in north end
Trench 4: 82 cm at west end
Trench 5: 49 cm
Trench 6: 49 cm in a space in the bedrock 2.43 m
   long and .76 wide
Trench 7: 49 cm north of room 16

The south-sloping deposit excavated from room 9 consisted of a top layer
of "refuse" (presumably cultural debris) 10 cm to 20 cm thick atop
"sandy deposit" 46 cm to 76 cm deep that "ran down from above." South
of the room was a similar sloping fill that was interpreted as
"secondary deposit."
Vivian did not make maps of his other excavations. His notes show that he felt he had recovered virtually all archeological material from the site, except for material "under a good section of floor remaining in cave 2..." (Vivian 1963). He also stated, prior to excavation, that "the only subfloor refuse of any quantity in the site is probably that under the floors of 10 and 10A."

He noted that corncobs not selected for analysis were placed in room 26 for storage and exhibit. The crew rerouted the visitor access trail, which had run through room 10, through room 9. Vivian also installed a steel plate and threaded turnbuckle in room 27 in order to hold its cracking and leaning northeast corner.

The extant notes from the 1963 excavation mention 13 rooms in caves 3, 4, and 5. In addition there is a discussion of two floor levels in room 1 (cave 2) which must indicate some excavation in that area. Seven of the noted rooms are discussed in terms of architectural features only; excavation may not have occurred in any of them. In room 19, the notes comment specifically "no debris."

After their arrival, Vivian and Dodgen soon focused on the excavation of the fill in rooms 27 and 10. Work began in these two rooms on October 22 and 23, with smaller rooms being worked later in the project. In room 27, subfloor tests are specifically mentioned, although there is no discussion of the character of the fill in this room. In room 10, Vivian encountered fill, burned roof material directly above the floor, and subfloor refuse.

In a short note on the stratigraphy of room 1 (cave 2), Vivian mentions a smaller upper floor (4.5 feet by 2.3 feet) 2.5 inches above a more extensive lower floor. This floor in turn rested on 20 cm to 30 cm of refuse. An unfilled depression now visible at the west end of room 1 may be the location of these excavations. Room 17 contained 24 cm to 40 cm of fill, with "quite a bit" of charcoal at the north side of the room.

Twenty-four centimeters of ash, debris, and corncobs were noted in room 30. Photographs show the excavation in room 21, which had rock and dusty fill. Thirty centimeters of fine dust and rock in room 20 were hand-screened. A brief note mentioned 30 cm of fill in room 24. Judging from the large collection of plant remains collected from the
room (see appendix), this was one of the richest areas of the site. Rooms 17, 29, 31, 32, and 33 are discussed only in terms of their architectural features. However, a photograph indicates that excavation was done in room 31. Room 34 was filled to the top of the wall remnants (about 30 cm) with refuse and charcoal, with some ash toward the center of the floor. On the trail between rooms 22 and 25, Vivian and Dodgen found an infant burial wrapped with loose fur padding and fur-wrapped cord textile. On November 4, notes on the features in room 29 were recorded. These are the last dated notes pertaining to the project.

Excavations by Don Morris, 1968

A 10-man Navajo stabilization crew, supervised by Don P. Morris, arrived at Gila Cliff Dwellings on July 2, 1968, remaining onsite until September 13. The crew constructed an exit trail from cave 4 and a connecting trail to the mouth of Cliff Dweller Canyon. Rooms 36, 37, 38, and 39 were stabilized after the excavation of cave 1.

Before excavation of cave 1, a few portions of collapsed masonry extended above the modern ground surface. Shallow fill (about 10-15 cm) was removed from around the foundations and fallen walls of rooms 36, 38 and 39 (Fig. 4.6). Material was not screened. Room (or space) 37 had a floor of "gray sandy silt, into which were sunk two circular pits and a slab-lined hearth. The walls of rooms 36, 38 and 39 were on 1.5 cm of dark organic soil which in turn rested on the gray floor; collapsed walls had up to 12 cm of fill beneath them. Several sherds and chipped stone artifacts lay beneath the foundations of rooms 38 and 39, evidence of an earlier use of the cave.

To prevent settling of the northeast corner of room 27, Morris exposed the foundation. In so doing, he uncovered a floor and deposits predating the room, an outside slab-lined hearth, and an infant burial. Above the packed dirt floor was 14 cm of cultural fill with abundant perishable material. Morris observed that corncobs (8 and 10 rows) and corn parts were most common; other objects recorded were seeds, string, a feather fragment, bone beads, small plain sherds and cloth. The wall of room 17 rested on the hard walking surface; below this floor was 50 cm of loose trash, resting on bedrock. The firepit was 60 cm in
Figure 4.6 1968 excavation of Cave 1 in progress.
diameter and 23 cm deep; the top of its slab walls were flush with the old use surface, and extended partly under the east wall of room 27.

An infant burial lay under a section of twilled matting, (Fig. 4.7) and was wrapped in embroidered cloth (Figs. 4.8, 11.2) and two other layers of fabric. While the burial was approximately 20 cm below the original hard-packed floor surface, no pit outlines were recorded. This newborn infant, of undetermined sex, had been laid with the head to the west directly on two stone slabs. The cloth wrappings included plain weave, weft-wrapped openwork, and blue and brown embroidery. The cloth bundle was tied with a yucca strand, looped at one end, tied in a square knot. A feather lay on the bundle; within the bundle folds were another small feather and a quid.

Following the stabilization project, Morris conducted a survey of the Gila Cliff Dwellings and the area around the Gila Visitor Center. This work is reported here in chapter 3.

**Excavations by Ronald and Pamela Everhart, 1970**

In August 1970, Ronald and Pamela Everhart excavated an adult burial that was discovered by a visitor near the trail, about 50 feet west of cave 1. The Everharts opened a meter square pit in the trailside slope, digging with trowels and brushes. The soil was sifted through a 1/8-inch screen.

The estimated age at death of the individual was 20-25. The burial was a primary inhumation, flexed at the hips and knees, lying on the right side. The body was aligned east-west and faced north. No artifacts were associated with this skeleton.

The Everharts proposed that the cemetery connected with the site lies on the talus to the southwest (Everhart and Everhart 1970).

**Summary**

While there were undoubtedly visits and some vandalism in Gila Cliff Dwellings in the late 19th and early 20th centuries, significant deposits remained intact in 1942, 1963 and 1968. Caves 1, 3, 4 and 5 have now been extensively excavated. Judging by the records and
Figure 4.7 Infant burial outside Room 27, covered with twilled mat. 1968 excavation.

Figure 4.8 Infant burial wrapped in cloth. Twilled mat has been removed. 1968 excavation.
present appearances, cave 2 is the most likely location of undisturbed deposits and may contain intact cultural materials. Judging also by Morris' observations at room 27, there is also the probability of small pockets of original deposits in cave 5, including debris laid down prior to room construction. References to trash underlying walls show that the cave received significant use prior to the cliff dwellings.
This chapter describes the features visible in the caves, rooms, and masonry walls of Gila Cliff Dwellings, as related in notes left by Gordon Vivian, 1968 stabilization records, and observations made in 1982 and 1983 by Don P. Morris. Existing tree-ring dates for the complex indicate relatively rapid construction during the "Great Drought" of the 1270s and 1280s. There is little evidence for extensive prior occupation of the caves. Room features are relatively uncommon. This fact, together with a continuous gradation of room sizes from extremely large to extremely small, renders meaningful interpretation of room use and function difficult. Some of the irregular hearths noted by Vivian may be relatively recent campfires.

Setting

The six caves which comprise Gila Cliff Dwellings were formed at the same level in the Gila Conglomerate. Due to the height of the cliff near the West Fork, caves 4, 5, and 6 are much higher than caves 1, 2, and 3. These three caves are easily reached by scrambling up the talus from Cliff Dweller Canyon. Caves 3, 4, and 5 interconnect, and the entire area used for construction of masonry dwellings is readily accessible. Quite possibly ladders or handlines may have been used to provide additional access to caves 4 and 5, but no such evidence remains.

Cave 6 is accessible by means of a long, narrow passage that has developed upward from the base of the talus, breaching the formerly inaccessible floor of the cave. Similar cavities are developing in caves 4 and 5. Near room 25, a developing cavity is about 30 cm from causing collapse of a portion of the floor of cave 4. Several of these
cavities have been walled off at their entrances throughout the site, forming small storage rooms.

A seventh cave, formed at the same general level as the others, can be found about 30 m downstream from cave 6. It is accessible only to climbers equipped with ropes and technical climbing gear. In order to investigate rumors of cultural remains (e.g., "Spanish muskets"), Superintendent Bill Lukens and Don P. Morris investigated the cave in 1968, finding no evidence of human occupation. Pitons hammered into a crack system leading toward the cave indicate modern exploration of the cave.

All of these caves face south and all feature well-developed overhangs, resulting in sites that are relatively warm in the winter and relatively cool and shady in the summer. The interior of cave 3 is large and sheltered enough to lessen daily and seasonal temperature variations. In addition, the cave roof arches upward from the entrance and would trap warm air from interior fires. The intense blackening of the cave ceiling must result from this entrapment.

Although the floors of the caves are littered with large and medium boulders fallen from the roof of the caves, they are relatively flat, with minimum modification in most cases. Construction within the caves does not seem to have been a difficult task; it is hardly surprising that the caves have been the scene of extensive prehistoric occupation.

Structures

Cave 1, Rooms 36-39 (Fig. 5.1)

Cave 1 contains three small rooms, probably used for storage, flanking an open area, room 37, which contains a slab-lined hearth and two associated shallow depressions. All walls in this cave are only one or two courses high; a possible south wall enclosing "room 37" has been obliterated. In any event, cave 1 contains a complex with storage units and space devoted to domestic activities. Entry to this cave is the easiest of any of the six occupied caves.
Figure 5.1 Cave 1, Rooms 36-39.
Cave 2, Rooms 1-8 (Figs. 5.2 and 5.3)

Cave 2, slightly larger than cave 1, contains substantial masonry construction. The south wall of rooms 2, 3, and 4 renders the interior of this cave quite dark and gloomy, even during midday, and blocks the cave interior from view. Only the walls of room 7 meet the room ceiling. The walls of the other rooms at this upper level extend to their original heights in many places, but stop 1 m or more below the cave roof. Rooms 3 and 4 appear to have had constructed roofs.

Rooms 2, 6, and 7 form a series of medium size rooms which are flanked on either side by the much larger rooms 1 and 8. Accessible from room 2 are rooms 3, 4, 4a, and 5, which are noticeably smaller than the central rooms. The principal access to this complex appears to be the large "T" door in the south wall of room 2 (Fig. 5.3). Before the construction of the Ruins Stabilization Unit's (RSU) wall at the south of room 1, one could scramble up a short slope and walk into this room. A balcony across the wall exterior probably made an easy walk to this door, and probably to room 5, from the west end of the cave. There does not appear to be any formal doorway giving access from room 1 into rooms 2, 6, or 7 although one can easily step over the wall separating room 1 and room 6. A low prehistoric wall preceded the existence of the RSU wall in room 1, but its original height and extent is unknown. The RSU wall was built to inhibit unauthorized access into cave 2.

Cave 2 has seen considerable occupation. The heavily smoked walls and ceiling contrast sharply with the relatively clean masonry walls of this complex.

Cave 3; Rooms 9-16, 35 (Fig. 5.4)

Cave 3 is the largest single cave within the complex. Most of the area has been left clear, with two separate clusters of rooms blocking the entrance to this cave. Rooms 9, 10, and 10A, along with small storage units (11-15) occupy the lower, direct entrance to cave 3, while rooms 16, 17, 18, and 19 fill the opening which leads into cave 4 from cave 3. The relatively level rear area of cave 3 shows no construction
Figure 5.2 Cave 2, Rooms 1-8.

41
Figure 5.3 Front of Cave 2. Beams and beam seats show level of probable balcony.
Figure 5.4 Caves 3 and 4.
except for a single short wall along the western margin of the cave, labeled room 35.

Room 16, which was never roofed, is built against the common back wall of rooms 18 and 19 and communicates with room 17 only through a peephole. Room 9 still retains charred roof beams, probably burned during historic times. Entrance into room 9 is unclear because of the existence of a large arch break in the south wall of the unit; this break probably developed from an existing doorway in the wall. Without such a door, access to cave 3 would be relatively difficult.

Rooms 10 and 10A each contain rectangular fireplaces and benches, representing a "kiva-like" appearance, although many standard kiva features, such as ventilators, deflectors, and sipapus are absent. In any event, these two rooms are distinct from others in the complex. Both rooms retain beam fragments and empty beam sockets, evidence of the existence of roofs.

With roofs in place on rooms 9, 10, and 10A, most of cave 3 would have been a large, relatively flat, open area, roughly split into two levels. The rear half of cave 3 is relatively level, although rather dark. Vivian and Dodgen found remnants of a hard-packed clay floor in this area. The definite floor and cultural deposits in this well-protected dark area indicate that this space was employed for more than just casual use.

Cave 4, Rooms 17-25, 28, 40-41 (Figs. 5.5 and 5.6)

Rooms 17, 18, and 19 apparently block the passage between caves 3 and 4. Rooms 18 and 19, in turn, are accessed from room 17. Room 17 is entered from a doorway in the east wall (from the direction of cave 4). Rooms 18 and 19, in turn, are accessed from room 17. East of this cluster is room 21, an unroofed enclosure, apparently without any prepared floor, which is the westernmost of a series of rooms built against the cave wall.

Cave 5, Rooms 26-27, 29-34 (Figs. 5.5, 5.6, and 5.7)

The division between cave 4 and cave 5 is arbitrary; the rooms between room 21 and room 34 are set against the back wall of the cave except for rooms 25, 25A, 26, and 27 which are clustered around the
Figure 5.5 Cave 5 from Cave 4. Room 22 on the left, rooms 25/25A on the right.
Figure 5.6 Caves 4 and 5.
Cave 5 (Fig. 5.8)

Although the main room complex is cave 5, the configuration of the rockshelter determined the arrangement of rooms within. Several large boulders remain in place inside the cave, having been too large to move during construction of the rooms. Room 27 is the largest room in this section. Rooms 25 and 25A are the only two-story unit in the entire complex. Rooms 25, 27, and 28 definitely possessed built roofs; others may have been roofed, or used the natural cave ceiling.

Four rooms, formed by blocking small cavities with masonry construction, lie at a lower level than the main room complex. Room 34, at the far east end of cave 5, has a small doorway. Room 34A next to it is now only an unwalled recess (Fig. 5.7). Room 41 is a small cavity with a wall stub below room 25 in cave 4. Room 40 is immediately adjacent to room 20, also in cave 4. All of these units probably functioned for storage.

Cave 6 (Fig. 5.8)

To the east of the main room complex is cave 6. Smoke blackening, trash, and artifacts show that the cave was occupied. No masonry construction is found in this cave, however. Most of the cave is a
Figure 5.8 Cave 6.
steep, dusty talus slope. A high ledge at the rear of the cave would have provided a use area.

Construction Details

Masonry and Walls

The horizontal masonry, 30 cm to 38 cm wide, is formed of thin conglomerate slabs laid in abundant mortar (Fig. 5.9). The stone was taken from the thinly bedded floor and slopes of the cave. Much of this material is still flaking off from exposed areas, and it covers the surface of some rooms, especially room 21. The rocks employed in the walls vary in thickness from 3 cm to 30 cm with the modal range between 3 and 10 cm. Some large slabs stand on edge in some walls, and boulders up to 160 cm high are incorporated in others. Some small rooms were built against, around, or on top of large slabs fallen from the roof.

Where wide thin slabs were used, a single stone often extends the full width of the wall; where smaller pieces were used the walls are two stones wide. The stone does not evidence shaping or trimming; it was laid with the most regular surface forming the face of the wall. There
is no evidence of a deliberate pattern in the masonry although in a few instances, there are rows of thicker stone giving a banded effect. The mortar is a heavy, sandy clay, used to level inequalities in the irregular rock surfaces; mortar thickness reaches 6 cm. There are no foundations; walls are built directly on the floor of the cave or on accumulations of trash 9 to 13 cm deep.

Eighteen wall surfaces retain definite smoothed plaster surfaces. The builders used a single heavy coat to even inequalities in the masonry and provide a smooth interior surface. In walls that do not have a definite plaster surface, the abundant mortar was pressed into the deeper irregularities, resulting in wall surfaces with more mortar than stone exposed. This technique gives many walls a roughly stuccoed effect.

Roof and Ceilings

Ten walls retain wooden roofing members; four additional walls have impressions or sockets for such members. In four rooms that had been burned, the fill contained burned clay impressions of roofing.

The major roofing members were small poles 8 to 12 cm in diameter, spaced 18 to 30 cm apart. In the more-or-less rectangular rooms, these small poles spanned the short dimension of the room and were supported directly by the walls. In room 10, the burned end of a beam with a maximum diameter of 30 cm suggests that the small poles forming the ceiling rested on this beam, instead of the north room wall. In the floor of room 33, there is a recess in the cave closed by a straight masonry wall. Two post impressions in the cave floor were so placed as to suggest that they supported a horizontal beam parallel with the masonry wall. The roof could have been supported between this horizontal beam and the masonry wall at the front of the room.

Burned clay impressions of the roofing from four rooms indicate that the small poles were covered with juniper splints, plus an occasional rod or withe. Numerous juniper splints were recovered in the fill or in unburned rooms. These were in turn were covered with a thick clay containing coarse sand. Grass does not appear to have been used as an intermediate material between the juniper splints and the thick clay.
Room Size

Rooms at Gila Cliff Dwellings run the gamut from those truly enormous in size to remarkably small units usable for little other than storage. Inspection of Figure 5.10, a graph of room size, reveals a uniform gradation from largest to smallest. There are no sharply differentiated size classes of rooms in this sequence.

Interior Room Features

Hearths. Rooms 10 and 10A both contain formal firehearths. Both are square and slab-lined, 45 cm by 45 cm and 30 cm deep. The slabs of both firepits project 28 cm above the floor. Both were filled with dense, packed white ash; there was no charcoal. The only other formal firepit is in "room" 37, the indefinite space in cave 1. A poorly formed rectangle, its walls are lined with slabs.

There were irregular hearth areas in rooms 20, 24, 29, 30, and 34. These are depressions in the floor surface, roughly circular to oval in shape, from 36 to 67 cm across and from 6 to 25 cm deep, the depth below the floor surface (on the underlying bedrock). These appear to have been depressions formed after the floors were laid; they are not clay-lined or slab-lined and their limits are not always sharp.

Vertical Posts. Rooms 24 and 29 each contained a set of two small vertical poles set upright in the floor. Both sets had burned off just above the floor line. Neither of these two sets of vertical poles appear to have any connection with roof beams. Both were near and parallel to the south wall of the room and in neither case did this south wall contain a doorway or other opening. It may be worth noting that both of these rooms also held three of the five irregular hearth areas formed in the floors, suggesting that they may have had some connection with a domestic task performed in the winter or with one that required fire or smoke.

Floors. Preserved floors are not common. The largest floored areas are in rooms 27, 10 and 10A, where clay floor surfaces were present over one-third to one-half of the rooms. There are some spots of floor surface in an additional six rooms (22, 23, 24, 29, 30, 33).
Figure 5.10 Room size.
floors remain in rooms formed partly by the cave, the floor clay runs well up the side of the cave, as much as 1 m in room 33.

These clay floors are composed of a single layer of the same clay mixture used for mortar and rough plaster, containing abundant sand. The only room with more than one floor level is room 1, which had two floors. The extent of these floors is not well known. A thin refuse layer occurred below the floor in room 27, perhaps simply a leveling of the surface. This layer rested on an uneven clay and rock construction.

Wall Openings

Vent. A smoke vent is present at the top of the wall in room 25A, the only room whose entire wall reaches the cave roof. Twenty-four cm wide and 15 cm high, the top of the vent is the overhanging cave roof while the sides and bottom are formed by the wall masonry. This vent is directly over the second-story doorway.

Windows or Peepholes. There are five windows or "peepholes;" one is in an interior wall of cave 2. The remaining four are in exterior walls of larger rooms where one could look out and across Cliff Dweller Canyon. All the windows are rectangular with stone lintels. Dimensions range from 15 cm by 15 cm to 21 cm high by 30 cm wide. They are 37 to 122 cm above the floor.

Doorways. There are 17 complete or partial doorways in 12 rooms where there remains sufficient wall height to determine the presence of this feature. Of the 17 examples, widths can be determined in 14. The maximum width is 70 cm, and the second widest doorway is 58 cm wide. The mean width of the remaining doorways is 40 cm. Door heights can be determined in 10 examples; the maximum is 85 cm, the minimum is 36 cm and the mean is 67 cm.

Of the 10 doorways with remaining lintels, only one was stone. Seven of the remaining nine were composed of small poles about 6 cm in diameter, split lengthwise. Two sets of lintels were built of small poles 3 to 6 cm in diameter.
Storage Bin. The only definite interior storage bin occurs in the southeast corner of room 27. It is square, 80 cm on a side, with walls 70 cm high. Rooms 11, 12, and 13 adjacent to room 10 may have been bins. Room 26 is a large exterior bin attached to room 27; room 34 was probably a storage area and some of the rooms built against cavities, with headroom of a meter or less, were undoubtedly used more for storage than for living.

Benches. In rooms 10 and 10A, benches were used to provide usable space against the sloping walls of the cave and on the slope between the two rooms. There is a bench on the east side of each room, built against the irregular east side of the cave. A much smaller bench exists in the northwest corner of room 5, but does not run the complete width of the room. What is evidently an even smaller bench barely protrudes from the fill of room 8, again in the northwest corner.

Tree Ring Dates

Various researchers have collected tree-ring specimens at Gila Cliff Dwellings between 1941 and 1968. Dates from these collections, summarized in Bannister, Hannah and Robison (1970:50), are given in room descriptions. In addition, the following dates (Table 5.1) were taken from beams without provenience.

The use of three different room numbering systems over more than a quarter century of investigation complicates interpretation of the data, but it is clear that almost all logs for construction of the present rooms were obtained during the mid-1280s, from 1283 to 1287. Thirty-one cutting dates are recorded from the site; only five are earlier than 1283. Noncutting dates, labeled as v or vv, range from 1239 to 1286 and cluster in the 1280s, although not as markedly as the cutting dates. This tight clustering of a large sample of timbers indicates relatively rapid construction of the site.

The distribution of the latest dates suggests that timbers may have been stockpiled over a few years before construction since any one room typically yields an assortment of cutting dates throughout the mid-1280s. The five 1287 cutting dates occur in four different rooms in cave 4, room 17, room 18, room 24, and "cave 4, room B." Of the seven
Table 5.1
MISCELLANEOUS TREE-RING DATES

Cave 4, Room 8 (no number)

- GP-3739 1185p - 1287G
- GP-3738 1211p - 1287rLGB

Cave 4, loose

- GP-3741 1205fp - 1284vv
- GP-3742 1246p - 1284rL
- GP-3743 1189p - 1285rG

Cave 5, Room A (no number)

- GP-3746 1190p - 1282rL

Cave 5, Room B (no number)

- GP-3744 1238 - 1285r

Cave 5, Trench 3

- GCD-11 1211p - 1286rB

No Provenience

- AGL-3 1196p - 1255vv
- AGL-4 1215p - 1268r
- GP-3747 1238p - 1282v
- AGL-6 1241p - 1284v
- AGL-5 1183p - 1285cLG
- AGL-9 1212p - 1286v

1286 cutting dates, all occur in cave 3 except for two dates from room 23 (cave 4). Of the four 1285 dates, one came from room 18 and one from "cave 5, room B." Another timber was found loose in cave 4 and the fourth has no provenience. Four 1284 cutting dates occur in room 9, one from room 10, and one from a loose beam in cave 4. Three 1283 dates come from room 9, while one derives from room 23.

The patterning of these dates suggests that construction may have generally occurred earlier in caves 2 and 3 and somewhat later, only a
year or two, in caves 4 and 5. The solitary date from the cave 2 complex of 1276, about 10 years before the construction in the caves to the east, is intriguing. Perhaps cave 2 rooms were built earlier to serve as quarters for an advance party, similar to the situation at Betatakin (Dean 1969:82).

Construction Sequence

Tree-ring dates indicate that the occupants built the structures within a few years. However, since Gila Cliff Dwellings is not as compact as many cliff dwellings and pueblos, it is not always possible to relate the construction of its various units to one another. Within cave 1, for example, not enough of the walls remain to allow discussion of the bonding sequence involving rooms 36, 37, 38, and 39.

In cave 2, wall bondings clearly indicate that room 7 preceded the remainder of the rooms in the cave, but the sequence is unclear for the remainder of the rooms. All of these rooms may have been built 10 years earlier than the rooms in the caves to the east.

Within cave 3, room 9 is isolated from other rooms in the cave. The walls of rooms 10 and 10A at no point touch the walls of the smaller storage units (rooms 11-15) which occupy a notably higher level. On the south side of room 10A, room 11 preceded room 12, while on the north, room 14 preceded room 15 and room 13.

Within the cluster formed by rooms 16 to 20, room 18 is definitely the first constructed. Rooms 17 and 20 clearly abut room 18. Room 16 abuts room 17 which in turn is abutted by room 19. Although the present interpretive trail runs through room 19, a 1914 photograph shows the west wall of room 19 intact with no doorway present. This wall therefore posed a barrier to access through these rooms between cave 3 and cave 4. One would enter room 16 from cave 3; entry to the other rooms was from cave 4. The only access between caves 3 and 4 would have been across the roof of room 17, although not much headroom would have existed. Unless the roof of room 20 contained a hatchway, access to this room came primarily from the lower level rather than directly from cave 4.

Along the cave wall, the first rooms built were rooms 21, 24 and 33, with subsequent construction filling the spaces between them.
Room 28 abuts room 24; in turn, rooms 22 and 23 abut room 28 and room 21. Rooms 22, 23 and 28 thus filled in the space between rooms 21 and 24. The south wall of room 30 abuts room 31. The abutment relationships of room 29 and 30 are obscured by well preserved plaster, but room 29 and 30 filled the space between rooms 24 and 31. Room 32 abuts room 33. Room 32 probably precedes room 31, since the construction of the curved wall of room 31 would make little sense were not room 32 already in place. Room 26, a small storage unit abuts room 27, while rooms 25, 25A and 34 are isolated from the other structures.

Indications of Multiple (Earlier) Occupancy

The sharp contrast between the heavily-smoked roof of cave 3 and the relatively clean masonry construction of rooms within this cave demonstrates that fires burned in the cave long before the construction of the present walls. A few anthropomorphic, zoomorphic and concentric-circle pictographs (Fig. 5.11) are on the cave walls in room 33 and above room 27. These paintings of the style called "Mogollon Red" by Schaafsma (1980:187-191) apparently precede the Gila Cliff Dwellings. The west wall of room 33 was built over one figure. Stabilization activities in 1968 uncovered a slab-lined cist near the northeast corner of room 27 which may predate the construction of the present unit. Some diagnostic Archaic artifacts are described elsewhere in this report. Further excavation which would remove large rockfall fragments in cave 3 might reveal earlier cultural strata.

Room Descriptions

Room 1, Cave 2

Area

75m²

Interior Features

Floor: Two floor surfaces, both of hard-packed clay, were located by Vivian in this room; one is rather fragmentary. There is a cut through the west floor, 2.3 m wide and 20 cm deep, presumably from
Figure 5.11 Cave 5 pictographs.
recent excavation. Presently the floor is covered with roof spall and
dust, below which are patches of a hard-packed original use-surface.

Wall: Most of the room is bounded by the cave wall. The east side
is marked by the wall separating room 1 from rooms 2, 6, and 7. A low
wall, only two to three courses high, is present at the mouth of the
cave.

Openings

There are no known openings from room 1 into any of the rooms to
the east.

Ceiling and Roof Details

The natural cave ceiling served as the roof for this room.

Tree-Ring Dates

None.

Discussion and Summary

This room appears to have been an open courtyard adjacent to the
more conventional rooms in the east half of cave 2. The presence of two
floors is unusual at Gila Cliff Dwellings.

Room 2, Cave 2

Area

12.5 m²

Interior Features

Floor: Featureless. A portion of the floor was the roof of
room 3.

Wall: All walls are of typical masonry with rough plastering, and
some smoke-blackening. There is a large upright slab in the north wall.
The walls in this room are probably standing at their original height:
north - 1.90 m; south - 1.80 m; east - 1.78 m; west - 1.80 m.
Openings

A large T-door opens to the exterior at the level of an inferred balcony that spanned the front of the cave. It is 100 cm wide at the top, 66 cm wide at the bottom, and 103 cm high. There is a half T-door, whose west jamb contains an offset while the east side remains straight, and opens in the north wall into room 8. It is 70 cm wide at the top, 44 cm wide at the bottom and 76 cm high. A conventional door, 49 cm wide and 76 cm wide, opens east into room 5. Neither of the latter two doors had lintels. Smoke patterns in the southeast corner indicate a corner hatchway opening into room 3 below.

Ceiling and Roof Details

The room was clearly not roofed.

Tree-Ring Dates

None.

Discussion and Summary

This room apparently provided primary entrance to the room complex that fills the east portion of the cave, with access through the distinctive T-door from a long balcony fronting the cave.

Room 3, Cave 2

Area

2.7 m²

Interior Features

Floor: No information in records. Presently consists of irregular bedrock and fill.

Walls: Unplastered masonry. The south wall of this room is contiguous with the large south wall of the cave 2 complex. The east wall and west wall abut this wall. The north wall abuts the east wall but the relationship between the west and north walls is unclear.
Openings

A rectangular doorway 50 cm wide and 66 cm high opens into room 4. There is a small window, 28 cm², in the south wall. A hatchway apparently connected rooms 2 and 3.

Ceiling and Roof Details

The roof of this room burned. Ceiling height was at least 1 m, but fill over the floor prevents more accurate measurement. The smoke stains from the fire indicate the location of the corner hatchway in the roof. A large viga running north-south has remnants in both the north and south walls. The southern remnant extends far enough to the outside to suggest a balcony on the exterior of the wall. This beam is paired with a beam at the same level jutting from the exterior wall of room 4.

Tree-Ring Dates

A cutting date of 1276 is recorded from this room. Presumably this is from the prominent beam discussed above.

Discussion and Summary

This room, with its small size and diminutive headroom, would be considered a storage chamber, except for the exterior opening in the south wall. Perhaps it was created as a result of the need for a flat floor in room 2, and for a direct link between rooms 2 and 4.

Room 4, Cave 2

Area

4.4 m²

Interior Features

Floor: Much of the floor is bedrock. Little fill remains. A masonry ledge, 32 cm high, extends 110 cm east from the west wall.

Wall: The south wall of the room is continuous with the exterior wall of room 2. The west wall abuts the south wall, and the north wall in turn abuts the west wall. The east wall is bedrock. The masonry walls are unplastered.
Openings

A rectangular doorway opens into room 3 through the west wall. A probable doorway opens into room 4A through the north wall. There are no openings in the south wall other than two beam sockets, although a break repaired by Richert (1956) may have been the location for a former doorway.

Ceiling and Roof Details

Two primary beams run north-south across the room. Four secondary beam sockets in the west wall indicate the presence of a roof. Ceiling height: 170 cm (minimum).

Tree-Ring Dates

None.

Discussion and Summary

The room was probably used for storage, and was one of a three-room series (rooms 3, 4, 4a) below the main level of rooms. Room 3 appears to have provided access between the two levels.

Room 4A, Cave 2

Area

6.5 m²

Interior Features

Floor: Irregular and sloping, flaky bedrock.

Wall: The south wall is built across the mouth of a small natural cavity. The rest of the room is composed of bedrock.

Openings

A break in the south wall probably developed around a doorway. Minimum height for this door was 64 cm. Because of wall breakdown, access is now possible directly from room 5 above.
Ceiling and Roof Details

Natural bedrock, entirely smoke-blackened, forms the rear ceiling; the front may have been the floor of room 5. Ceiling Height: 1.78 m.

Tree-Ring Dates

None.

Discussion and Summary

This small room was probably for storage.

Room 5, Cave 2

Area

12.5 m²

Interior Features

Floor: Irregular; most of the floor is missing. It extended over rooms 4 and 4a.

Wall: The south wall connected with the south wall of room 2. The west and north walls are bonded. The north wall incorporates a large upright slab. The south half of the west wall abuts the south wall. The east wall is bedrock. A 24 cm high bench was built along the north wall. Walls are roughly plastered and smoke-blackened. At present the south wall only rises one course above floor level.

Openings

A rectangular door opens into room 2.

Ceiling and Roof Details

There is no indication that the room was ever roofed.

Tree-Ring Dates

None.
Discussion and Summary

Room 5 possibly opened into room 4 and the two may have been used as one space. Depending on the height of the south wall, room 5 could have served for habitation, with storage available in rooms 4 and 4a. If the south wall was no higher than today, it was simply a sheltered work space.

Room 6, Cave 2

Area
9.4 m²

Interior Features

Floor: No floor features observed. Perhaps as much as 1 m of fill remains over the floor.

Wall: The plastered walls of this room stand at their original height and do not touch the ceiling. The east and west walls clearly abut room 7. The southwest corner is barely exposed and construction is unclear. In the southeast corner is a 61 cm wide doorway to room 8. The east wall contains two upright logs at its southern end. Wall Height: east - 1.14 m; south - 1.12 m; west - 1.3 m. Room 7 forms the north wall.

Openings

Doorways open into rooms 7 and 8.

Ceiling and Roof Details

The room was not roofed.

Tree-Ring Dates

None.

Discussion and Summary

No floor features are visible since fill blankets the room. It is interpreted as enclosed work space or a living room. A small low bench
or shelf in the northeast corner was supported by beams in the north wall of room 7.

Room 7, Cave 2

Area
8.2 m²

Interior Features
Floor: Only fill is visible.
Wall: The north wall is bedrock. The east and west walls abut this bedrock while the southwest and southeast corners appear to be bonded. The exterior south wall shows two building episodes. The upper section, beginning 48 cm above the existing floor, is smoke-blackened. In the east part of this wall is a row of three beam seats, 32 cm above the present floor. The centers of these are 5 cm, 34 cm and 71 cm from the corner, and their diameters are 8, 7, and 6 cm. Probably they supported a bench or shelf in the northeast corner of room 6. In the southeast corner are five hanging pegs, three on the east wall and two on the south wall. Those in the east wall are 3 cm across. One is in the corner; the second is 44 cm from the corner and 29 cm below the ceiling; the third is 66 cm from the corner and 16 cm below the ceiling. The two in the south wall are 2 to 3 cm in diameter. One is 64 cm from the corner and 15 cm below the ceiling; the other is 85.5 cm from the corner and 22 cm from the ceiling. There is a small niche (7 cm high, 6.5 cm wide and 11 cm deep) in the east exterior wall, 40 cm from the southeast corner of room 7 and 48 cm above ground surface.

Openings
A central doorway in the south wall (41 cm+ wide, 66 cm+ high), badly damaged, connects this room to room 6. A door 44 cm wide and 61 cm high through the east wall once connected with room 8. What appears to be the original sill shows at ground level. The door is now sealed.
Ceiling and Roof Details

The natural cave roof forms the room ceiling 1.65 cm above the present fill at the south wall.

Tree-Ring Dates

None.

Discussion and Summary

The abutting relationships indicate that room 7 was the first room constructed in the upper level of cave 2.

Room 8, Cave 2

Area

38.6 m²

Interior Features

Floor: Any features on the floor of this room are obscured by fill, which appears to be rather shallow near the cave wall, deepening near the south and west walls. Compacted use-surfaces and bedrock are exposed in patches. Here, as in rooms 1 and 6, future research should include uncovering and mapping the original floor and looking for hearths and other features. A small masonry bench is in the northwest corner. Its lower course is bordered to the east wall of room 7. The bench is 31 cm high, 31 cm wide, and 58 cm long.

Walls: The north and east boundaries are cave bedrock. The walls of rooms 5, 2, 6, and 7 bound the room to the south and west. All walls are roughly plastered.

Openings

A doorway connects room 8 to room 6 in the southwest corner of room 8. A very short distance to the east, another doorway opens into room 2. Sills are at present ground surface level.
Ceiling and Roof Details

The cave roof rises to 2.25 m above the present ground surface.

Tree-Ring Dates

None.

Discussion and Summary

This room is primarily open space bounded by the construction of rooms 5, 6, and 7. As such, it should be regarded as more of a courtyard than a room, that is, an open area where communal activities occurred. The access from rooms 2 and 6, as well as the possibility of access from room 7, lends credence to this notion.

Room 9, Cave 3

Other Designations

Steen's Group II, room 5

Area

15.7 m²

Interior Features

Floor: No features evident.

Fill: Material in this room appears to be sandy deposit from cave walls, beneath a layer of refuse 10 to 20 cm thick that ran downslope from above in cave 3.

Walls: The west, south, and east walls appear to be bonded. The north wall is cave bedrock. The room is a large cavate opening which has been walled off with masonry. Only the south wall retains original surface, which is well-plastered and heavily smoke-blackened. In the southeast corner is a recessed corner niche formed over a natural bedrock shelf 1.2 m above the floor.

Openings

An enormous arched opening was knocked out in the south wall of this room. Prior existence of a doorway is likely, but unknown.
Ceiling and Roof Details

Twelve small beams run north and south to support a ceiling. These beams are burned. They were supported by a primary beam set in the east and west walls. Ceiling Height: 1.88 m (minimum).

Tree-Ring Dates

There are 11 tree ring dates from room 9. Nine of these are cutting dates, seven of which fall in 1283 or 1284. Actual construction occurred then or a few years later. Beam reuse is indicated by the earlier dates.

GP-3726 1157p - 1264cL
GCD-41 1188p - 1274++v
GP-3725 1192p - 1283+rL
GCD-2 1213 - 1283+r
GCD-46 1244p - 1283+cL
GCD-44 1239p - 1284cL
GCD-42 1242p - 1284cL
GCD-45 1244p - 1284cL
GCD-4 1200p - 1284cL
GCD-6 1218p - 1285v
GCD-40 1239p - 1286cL

Discussion and Summary

This well-dated structure probably served for habitation.

Room 10, Cave 3

Other Designations

Steen's Group II, room 1

Area

20 m²

Interior Features

Floor: The floor is hard clay. There is a centrally located square slab-lined hearth. Its interior dimensions are 35 cm by 40 cm. In 1963 it was filled with dense white ash. A prominent masonry bench
follows the south and east walls. The bench is 0.5 to 1.0 m wide and
0.5 to 0.7 m above the room floor.

Fill: Observed during 1968 excavations, an upper layer of dust and
trash 24 cm to 36 cm thick appeared to be material from the higher
slopes of the cave. Below this was a level of charcoal and burned clay
impressions of roofing, 9 cm to 18 cm deep. It was a uniform deposit
over the floor and benches of rooms 10 and 10a, and represented the roof
material burned in place. Numerous red-orange roofing impressions are
about 9 cm to 12 cm thick. Most of the impressions were of slats 2 cm
to 5 cm wide, which are probably split juniper. The hearth in room 10
is sunk into underlying refuse which is 48 to 55 cm deep. Its interior
dimensions are 35 cm by 40 cm. In 1963 it was filled with white ash.

Wall: The south and west walls are bonded and abut cave bedrock at
their ends. A northeast wall, which also abuts cave bedrock, separates
room 10 from room 10a. Room 10 and 10a fill a cavity at a low level in
cave 3. Interior walls are plastered, smoothed and smoke-blackened.

Openings

Richert (1956) records the right jamb of a low doorway in the south
wall. Photos indicate it was 40 to 60 cm high. By 1968, much of this
wall had collapsed, leaving an arched opening.

Ceiling and Roof Details

There is a large burned beam stub in the west wall. Richert (1956)
stated that the other end rested on sloping bedrock on the east side.
Several secondary beam sockets from north-south vigas in the south wall,
southwest corner, remained in 1968. Ceiling Height: 2.0 m.

Tree-Ring Dates

There is one date from room 10.

AGL-11 1249p - 1284cL

Discussion and Summary

This was probably a habitation room. Vivian noted in 1963 that the
floors of rooms 10 and 10a rested on earlier cultural deposits.
Room 10A, Cave 3

Other Designations
Steen's Group II, room 1.

Area
14.5 m²

Interior Features
Floor: Hard clay. There are two benches, one in the northeast part of the room (30 cm high, 85 cm wide, and 200 cm long) and one in the southeast (38 cm high, 34 cm wide and 55 cm long). In the center of the room is a sunken rectangular slab-lined hearth, 43 cm wide and 55 cm long. In 1963 it was filled with dense white ash.

Wall: Although it is not clear, the south wall probably abutted rooms 11 and 15. Only the ends of the wall remain. The walls are not plastered, but there is little of them left. The room interior is smoke-blackened.

Openings
Unknown.

Ceiling and Roof Details
No ceiling remains, but seven beams in the northwest wall indicate a ceiling height of 2 m.

Tree-Ring Dates
None.

Discussion and Summary
This was probably a habitation room.

Room 11, Cave 3

Area
0.5 m²
Interior Features
Floor: Irregular bedrock, covered with loose dirt fill.
Wall: Only very low walls remain. Evidently all corners bond.

Openings
None evident.

Ceiling and Roof Details
No evidence remains.

Tree-Ring Dates
None.

Discussion and Summary
This very small room must have been used for storage. Its floor was apparently about 30 cm above the ceiling of room 10.

Room 12, Cave 3

Area
1 m²

Interior Features
Floor: The floor is bedrock.
Wall: Only very low walls remain. The northwest wall abuts the south wall (room 11). The northeast wall abuts the northwest wall. The east wall is bedrock.

Openings
A doorway opens into the area above room 10B. It appears L-shaped; the lower portion is 28 cm wide and the upper portion is 70 cm wide. The sill is 50 cm above the southeast bench of room 10A. The original door appears to have been partly sealed off and narrowed.

Ceiling and Roof Details
None remain.
Tree-Ring Dates
None.

Discussion and Summary
A small room which was probably used for storage, and probably opened into room 10A.

Room 13, Cave 3

Other Designations
Steen's Group II, 3 and 4

Area
Unknown. Width of space about 1.5 m. Steen's 1942 map shows an enclosure 1.4 m long.

Interior Features
Floor: Bedrock, about 45 cm below present dirt fill.
Wall: The south wall of this "room" is a very low wall between rooms 9 and 14.

Openings
None visible.

Ceiling and Roof Details
None.

Tree-Ring Dates
None.

Discussion and Summary
On the 1935 map, room 13 is immediately northeast of room 12, not the location shown on the map with this report. Steen's map shows two rooms at this location, which are not evident now. There is no present evidence that this was a room.
Room 14, Cave 3

Other Designations

Steen's Group II, room 2.

Area

2.9 m² (minimum)

Interior Features

Floor: None recorded.
Wall: Only very low fragments of the west, south, and east walls remain. Bonding relationships are indeterminate in this room. Morris (1968) stated, "A well-formed adobe cap on these walls indicates that they are probably standing at their original height" (20 to 30 cm above existing ground surface).

Openings

None.

Ceiling and Roof Details

None.

Tree-Ring Dates

None.

Discussion and Summary

This small room was possibly used for storage.

Room 15, Cave 3

Area

Unknown

Interior Features

Floor: None recorded.
Wall: Only a very low stub wall remains on the edge of the brink above rooms 10 and 10A. This wall abuts room 14.

Openings
None evident.

Ceiling and Roof Details
None.

Tree-Ring Dates
None.

Discussion and Summary
This was probably not a room.

Room 16, Cave 3

Other Designations
Steen's Group II, room 6

Area
13.5 m²

Interior Features
Floor: None evident at the time of excavation.

Fill: There was much loose stone on the surface of this room before excavation; there is no prepared floor. The floor on the west side is bedrock covered with dust. On the east side there is a crack or trench in the bedrock containing about 15 cm of refuse underlain by 40 cm of sterile sand. This refuse runs under the east side of the north wall.

Wall: The east wall is composed of the west walls of rooms 18 and 17. The north wall of room 16 abuts the west wall of room 17. The south wall abuts bedrock in the southeast corner. The northwest and southwest corners are bonded. A short wall stub abuts the exterior northwest corner, extending toward the interior of cave 3. The maximum
height of the room (except for the previously constructed east wall formed by room 17) is 1 m at the east end of the north wall. Wall interiors are rough plastered, except for the room 17 wall, which is smooth plastered. The south wall interior is smoke-blackened.

Openings
There is a 15 cm$^2$ opening in the east wall, 84 cm above the present surface, looking into room 17. Another peephole penetrates the south wall at the southwest corner. A central break in the west wall may indicate the location of an entrance into room 16.

Ceiling and Roof Details
There is no indication of any roof on this room.

Tree-Ring Dates
None.

Discussion and Summary
Clearly some of the cultural material excavated in this room is earlier than the construction of room 16 and even of room 17. This is easternmost room in cave 3. An unroofed, low-walled work enclosure, it was built after rooms 17 and 19 were constructed, forming a barrier between caves 3 and 4.

Room 17, Cave 4

Other Designations
Group II, room 7

Area
31.5 m$^2$

Interior Features
Floor: There are no features present. The floor is bedrock.
Fill: In 1963 there was 24 cm to 40 cm of trash on the floor.
There was much charcoal on the north side, four pieces of which were saved.

Wall: A large stone slab in the east wall has been partially shaped with stone tools to make it flush with the masonry. There is a niche in the west wall, near the southwest corner, 1.1 m above the floor. The niche is 10 cm wide, 10 cm high, and 22 cm deep. A peephole in the west wall, 1.75 m from the southeast corner, is 97 cm above the floor and 18 cm in diameter. The south wall is the north wall of room 18. The east and west walls of room 17 abut this wall. The northeast corner is bonded, while the north wall abuts the west wall. The east, west and north walls are smoothly plastered inside; the south wall has patches of a somewhat rougher plaster. The west wall has traces of an interlocking dado design in white.

Openings

There were three doors connecting this room with room 18, room 19 and the open area east of this room. Wood pole lintels remain in the doorways in the north and east walls. The damaged doorway leading into room 18 is flanked by beams which project 90 cm into room 18. The east door is 80 cm high and 41 cm wide; the north door is 74 cm high and 39 cm wide. A photograph taken by Louis C. Dornbusch in 1914 shows that a large section of the west wall had collapsed, so it is not known if a door to room 17 connected with cave 3.

Ceiling and Roof Details

Two primary beams in the north wall are burnt. There are five secondary beam fragments, 9 to 12 cm diameter, in the east wall. Beams in the south wall, 20 to 25 cm diameter, are associated with room 18. The walls rise about 30 cm above the roof line to form a parapet. Four pole sockets in the west side of the north wall apparently supported a platform. Ceiling Height: 1.88 m.
Tree-Ring Dates

There is one cutting date of A.D. 1287 from room 17:

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<th>Range</th>
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<tbody>
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<td>1210p - 1259vv</td>
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<tr>
<td>AGL-13</td>
<td>1226p - 1263vv</td>
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<td>1250 - 1287vv</td>
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<tr>
<td>GCD-32</td>
<td>1168 - 1284vv</td>
</tr>
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</table>

Discussion and Summary

This large room, with sizeable store rooms (18, 19) at each end, is distinctive by its size, interior wall finish, and a corner platform. This and another large room (27) are suggested to be communal/ceremonial structures.

Room 18, Cave 4

Other Designations

Group II, room 8

Area

15.0 m²

Interior Features

Floor: Featureless packed dirt.

Wall: The south wall of the room is a bedrock column which separates cave 3 from cave 4. The west, north, and east walls are bonded and abut the bedrock. Only the east wall is partially plastered; other walls are unplastered. There are two small niches (15 cm high, 18 cm high) in the east and north walls, about 35 cm above the floor. A single hanging peg is anchored 1.37 m above the floor, in the west end of the wall.

Openings

The east wall contains two small peepholes. These allow observation of the area in front of cave 4. An entrance in the north wall, 40 cm by 80 cm allowed entrance from room 17.
Ceiling and Roof Details

Eight secondary beams in the north wall, 20 to 30 cm apart, rested on a small primary beam set diagonally in the north wall and in the east wall. A second primary beam fragment is set in the east wall. It would have also seated in the north wall near the entrance. Ceiling Height: 1.96 m.

Tree-Ring Dates

There are three dates from this room.

GP-3733  1158 - 1269vv
GP-3736  1228 - 1285+r
GP-3735  1232p - 1287r

Discussion and Summary

This storage room was built before rooms 17 and 19, but the tree-ring dates show that all three rooms were part of a single building episode.

Room 19, Cave 4

Other Designations

Steen's Group II, Room 9

Area

16.0 m²

Interior Features

Floor: The floor is bedrock.

Fill: In 1963 there was no debris, only a few loose stones and some dust.

Wall: The north wall is bedrock, as is a portion of the east wall. The wall interiors are unplastered. The east wall abuts the south wall, which in turn abuts the west wall. Dornbusch's 1914 photograph shows the west wall intact without openings.
Openings

One doorway connects with room 18. Another doorway exited through the east wall at the point where the trail now crosses the wall.

Ceiling and Roof Details

There are no indications of a roof in this room.

Tree-Ring Dates

None.

Discussion and Summary

Room 19 was completed by construction of its east wall, connecting the northeast corner of room 17 with the natural cave face. Since this room was not roofed, it probably served as enclosed work space. The 1914 photograph shows that the present access through this from between caves 3 and 4 did not originally exist.

Room 20, Cave 4

Area

5.0 m²

Interior Features

Floor: Some of the hard clay floor was present when excavated by Vivian. He noted an irregular ash deposit in this room.

Fill: In 1963 the surface of the room was covered with small rock and numerous juniper splints. Debris, rock, and fine dust were up to 30 cm deep.

Wall: Builders formed the room by erecting the south wall of the room, which sealed off a natural south-facing cavity below rooms 17 and 18. The interior is unplastered. The original wall height was at least 1.85 m.
Openings

None currently evident. A wood lintel in the south wall, 85 cm above the floor, suggests a sealed doorway. Below this now is a rectangular opening, 32 cm high and 43 cm wide, at floor level.

Ceiling and Roof Details

Two partial beam sockets exist in the south wall; nine replica beam sockets are the result of stabilization.

Tree-Ring Dates

There is one date from the room:

GCD-21 1138 - 1284v.

Discussion and Summary

This small room is of a size appropriate for storage, but this use is questioned because of the possible hearth.

Room 21, Cave 4

Other Designations

Steen's Group II, room 10

Area

48.2 m²

Interior Features

Floor: Steeply sloping cave bedrock. Little or no fill exists in the room.

Wall: The east and west walls abut the cave bedrock; the southwest and southeast corners are bonded. The three walls are covered with rough plaster. Walls have no smoke blackening. There are two niches in the southwest corner - one in the west wall and one in the south wall. The east wall incorporates an upright slab. Present wall heights: east wall - 1.65 m; south wall - 1.45 m; west wall - 1.80 m.
Openings
Each wall contains a doorway. The east doorway opens into room 23 while the south and west doorways access open areas next to room 21. The east door is 43 cm wide and 60 cm high. The west door is 30 cm wide; height unknown. The south door is 65 cm wide; height unknown.

Ceiling and Roof Details
There is no indication of a roof in room 21.

Tree-Ring Dates
None.

Discussion and Summary
With the unfinished rough floor, unplastered walls, lack of a roof and any internal features, this was apparently only an enclosed work space. It perhaps served as a courtyard, giving access to caves 4 and 5 from the talus below.

Room 22, Cave 4

Other Designations
Group II, room 12

Area
13.0 m²

Interior Features
Floor: Cave bedrock forms the floor at the rear of the room, while packed dirt is the floor material at the front (south) of the room. No features remain.

Wall: The north wall, separating rooms 22 and 23, abuts the east and west walls. The south wall abuts the west wall and bonds with a section of the east wall. The east wall is composed of a curved segment of the wall of room 28 and a short straight section with abuts the curved wall. The south wall originally incorporated a large boulder,
which fell away; Richert mortared in the hole below the floor in 1956. Interior walls are not plastered.

Openings
There are doorways leading into room 23 (30 cm wide; height unknown) and the open space through the south wall (35 cm wide, 60 cm high). A wood pole lintel remains in this door. There are peepholes on each side of the south door; the east one is 10 cm in diameter and is 1.2 cm above the floor, the west one is 12 cm wide and 20 cm high, 1.05 cm above the floor.

Ceiling and Roof Details
There is no evidence of a roof for this room.

Tree-Ring Dates
None.

Discussion and Summary
The relationships of the abutting walls show that room 22 and 23 were created after room 23 and room 38 had been built. In addition, Richert (1956) notes that the east wall of this room was built on refuse; he sealed over a space where this debris had been disturbed by vandals.

Room 23, Cave 4

Other Designations
Steen's Group II, room 11

Area
3.5 m²

Interior Features
Floor: Sloping cave bedrock.
Wall: The south wall abuts the east and west walls. The north wall is bedrock. Interior walls are not plastered.
Openings

There is a doorway of undetermined width and height into room 28 to the east, and a 55 cm wide door to room 21 to the west.

Ceiling and Roof Details

A beam socket above the east doorway probably relates to the roof of room 28; there is no evidence of a roof for room 23.

Tree-Ring Dates

<table>
<thead>
<tr>
<th>GCD</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCD-19</td>
<td>1229p - 1283rLG</td>
</tr>
<tr>
<td>GCD-17</td>
<td>1235p - 1286L</td>
</tr>
<tr>
<td>GCD-18</td>
<td>1249p - 1286cB</td>
</tr>
</tbody>
</table>

Discussion and Summary

Room 23 may have been storage space tucked under the low roof at the rear of the cave; however, with doors leading to rooms 21 and 28, it may have been only a passageway, which would have been more convenient than edging around the slope outside room 22.

Room 24, Cave 4

Other Designations

Steen's Group II, room 14

Area

9.5 m²

Interior Features

Floor: The floor is hard-packed dirt. There were two burned posts 8 cm in diameter, 70 cm apart (center to center) in the floor, flush with the floor surface. In 1968 there were two ash areas in the floor. One ash-filled hearth was large and irregular, about 67 cm in diameter and 27 cm deep, partly slab-lined. A smaller basin-shaped pit overlapped it. It was 43 cm in diameter and 18 cm deep. There was about 30 cm of debris under the broken floor.
Wall: The north wall is bedrock. The roughly oval wall shows no abutments and appears to be one continuous piece of construction. The interior is unplastered and shows some smoke-blackening.

Openings

Doorways lead to rooms 28 (30 cm wide, about 50 cm high) 29 (42 cm wide, height unknown), and the exterior of the room (35 cm wide and 65 cm high).

Ceiling and Roof Details

Paired beam sockets remain in the east and west walls, two in each wall. Those in the east wall are 1.6 m above the floor; those in the west wall are 1.34 cm above the floor and are not aligned with those in the east wall.

Tree-Ring Dates

<table>
<thead>
<tr>
<th>GCD-13</th>
<th>1200p - 1239vv</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCD-15</td>
<td>1230p - 1287cLG</td>
</tr>
</tbody>
</table>

Discussion and Summary

The hearths and roof indicate that this was a dwelling room. The wall abutting sequence show that this room was built before any of the rooms adjacent to it.

Room 25 (bottom)/25A (top), Cave 4

Other Designations

Steen's Group II, room 18

Area

5.6 m²

Interior Features

Floor: The floor of the upper story is missing. The lower floor is bedrock.
Wall: All corners are bonded in both stories. The south wall is bedrock. The plaster of the lower room is much darker than the upper room, although the smooth walls indicate both stories were built at the same time. The interior walls of the upper room are plastered and smoke-blackened.

Openings

A vent 15 cm high and 24 cm wide is centered above the upper story (Room 25A) doorway, where the wall meets the cave roof. In 1968, the collapsed space between the doors of these rooms was restored. Each story now has a door in the north wall. The original door dimensions are unknown.

Ceiling and Roof Details

In room 25 there are seven secondary beam sockets (9-12 cm diameter) in the east wall and nine in the west wall. Burned stubs remain in some of the sockets. Ceiling height of room 25 is 1.2 m. The ceiling height of room 25A is 1.5 m.

Tree-Ring Dates

None.

Discussion and Summary

The size of the rooms suggests a storage function, but the presence of the vent and smoke blackening suggests habitation in the top room.

Room 26, Cave 5

Other Designations

Steen's Group II, room 19

Area

2.0 m²
Interior Features

Floor: Packed dirt.

Wall: The north and south walls abut the west wall of room 27. Other corners are bonded. Interior not plastered or smoke-blackened.

Openings

None evident.

Ceiling and Roof Details

No information remains. The wall height is not determined, but exceeds 1 m. Beams spanning room are a modern addition.

Tree-Ring Dates

None.

Discussion and Summary

A small storeroom associated with room 27.

Room 27, Cave 5

Other Designations

Steen's Group II, room 20

Area

25 m²

Interior Features

Floor: Vivian cleared about 1/3 of the room, apparently the east section, uncovering a good clay floor over most of its interior. Below the floor was an irregular surface which was evened up with 6 cm to 9 cm of dirt refuse before the floor was laid. There was an oval hole (mortar?) 12 cm in diameter by 15 cm in diameter in the floor 1.88 m from the south wall. A masonry-walled bin in the east corner has been restored by RSU. It is now 70 cm high, 82 cm wide (east-west) and 1 m long (north-south).
Wall: All corners of the room appear to be bonded. The walls are plastered smooth, and have no smoke blackening. Maximum wall height: 2 m. Large boulders incorporated in the northwest and southwest corners are both smoke-blackened from earlier occupations. A series of rectangular niches are spaced around the room:

<table>
<thead>
<tr>
<th>HEIGHT ABOVE FLOOR</th>
<th>HEIGHT</th>
<th>WIDTH</th>
<th>DEPTH (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1.17 m</td>
<td>17</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>2. 1.04 m</td>
<td>13</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>3. 0.95 m</td>
<td>13</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>4. 0.91 m</td>
<td>23</td>
<td>18</td>
<td>16</td>
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<tr>
<td>5. 0.93 m</td>
<td>14</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>6. 0.20 m</td>
<td>28</td>
<td>29</td>
<td>20</td>
</tr>
<tr>
<td>7. 1.17 m</td>
<td>22</td>
<td>20</td>
<td>19</td>
</tr>
</tbody>
</table>

Niche number 5 is smoothly plastered; the rest are rough, and could have had beams removed. Since niches 1-5 are aligned, it is possible that they supported a shelf or balcony a meter above the floor.

Openings

A doorway in the south wall was made smaller by prehistoric remodeling. Wood pole lintels were used in both openings. It is now 65 cm high and 36 cm wide. The original door height, measured to a buried wood sill, is 93 cm. This led to a natural rock ledge, which can be reached from the ledge forming room 34, 34a floors below.

Ceiling and Roof Details

In 1968 the south wall contained three secondary beam sockets. Low spots in the east and west walls prior to capping in 1968 may have marked primary beam sockets. Apparent ceiling height is about 1.9 m. Looking up from Room 27, one can see two red anthropomorphic pictographs on the rock above. The cave roof is smoke-blackened above Room 27.

Tree-Ring Dates
None.
Discussion and Summary

A very large room occupying much of the available open area in cave 5, its unusual features suggest a distinctive, communally-used chamber.

Room 28, Cave 4

Other Designations

Steen's Group II, room 13

Area

10.5 m²

Interior Features

Floor: Packed dirt. Large boulders intrude into the southeast portion of this room.

Wall: The curved southwest wall abuts the rear of the cave and the east wall. There is no plaster on the walls.

Openings

Doorways open into rooms 22, 23, and 24.

Ceiling and Roof Details

The westerly portion of the wall contains two burned beams. There is an empty socket above the doorway into room 23. Ceiling Height: approximately 1.9 m.

Tree-Ring Dates

None.

Discussion and Summary

Large enough to serve for habitation, this room was built after room 24 and before rooms 22 and 23.
Room 29, Cave 5

Other Designations

Steen's Group II, room 16

Area

10.5 m²

Interior Features

Floor: Packed clay - mostly missing now. Vivian reported that two vertical posts, 8 cm and 11 cm in diameter, were set in the floor 34 cm apart and 58 cm from the south wall in the west half of the room. There was a flat stone between them. The posts extended a maximum of 18 cm into the floor. Their ends were battered, as if pounded, and their tops were burned off to floor level. The pit in which the posts sat had been packed with stones. There was an irregular ash deposit, 6 cm deep, 43 cm wide and 64 cm long from the floor surface to bedrock.

Wall: The south wall abuts the west wall of this irregular room. The southeast corner appears to be bonded, although thick, rough plaster obscures the corner. The east wall, which rises to the cave roof, contains three upright posts incorporated into its masonry. Interior walls are not plastered. A large boulder is incorporated into the south wall.

Openings

The east wall only partially separates room 29 and 30. The opening between this partition and the cave wall is 1.38 m wide. The low south wall may or may not have had a doorway at one time. A doorway leads into room 24.

Ceiling and Roof Details

No evidence for a roof. The low cave roof would have made a constructed roof unnecessary. Although they do not now, the south walls of rooms 29 and 30 probably extended to the cave roof.
Discussion and Summary

Probably used for habitation, this room contained a pair of posts similar to those in room 24, just next door.

Room 30, Cave 5

Other Designations

Steen's Group II, room 17

Area

7.5 m²

Interior Features

Floor: Originally clay, now packed dirt. Vivian noted an oval hearth, about 36 cm by 39 cm, full of ash. The hearth bottomed on bedrock, about 5 cm below the remaining floor.

Fill: In 1963 the fill in this room was predominantly corncobs, about 24 cm thick.

Wall: The south wall abuts the east wall, and probably abuts the west wall, although the plaster on both walls is too thick to allow a definitive observation. The north wall is bedrock.

Openings

A 1.38 m wide opening between the end of the west wall and the bedrock connects room 30 with room 29.

Ceiling and Roof Details

The smoke-blackened cave roof is low here, serving as the roof of the room.
Discussion and Summary

This appears to have been one of a series of interconnected habitation rooms.

Room 31, Cave 5

Other Designations
Steen's Group II, room 21

Area
10.5 m²

Interior Features

Floor: Packed dirt and exposed bedrock.

Wall: The north wall is bedrock. The south and west walls are one continuous. The wall interior is unplastered and lacks smoke-blackening. Two negative handprints have been painted in red on the north cave wall, 32 cm from the floor and 118 cm from the west wall.

Openings

A gap between the south and east walls is the entrance into this room. This space has deteriorated and the original door shape and size cannot be determined.

Ceiling and Roof Details

No roof is evident for this room. The cave roof is relatively low.

Tree-Ring Dates
None.

Discussion and Summary

This was probably an enclosed work space.
Room 32, Cave 5

Other Designations
Steen's Group II, room 22

Area
8.3 m²

Interior Features
Floor: Packed dirt.
Wall: The north wall and a portion of the east wall are bedrock. The remaining masonry walls are evidently bonded. The east wall abuts the west end of the south wall of room 33. There is a small niche, 12 cm in diameter and 30 cm above the floor, in the bedrock toward the northeast. Wall interiors are not plastered; they have some smoke-blackening.

Openings
A doorway in the west wall opens into the area in front of room 31. It is 50 cm wide and 85 cm high.

Ceiling and Roof Details
Vivian recorded a "roof impression" in one wall 1.5 m above floor.

Tree-Ring Dates
None.

Discussion and Summary
The room is large enough to serve for habitation, but has no distinguishing attributes. The cave is smoke-blackened at the rear of the room. Since the west masonry wall abuts this, it shows prior use of the cave.
Other Designations
Steen's Group II, room 33

Area
25.0 m²

Interior Features
Floor: The rough sloping bedrock is filled over at the front of the room, forming a flat surface extending 2.8 m back from the masonry wall. Vivian recorded a plaster coating over bedrock. At the east end of the room, 1.45 m from the front masonry wall, and 1.1 m from the east cave wall, is an adobe-ringed post mold, 21 cm in diameter.

Wall: The room was formed by an unplastered masonry wall, rising a maximum of 1.72 m above the floor, that spans the front of a natural cavity in the bedrock. The wall interior is smoke-blackened. Three pole sockets are left in the wall, at distances of 0.3 m, 1.58 m and 2.5 m from the east wall of the room. They are on the same plane, measuring 0.7 m, 0.61 m and 0.57 m from the floor, respectively. Possibly they contained hanging pegs rather than being seats for shelf-supports, since they are below the level of the door lintel.

Openings
There is one small doorway with a split wood lintel, 62 cm high and 48 cm wide through the masonry wall. There is a small window, 23 cm high and 28 cm wide, between it and the east end of the wall.

Ceiling and Roof Details
There is now no evidence of a constructed roof; the cave walls and roof are smoke-blackened from about 1 m above the room floor. Vivian recorded two posts parallel to the front wall, and inferred that these were roof supports. Much of the smoke-blackening is spalled off. Over this is painted a panel of 17 or more pictographs in red paint (see Fig. 5.11). Most (about 13) are small simple anthropomorphs; two are concentric circles and two are quadrupeds. These span the rear cave
wall of the room, in a zone approximately 2 m above the floor. The west end of the masonry wall partly covers one figure, showing that the pictographs and smoke-blackening come from use of the cave prior to the room's construction.

Tree-Ring Dates
None.

Discussion and Summary
The abutting sequence indicates that this room was one of the earliest in cave 5, built prior to rooms 29 to 32. Lack of definite roof, wall plaster and hearth indicate that it was an enclosed work space rather than a dwelling.

Room 34, Cave 5

Area
4.5 m²

Interior Features
Floor: Bedrock.

Fill: In 1963 this room was filled to the top of the walls (about 30 cm) with refuse and charcoal. Vivian noted some ash toward the center of the room.

Wall: A few courses of masonry enclose a level area and a small cavity below room 33.

Openings
None recorded. The present doorway is an RSU creation.

Ceiling and Roof Details
There is no evidence for a roof. However, the cavity forms a natural roof 1.7 m high at the rear of the room and is clearly smoke-blackened. If a constructed roof extended out from this, it would form a walkway between rooms 32 and 33.
Tree-Ring Dates
None.

Discussion and Summary
This is surely a small storage area. Rooms 34 and 34A both open onto a natural ledge below the main cave floor.

Room 34A, Cave 5

Area
Unknown. This is a small smoke-blackened cavelet 2 m deep, 1.7 m wide, and 1.1 m high, whose floor is at the same level as room 34.

Interior Features
Floor: Bedrock.
Wall: No masonry exists.

Openings
None.

Ceiling and Roof Details
Natural bedrock roof.

Tree-Ring Dates
None.

Discussion and Summary
The location of this room is uncertain, since its designation is recorded only on artifact tags from the 1963 excavation.

Room 35, Cave 3

Area
Unknown.
Interior Features

Floor: No evidence.

Wall: All that remains of this enclosure is a single low straight masonry wall, 3.75 m long, 4 m from the cave wall. This wall is at the far west end of cave 3, and is partly built on top of a large boulder.

Openings

None.

Ceiling and Roof Details

No constructed roof.

Tree-Ring Dates

None.

Discussion and Summary

This may not have been a totally enclosed space, but only a barrier or retaining wall. There are no mud lines on the cave roof or wall where the wall might have contacted bedrock.

Room 36, Cave 1

Area

1.6 m²

Interior Features

Floor: Hard-packed dirt just above bedrock of the cave floor.

Wall: Only a few basal courses remain. The east wall is formed by the bedrock wall of cave 1. In 1968 Morris exposed and left in place 20 courses of a collapsed wall extending from the south wall of this room. Rubble also extends 59 cm to the west of room 36, suggesting a wall segment extending in that direction.

Openings

None remain.
Ceiling and Roof Details
   No evidence.

Tree-Ring Dates
   None.

Discussion and Summary
   This small room undoubtedly was used for storage.

Room 37, Cave 1

Area
   About 20 m minimum, including hearth and ash pits

Interior Features
   Floor: Hard-packed dirt above bedrock. At front center of the floor are two circular ash pits and a rectangular slab-lined hearth.
   Wall: This room is space bounded by room 36 on the east, the cave face on the north, and rooms 38 and 39 on the east. There is now no trace of a south wall.

Openings
   None.

Ceiling and Roof Details
   None.

Tree-Ring Dates
   None.

Discussion and Summary
   This appears to have been an open work area, flanked by three small storerooms. There is a possibility that it was enclosed by a wall on the south, but this consists only of a line of rock shown in an excavation photograph (see Fig. 4.6) and the collapsed rubble west of room 36.
Room 38, Cave 1

Area
2.8 m²

Interior Features
Floor: Packed dirt. No features.
Wall: Only low courses of masonry exist. This is one of two rooms formed when a partition divided a larger square room. Mud lines show where the east and west wall contacted the bedrock surface, extending to a height of 1.07 m above floor level.

Openings
There is a 38 cm wide opening in the east wall opening into room 37, and one 55 cm wide in the south wall opening into room 39.

Ceiling and Roof Details
No evidence remains.

Tree-Ring Dates
None.

Discussion and Summary
This room is a small storage area.

Room 39, Cave 1

Area
1.5 m²

Interior Features
Floor: Packed dirt.
Wall: Very low walls, only one to two courses high, remain. The south wall appears to bond with the east and west walls. The north wall abuts the east and west walls, separating this room from room 38.
Openings
There is a doorway in the north wall, connecting this room with room 38.

Ceiling and Roof Details
No information.

Tree-Ring Dates
None.

Discussion and Summary
This is a small storage area.

Room 40, Cave 4

Area
Unknown.

Interior Features
Floor: Bedrock and packed dirt.
Wall: The isolated south wall fragment would have abutted bedrock.
The north wall of this room would be the south wall of room 20.

Openings
None are currently evident.

Ceiling and Roof Details
No information.

Tree-Ring Dates
None.

Discussion and Summary
Not enough of this room remains to determine its use or size.
Room 41, Cave 4

Area
Not determined.

Interior Features
Floor: Sloping bedrock.
Wall: A very fragmentary masonry wall indicates that the large cavity below room 25 at one time was walled off.

Openings
None now remain.

Ceiling and Roof Details
Smoke-blackened bedrock ceiling; no evidence for a constructed roof.

Tree-Ring Dates
None.

Discussion and Summary
A very low wall and some trash indicate a room once existed here. The floor area would depend on where the floor level occurred. Use of the room is indeterminate.
Summary and Interpretation

by
Keith M. Anderson

Summary

Tree-ring dates and pottery types show that the settlement at Gila Cliff Dwellings was built quickly, in the A.D. 1270s and 1280s, during the final years of the Tularosa phase of the Mogollon tradition. The architecture of the site, seen as the exoskeleton of a human community, is perhaps the best source of evidence for the history, composition and size of that community.

There are several basic questions to be addressed in analyzing the architecture. Was the site a replica of others of the time and region, or did it serve a unique purpose because of its location and the cultural and social demands of the time? Obviously the site layout had to conform to the cave. What else was distinctive about the settlement? Was it just another small hamlet of farmers, or was its purpose more esoteric, perhaps for seasonal and/or ceremonial use? How many people dwelt there at one time?

Although short-lived, Gila Cliff Dwellings has some traceable sequence of growth. What does this sequence imply about the nature of the site, its social organization, and its place in regional cultural, demographic and social changes? Most human settlements reflect a larger social context in their organization and changes, and we assume that Gila Cliff Dwellings can tell us something of the processes at work in the Upper Gila generally.

The first problem to be resolved is the use to which different categories of rooms and spaces were put. Ordinarily, our inferences from architecture would be independently testable by the artifacts found in rooms and extramural locations. With the limitations on provenience data we cannot do this for Gila Cliff Dwellings. We must rely on inferences that walls, floors and features can support, bolstered by comparison with other Tularosa and Reserve phase sites. Fortunately, a number these have been extensively excavated.
Gila Cliff Dwellings now has remnants of 42 rooms, ranging from a tiny storeroom of 0.5 m$^2$ to a 75 m$^2$ courtyard taking up the west half of cave 2. The site is not organized in an immediately obvious repetitive pattern of distinguishable room types or clusters. Each cave contains its own distinctive assortment of walled spaces. Because of this lack of obvious pattern, an interpretation of architectural features must allow for alternative inferences. With the data at hand, even the possible population of the site must be estimated within a fairly broad range.

Looking at Gila Cliff Dwellings without previous reference to analogous sites in the Mogollon area, the rooms sort reasonably into storerooms, living rooms, courtyards, and communal structures. Table 5.2 lists all rooms and numbered spaces at the site, and what were recorded as their key characteristics.

One's first impression of the architecture is a lack of distinguishing characteristics or features; categorizing rooms requires careful scrutiny of subtle and minor aspects of construction.

Obviously size is the first, or one of the first, characteristics to be considered. Certain common-sense criteria apply; a room too small for a family dwelling is presumed a storeroom, if it is vandal- or pest-proof. Living rooms are next in size, and large rooms or spaces are presumed to have been used as multi-household or group communal structures. As Figure 5.10 shows, size alone gives no obvious clues to room use; the histogram shows a regular and gradual trend in increasing size up to structures of 16 m$^2$, which range includes all storerooms and all but one "living room." However, small courtyards also fall in the upper end of this range. There are relatively few structures that exceed 16 m$^2$ in area, and these are large courtyards or enclosed communal structures.

In support of these functional tags are relatively few variables of room construction. Roofs, of course, provide protection from weather, pests, and unwanted neighbors. One of the most striking features of Gila Cliff Dwellings is a relatively large number (at least 15) of unroofed structures; only 19 structures were fairly certain to have had constructed roofs or walls that extended to the natural cave ceiling. The residents of this settlement did a lot of out-of-door living.
Table 5.2
LIST OF ALL ROOMS AND NUMBERED SPACES WITH KEY CHARACTERISTICS

<table>
<thead>
<tr>
<th>GICL ROOMS</th>
<th>SIZE (m²)</th>
<th>FLOOR FEATURES</th>
<th>FLOOR</th>
<th>ROOF</th>
<th>DOOR(S)</th>
<th>OPENINGS</th>
<th>WALL FEATURES</th>
<th>PLASTERED INTERIOR WALLS</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75</td>
<td>C</td>
<td>U</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Open courtyard</td>
</tr>
<tr>
<td>2</td>
<td>12.5</td>
<td>E, R</td>
<td>U</td>
<td>3</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Entryway/living room</td>
</tr>
<tr>
<td>3</td>
<td>2.7</td>
<td>B</td>
<td>2</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Entryway/storeroom</td>
</tr>
<tr>
<td>4</td>
<td>4.4</td>
<td>B</td>
<td>2</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storeroom</td>
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<td>U</td>
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<td></td>
<td></td>
<td></td>
<td>Storeroom</td>
</tr>
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<td>1</td>
<td>x</td>
<td></td>
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<td>?</td>
<td>N</td>
<td>x</td>
<td></td>
<td></td>
<td>Living room</td>
</tr>
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<td>10</td>
<td>20</td>
<td>H, B</td>
<td>C</td>
<td>B</td>
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<td>Living room</td>
</tr>
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<td>14.5</td>
<td>H, B</td>
<td>C</td>
<td>B</td>
<td>?</td>
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<td></td>
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<td>Living room</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Probably not a room</td>
</tr>
<tr>
<td>16</td>
<td>13.5</td>
<td>U</td>
<td>1?</td>
<td>P</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Open work space</td>
</tr>
<tr>
<td>17</td>
<td>31.5</td>
<td>B</td>
<td>3</td>
<td>P</td>
<td>N, A</td>
<td>X</td>
<td></td>
<td></td>
<td>Communal structure</td>
</tr>
<tr>
<td>18</td>
<td>15</td>
<td>E</td>
<td>B</td>
<td>1</td>
<td>P</td>
<td>N, H</td>
<td></td>
<td></td>
<td>Storeroom</td>
</tr>
<tr>
<td>19</td>
<td>16</td>
<td>U</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unroofed enclosure</td>
</tr>
<tr>
<td>20</td>
<td>5</td>
<td>H(?)</td>
<td>C</td>
<td>B</td>
<td>?</td>
<td>V</td>
<td></td>
<td></td>
<td>Store/living room</td>
</tr>
<tr>
<td>21</td>
<td>48.2</td>
<td>U</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>Unroofed enclosure</td>
</tr>
<tr>
<td>22</td>
<td>13</td>
<td>E</td>
<td>U</td>
<td>2</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td>Unroofed enclosure</td>
</tr>
<tr>
<td>23</td>
<td>3.5</td>
<td>U</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passageway</td>
</tr>
<tr>
<td>24</td>
<td>9.5</td>
<td>P, H</td>
<td>E</td>
<td>B</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Living room</td>
</tr>
<tr>
<td>25</td>
<td>5.6</td>
<td>B</td>
<td>1</td>
<td>P?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storeroom</td>
</tr>
<tr>
<td>25A</td>
<td>5.6</td>
<td>R</td>
<td>N</td>
<td>1</td>
<td>V</td>
<td>X</td>
<td></td>
<td></td>
<td>Storeroom/living room</td>
</tr>
<tr>
<td>26</td>
<td>2</td>
<td></td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storeroom</td>
</tr>
<tr>
<td>27</td>
<td>25</td>
<td>Bn, Ba</td>
<td>C</td>
<td>B</td>
<td>1</td>
<td>S</td>
<td>X</td>
<td></td>
<td>Communal structure</td>
</tr>
<tr>
<td>28</td>
<td>10.5</td>
<td>E</td>
<td>B</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>29</td>
<td>10.5</td>
<td>H, P</td>
<td>C</td>
<td>N</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Living room</td>
</tr>
<tr>
<td>30</td>
<td>7.5</td>
<td>H</td>
<td>C</td>
<td>N</td>
<td>1</td>
<td>x</td>
<td></td>
<td></td>
<td>Living room</td>
</tr>
<tr>
<td>31</td>
<td>10.5</td>
<td>E</td>
<td>U?</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unroofed enclosure</td>
</tr>
<tr>
<td>32</td>
<td>8.3</td>
<td>E</td>
<td>B?</td>
<td>1</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td>Living room</td>
</tr>
<tr>
<td>33</td>
<td>25.0</td>
<td>P</td>
<td>C?</td>
<td>U</td>
<td>1</td>
<td>P</td>
<td>H?</td>
<td></td>
<td>Unroofed enclosure</td>
</tr>
<tr>
<td>34</td>
<td>4.5</td>
<td>H?</td>
<td>N/B?</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>Storeroom</td>
</tr>
<tr>
<td>34A</td>
<td>?</td>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Use unknown</td>
</tr>
<tr>
<td>35</td>
<td>?</td>
<td></td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Probably not a room</td>
</tr>
<tr>
<td>36</td>
<td>1.6</td>
<td>E</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storeroom</td>
</tr>
<tr>
<td>37</td>
<td>20+</td>
<td>H</td>
<td>E</td>
<td>U</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Open work space</td>
</tr>
<tr>
<td>38</td>
<td>2.8</td>
<td>E</td>
<td>?</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storeroom</td>
</tr>
<tr>
<td>39</td>
<td>1.5</td>
<td>E</td>
<td>?</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storeroom</td>
</tr>
<tr>
<td>40</td>
<td>?</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Use unknown</td>
</tr>
<tr>
<td>41</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Use unknown</td>
</tr>
</tbody>
</table>

KEY:
Roof: B = Built; N = Natural Bedrock; U = Unroofed
Wall Openings: P = Peephole; V = Vent
Wall Features: H = Niches; H = Hanging Pegs; S = Shelf; L = Ledge; A = Pictograph
Floor Features: B = Bench; S = Bin; H = Hearth; P = Posts; Ba = Basin
Prepared Floor: C = Prepared Clay; E = Hardpacked Earth; R = Ceiling of Room Below
Floors are often natural soil or bedrock surfaces; deliberate construction of a clay surface, or packed earth, bespeaks the care or heavy traffic associated with a dwelling or communal room.

Doors provide some clues to the amount and kind of access permitted. The majority are simply rectangular openings 30 to 55 cm wide and 50 to 95 cm high. Only in cave 2 do larger T- or L-shaped openings exist which channeled access between unroofed spaces. Probably the number of doors per room or enclosure is as important as size. Multiple doors occur in passageways, living rooms, communal rooms and courtyards. Storerooms with traceable doorways usually have only one.

Hearth, and there are few, indicate cold weather occupancy and/or cooking. Like roofs, these are relatively few (10) and only four are neatly constructed slab-lined pits. The rest are ash-filled basins or simply recorded as ash layers on or in the floor.

Wall plastering, while not totally consistent in its associations, may be one of the best clues to the use of a structure. Assumed to be a deliberate attempt at aesthetic improvement, it occurs in only 12 structures, and the best finished plaster is in the two largest rooms, 17 and 27.

Room shape, which shows little pattern beyond a dominance of 4-walled rooms and enclosures, can be discarded as a useful clue to room use. There is one 5-sided room (32), and others of a semicircular plan (24, 28, 33). Room shape was often determined as much by the contours of the cave walls as by any other factor.

Wall height, where it can be determined, is not significant; it is evident that the maximum wall or ceiling height was 2 m or slightly less, allowing room occupants to stand upright, or providing an effective screen for the inside of the enclosure.

A number of small features of floors and walls are found: benches, shelves, niches, peepholes, hanging ledges, vents and bins. These are of limited value in determining room use, since there are relatively few of any of them, and their associations are inconsistent. It is assumed that the greater variety of such features in a room, the greater variety of activities therein. Some have been previously determined to have special implications; hanging pegs, for instance, have been determined
by Dean (1969:28) to be a feature of granaries in Kayenta Anasazi cliff dwellings.

In looking at these rooms, then, the sorting was made as follows:

Storerooms are small (0.5 to 15 m$^2$) without interior plastering, having usually only one door, and may have hanging pegs and or niches in the wall.

Living rooms are intermediate in size (7.5 to 20 m$^2$), definitely roofed and usually have hearths. Interior walls of a few are plastered.

Unroofed walled enclosures usually lack plastered interiors, definite floors, or any other distinctive features. They range from moderate-sized rooms (10.5 m$^2$) to large enclosures (75 m$^2$).

Two rooms (17 and 27) are labeled as communal structures; they were the largest roofed structures (31.5 m$^2$ and 25 m$^2$) in the settlements, with smooth interior plastering, and a unique combination of wall/floor features. Room 27 apparently had a 1-m high shelf or balcony running the full length of one wall, and a rectangular bin or storage space in one corner. Room 17 had the only example of mural art, a number of wall niches, a platform in one corner, and two sizable storage chambers connected to it.

Building and Occupation Sequence

Although data on the relative age of room completion are sketchy, they suggest a west-east growth, with initial construction of storerooms and living rooms. Without tree-ring dates from Cave 1, we cannot put it in the sequence, although pottery (see tables 6.1-6.4) places it comfortably in the Tularosa phase, generally contemporary with the other cave occupations.

Cave 2 has the earliest timber cutting date, A.D. 1276, which comes from a small storeroom (Room 3), one of three small lower level chambers. The first room in the upper level was room 7, a large storeroom at the rear of the cave; subsequent construction extended out toward the front. During the occupation of cave 2, one of the doors in room 7 was sealed, leaving the front door as its only entry.

Wall joints in cave 3 are poorly preserved if at all, so the sequence here is not evident. Living rooms 9 and 10 have cutting dates
of 1284 and 1286, with probable stockpiling of timbers over this period. One enclosure in the cave interior (room 16) was built after the room 17-19 series separated caves 3 and 4; its wall abuts room 17. This series began with the construction of a large storeroom (18) in A.D. 1287. To this a large communal room (17) was added. In the same year, a small living room (24) was built. Construction of other rooms along the rear cave wall extended west and east from room 24, stopping at rooms 21 and 33, which had been constructed some time before this lateral growth ended.

Based on this admittedly incomplete data, it would appear that the primary requisite of occupation in the cave were storage facilities and dwellings. Once these basic requirements were met, and probably a certain minimum population was reached, the villagers then turned to construction of work enclosures and communal rooms. If in fact the settlement founders did stockpile beams, it shows a planned move. One might also suggest that initial occupation was in the summer, when the cave was comfortable without heated, enclosed dwellings and before stored food was a necessity.

The duration of occupation after about A.D. 1287 is unknown. One evidence of short duration is the lack of post-construction modification. Many floors are unfinished, although this may be because a bedrock foundation made it unnecessary to build artificial floors. Eight floors are labeled as "clay," 14 as packed earth; the rest have no record of built floors. There are no layered multiple floors in rooms; the only example of two floor layers was in the large western half of cave 2 (room 1), which may have been the first Tularosa phase occupation on the site.

There is an almost total lack of room remodeling. No walls were extended or rebuilt, and only three doors were modified; two rooms (7 and 20) have evidence of sealed doorways, and a door in room 27 was reduced in size.

Use of Space, in Comparison with Other Tularosa Phase Sites

Judging from the survey described in chapter 3, the occupation trend of the West Fork of the Gila River parallels that of the Tularosa
phase elsewhere. During this time a dispersed population that had occupied small farming hamlets concentrated in a relatively small number of larger settlements like Gila Cliff Dwellings (Bluhm 1959:541; Berman 1979:59-61; Fitting 1982:51), which was built during the final years of the Tularosa phase.

The tree-ring dates A.D. 1276-1287 indicate that this settlement was built perhaps in as little as 11 years. We presume it housed about 8-10 households who had abandoned small pueblo settlements to take advantage of the sheltered dry cave near a year-round spring. The cliff dwellings housed a relatively isolated settlement, during a time of harsh climatic straits—the well-known "Great Drought" of 1276-1299—when cliff dwellings in other parts of the Southwest, notably the Anasazi area, offered a haven to refugees in similar circumstances.

The purpose of this section is to determine if composition and use of space in the cliff dwellings gives any insights into the makeup of this settlement.

The room-by-room descriptions and functional classifications have already been discussed, and are summarized in Table 5.2. An obvious next step is to compare use of space in Gila Cliff Dwellings with other excavated Tularosa phase sites. In this comparison we are interested in determining whether the Cliff Dwellings was the usual year-round habitation, encompassing normal day-to-day activities, or whether it was the location of specialized activities, housing a special segment of the population, perhaps less than year-round. Was it established at the outset as a village relocation, or did it grow from a seasonal or ceremonial outpost? One avenue of investigating these questions is to compare the size, number and proportions of different categories of rooms (dwellings, storerooms and communal structures with other Tularosa phase sites).

The sites used in comparison are in the area where the Tularosa phase has been defined, in the San Francisco, Blue and Tularosa River drainages 50 or more miles (80+ km) northwest of Gila Cliff Dwellings. Multiroom open pueblos used for comparison are: Starkweather Ruin (Nesbitt 1938); Higgins Flat Pueblo (Martin and others 1956); Apache Creek Pueblo (Martin, Rinaldo and Barter 1957); Site 13 (Schroeder 1954); Site 9 (Borhegyi 1956); Armijo and Schoolhouse Canyon sites.
(Allen 1969); Whiskey Creek - LA4986, LA4988 (Kayser 1972b); Gallo Pueblo (Bullard 1950). One cliff dwelling, Hinkle Park Cliff Dwellings (Martin, Rinaldo and Bluhm 1954) is also used in comparison.

Starkweather Ruin, Site 9, Hinkle Park, LA4986 and LA4988 were completely excavated; between 20 percent and 70 percent of the other pueblos have been dug. This limits the potential for comparing percentage of different categories of rooms, but yields a total of 105 rooms excavated out of a probable total of 188. Size of these sites ranges from 8 to perhaps 50 rooms. Gila Cliff Dwellings is apparently the largest Tularosa phase pueblo that has been completely exposed.

The number, range and mean size of living rooms, storerooms and communal rooms in open pueblos are given in Table 5.3. Dimensions have been taken from scale maps, usually measured to the closest 0.5 m.

<table>
<thead>
<tr>
<th>ROOM SIZE IN TULAROSA PHASE OPEN PUEBLOS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL NUMBER OF ROOMS</strong></td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Living Rooms</td>
</tr>
<tr>
<td>Storerooms</td>
</tr>
<tr>
<td>Communal Rooms</td>
</tr>
</tbody>
</table>

Hinkle Park Cliff Dwellings, a small early Tularosa phase cliff dwelling, had the following array:

<table>
<thead>
<tr>
<th>ROOM SIZE IN HINKLE PARK CLIFF DWELLINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL NUMBER OF ROOMS</strong></td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Living Rooms</td>
</tr>
<tr>
<td>Storerooms</td>
</tr>
</tbody>
</table>

Areas of rooms in Gila Cliff Dwellings, calculated by using a grid overlay, are:
Table 5.5
ROOM SIZE IN GILA CLIFF DWELLINGS

<table>
<thead>
<tr>
<th>TOTAL NUMBER OF ROOMS</th>
<th>SIZE RANGE</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Rooms</td>
<td>8</td>
<td>7.5 - 20.0 m²</td>
</tr>
<tr>
<td>Storerooms</td>
<td>14</td>
<td>0.5 - 15.0 m²</td>
</tr>
<tr>
<td>Communal Rooms</td>
<td>2</td>
<td>25.0 - 31.5 m²</td>
</tr>
</tbody>
</table>

The above comparisons do not attempt to include all the rooms from Gila Cliff Dwellings. There are some that may be either storerooms or living rooms, some whose use is unknown or equivocal, and some walled but unroofed spaces that appear not to have any direct analogs in open pueblos. The 24 rooms from Gila Cliff Dwellings whose functions are identified fall easily within the size range of analogous rooms in other Tularosa phase sites. One notable exception is a storeroom (18) that is the largest reported for any of these sites. The unusual size of this room probably relates to its connection with communal room 17.

The space within caves 1-5 are apportioned as follows:

Table 5.6
FLOOR SPACE OF DIFFERENT USE-CATEGORIES
IN GILA CLIFF DWELLINGS

<table>
<thead>
<tr>
<th>NUMBER OF ROOMS OR SPACES</th>
<th>TOTAL FLOOR SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Rooms</td>
<td>111.0 m²</td>
</tr>
<tr>
<td>Living/Storerooms</td>
<td>10.6 m²</td>
</tr>
<tr>
<td>Storerooms</td>
<td>57.9 m²</td>
</tr>
<tr>
<td>Entryway/Living Room</td>
<td>12.5 m²</td>
</tr>
<tr>
<td>Entryway/Storeroom</td>
<td>2.7 m²</td>
</tr>
<tr>
<td>Work Area/Living Room</td>
<td>12.5 m²</td>
</tr>
<tr>
<td>Unroofed Enclosures</td>
<td>143.6 m²</td>
</tr>
<tr>
<td>Open Work Space</td>
<td>20.4 m²</td>
</tr>
<tr>
<td>Passageway</td>
<td>3.5 m²</td>
</tr>
</tbody>
</table>
Communal Structures 2 56.5 m²
Courtyards 3 648.5 m²

Of these categories, only living rooms, storerooms and communal rooms can be used in comparison with open pueblos, since the other categories of space are those found in plazas or space around rooms. These are difficult to define under the best of circumstances and most excavations of open Tularosa phase sites have included little extramural space.

The amount of floor space enclosed in storerooms and living rooms should give an index of the degree of permanency of a settlement, and the presence of nuclear family dwellings. The proportion of storage area to living space in the few sites that have been totally excavated is given in Table 5.7.

Table 5.7
PROPORTION OF STORAGE SPACE TO LIVING ROOM SPACE

<table>
<thead>
<tr>
<th>Site</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gila Cliff Dwellings</td>
<td>1:1.91</td>
</tr>
<tr>
<td>Starkweather Ruin</td>
<td>1:1.98</td>
</tr>
<tr>
<td>Site 9</td>
<td>1:1.92</td>
</tr>
<tr>
<td>LA4988</td>
<td>1:2.11</td>
</tr>
<tr>
<td>Hinkle Park Cliff Dwellings</td>
<td>1:1.50</td>
</tr>
</tbody>
</table>

This small sample suggests that the normal ratio of storage space to living space is about 1:2. The reasons for the slightly smaller amount of storage space at LA4988 are unknown—perhaps more storerooms lay outside the area excavated. Hinkle Park Cliff Dwellings, on the other hand, appears to have ample storage space, and may have held caches of food for use elsewhere. In any case, the residents at Gila Cliff Dwellings seem to have had the usual amount of pantry space for an established year-round settlement.

These numerical comparisons have treated Gila Cliff Dwellings as a unit, and indicate that, if our functional tags for rooms are correct, the completed settlement was a regular village with all rooms and space necessary to sleep in privacy, work comfortably, store food, and hold
communal gatherings and rituals. These activities were not neatly organized in clearly defined suites but were determined partly by the cave's shape and by the settlement's history. The apparent lack of roofed dwellings in caves 1 and 2 suggests that activities there differed from those in caves 3 and 4. If, in fact, the village began in these caves, as hinted by a single early tree-ring date, these may have been the localities of the first work parties, perhaps in warmer seasons, and the base from which the village proper was built in caves 3-5. The lack of definable room suites is apparently a Tularosa trait, but it may also be taken as an indication that the cliff dwellings were taken over by a whole community at once, rather than a move by one family after another. This is in accord with the short period of construction evidenced by tree-ring dates. Related to this is the very small amount of modification of the site; sealed doorways and layered floors are rare.

Presuming a general west-east direction of construction, and in view of the wall construction sequence of rooms 16-19, it appears that communal rooms 17 and 27 were built after the settlement was established. This supports the inference that the Gila Cliff Dwellings was intended at the outset as a settlement relocation, and did not begin as a ceremonial location to which dwellings were appended. Mammon came first. This appears to be the case also in Starkweather Ruin, Higgins Flat Pueblo, and the Schoolhouse Canyon Site. Indications at these sites are that the communal structures were built after the settlement was in use when a physical and social foundation had been established for communal and ceremonial activities.

Settlement Population

Population estimates for prehistoric southwestern pueblos have been attempted using various assumptions, analysis and indicators (see Turner and Lofgren 1966; Hill 1970:75-77), with the result being an estimate of five to six people per household. The best indicator of a household appears to be a hearth or living room, of which Gila Cliff Dwellings has
8 to 10. Using the conventional calculations then, we estimate that Gila Cliff Dwellings housed 40 to 60 people at its peak, assuming all living rooms were used at the same time.
Chapter 6
POTTERY

by
Keith M. Anderson

Introduction

Pottery analysis was undertaken primarily for estimating the span of occupation of Gila Cliff Dwellings and to look for Mogollon occupation that predated the standing masonry structures. We were also looking for macroscopically visible evidence of significant cultural contact outside the upper Gila. For this analysis we relied on standard type categories described in the literature (Martin and Rinaldo 1950a; Rinaldo and Bluhm 1956; Carlson 1970; Cosgrove and Cosgrove 1932; Kidder and Cosgrove 1949). Patricia Crown, Donald Graybill, Alexander J. Lindsay, Jr., Gloria Fenner and William Longacre examined painted sherds and helped in categorizing them. All pots and sherds from Vivian's 1963 excavations had been previously sorted and typed, presumably by D. Dodgen and G. Vivian. These sorts were all reexamined, and some minor changes made. Unfortunately, detailed provenience for this collection has been lost in the 20 years since excavation. Plain and textured sherds are stored in boxes segregated only by cave; painted sherds from all caves have been mixed together. Individual sherds have no provenience markings. Collections made by Steen in 1943 and Morris in 1968 had not been examined before.

Tables 6.1-6.4 (at the end of this chapter) list pottery from the site, and figures 6.1 through 6.7 show representative sherds and vessels. In most cases, pottery was sorted easily according to distinguishing characteristics of local types.

Types
Alma Plain

Alma Plain includes unpainted brownware sherds with noticeable variability in smoothness and evenness of exterior walls; however, there
appeared no reliably distinctive features for separating out kinds of surface treatment. Although these sherds apparently fit within the range included by others under Alma Plain, it appears, in this Tularosa phase context, to be a catch-all category which might be productively reexamined in the future. One plain miniature seed jar, 2.5 cm high and 3.5 cm in diameter, comes from the collection (Fig. 6.1d).

Corrugated

Corrugated vessel surface treatment falls within described types, although rims are occasionally difficult to associate with corrugation styles. A few brown indented corrugated sherds (less than 1 percent) were smoothed and polished after being indented.

Tularosa Fillet Rim

Tularosa Fillet Rim bowl sherds are the most common type, assuming that the smudged and burnished interior body sherds are associated with the fillet rims. One whole bowl (Fig. 6.2a) and four incomplete bowls are in the collection. Bowl diameters are: 12.5 cm, 16.5 cm, 17.0 cm, 28 cm, and 45 cm.

Unclassified White Ware

Unclassified White Ware sherds are those without black painted decoration, or with unclassified traces of painted elements.

Tularosa Black-on-white

(Figs. 6.2-6.5)

There is continuity of design from Reserve Black-on-white to Tularosa Black-on-white (Martin and Rinaldo 1950a:502-504; Rinaldo and Bluhm 1956:177-185), with primary changes in Tularosa Black-on-white being toward more crowded black elements, increased use of angular designs, finer brush work, more globular ollas, and eccentric handles and vessel shapes. The overall effect tends toward a "negative" design,
Figure 6.1 Pottery: (a) Reserve Black-on-white pitcher; (b) Tularosa Black-on-white pitcher; (c) Tularosa Black-on-white bird-tail vessel; (d) Alma Plain miniature seed bowl; (e) Tularosa Black-on-white ladle handle; and (f-g) Tularosa Black-on-white ladle bowls.
Figure 6.2 Pottery bowls: (a) Tularosa Filet Rim; and (b) St. Johns Polychrome.
Figure 6.3 Sherds: Tularosa Black-on-white design elements. Letters correspond to element categories.
Figure 6.4 Sherds: Tularosa Black-on-white design elements. Letters correspond to element categories.
Figure 6.5 Sherds: Tularosa and Mimbres Black-on-white sherds. Tularosa Black-on-white: (a) element R; (b) element S; (c) element T; (d) element U; (e) element V; (g) element W. Mimbres Bold Face: (f). Mimbres Classic: (h-i).
with painted elements dominating white field. Since the chronology of
the Gila Cliff Dwellings assemblage is important, and since the
provenience data for most sherds is unknown, we have tabulated and
illustrated elements and of all black-and-white pottery from the
1963 Vivian excavations to show the range of variation. All of this is
labeled as Tularosa Black-on-white, although some could be classified as
Reserve Black-on-white.

Elements (Figs. 6.3-6.5)

A. Linear or angular designs; broad solid lines alternating with
parallel-hatched bands. Design usually interlocking angular scroll
of alternating solid and hatched lines.
B. Opposing solid and parallel-hatched sawteeth.
C. Opposing solid and parallel-hatched terraces.
D. Alternating broad solid lines and diagonal hatched bands.
E. Interlocking spiral scroll, alternating broad solid lines and
diagonal hatched lines.
F. Connected solid, hatched triangles.
G. Hatchure-filled triangles (only portion of element preserved).
H. Nested zigzag solid lines.
I. Parallel solid lines in scroll, angular patterns.
J. Interlocking solid terraces (occasionally separated by linear
bands.)
K. Ticked lines.
L. Bands of parallel narrow lines used to separate other design
elements.
M. Solid broad line decorations. In interlocking scrolls on necks of
jars.
N. Miscellaneous solid triangles.
O. Hatched squares/trapezoids with solid elements.
P. Miscellaneous hatched elements, incomplete.
Q. Flying triangles.
R. Negative diamonds.
S. Cross-hatched and parallel hatched elements.
T. Hatchure-filled bands and solid terraces.
U. Hatchure-filled bands and stepped hatchures (one bowl with nested exterior design).
V. Heavy "squiggle" hatchures.
W. Barbed solid lines.

The only whole black-on-white vessel is a miniature Reserve Black-on-white pitcher, 6.5 cm high (Fig. 6.2a). Incomplete Tularosa Black-on-white vessels include: two small ladle bowls 12 cm and 13 cm in diameter (Fig. 6.2f, g); a ladle handle (Fig. 6.2e); and a small pitcher (Fig. 6.2b).

White Mountain Red Ware

White Mountain Red Ware sherds are predominantly St. Johns Polychrome; those with no exterior paint were tabulated separately, but differ in no other way. One 28-cm diameter bowl is partially reconstructed (Fig. 6.1b). Four sherds with subglaze paint are decorated in a Pinedale Polychrome or Black-on-red style (Fig. 6.6a) and come from one bowl.

Cloverdale Incised

Cloverdale Incised sherds (Fig. 6.6d, e) are all from jars with incised decoration in a herringbone pattern. This generally resembles sherds illustrated from the Pendleton Ruin (Kidder and Cosgrove 1949:Fig. 18).

Chupadero Black-on-white

Another exotic type is Chupadero Black-on-white (Fig. 6.6c), found in small numbers.
Figure 6.6 Exotic sherds: (a) Glaze-on-white; (b) Pinedale Polychrome or Black-on-red; (c) Chupadero Black-on-white; (d-e) Cloverdale Incised.
Subglaze Ladle Bowl

This is represented by six sherds of a small black-on-white bowl with terraced and long hatchure design (Fig. 6.6a). It appears to be within the range of Tularosa Black-on-white.

Lugs and Handles

Consistent with trends discussed by Martin and Rinaldo (1950a:503), there are only three strap handles. They are short, unlike those pictured on pitchers of Reserve Black-on-white.

There is one lug with encircling bast cordage still attached (Fig. 6.7f), one animal effigy lug (Fig. 6.7g), and two short vertically perforated lugs (Fig. 6.7e).

Unusual Vessel Shapes

There are sherds from two effigy jars, and one bird-tailed vessel (Fig. 6.1c).

Ceramic Pipe

One plainware sherd from a conical, tabular object appears to be a pipe. Maximum estimated diameter is 3.1 cm; length is 4.4 cm.

Worked Sherds

These are the usual scoops, scraping tools, and pendants made by grinding broken sherds to rounded or square shapes (Fig. 6.7a-c). Types are: San Francisco Red (6), Alma Plain (6), Burnished and Smudged Bowl (Tularosa Fillet Rim or Reserve Smudged) (1), Tularosa Black-on-white (2), and unidentified whiteware (1).
Figure 6.7 Worked sherds and lugs. Worked sherds: (a) smudged; (b) Tularosa Black-on-white; (c, d) San Francisco Red. Tularosa Black-on-white lugs: (e) vertically perforated; (f) cord-wrapped, and (g) zoomorphic.
Pot Mend

One sherd of San Francisco Red was drilled through, and holds a fragment of cordage, probably used to prepare the cracked pot (Fig. 6.7d).

Chronological Inferences

The Gila Cliff Dwelling ceramic assemblage is almost entirely of the Tularosa phase. Dominant types and relative proportions (Tables 6.1-6.4) fit with Tularosa Phase assemblages from the Reserve area reported by Martin, Rinaldo, and Barter (1957:Fig. 52). This conforms to an A.D. 1280 occupation. A small number of Mimbres Bold Face (Fig. 6.5f) and Classic (Fig. 6.5h, j) sherds may represent an early occupation. At a stylistic level of analysis, there is little difference between Gila Cliff Dwelling sherds and those from the San Francisco drainage, although there may have been slightly more connection with the Mimbres-Animas area (evidenced by the polished corrugated and Cloverdale Incised sherds). There is a hint of an earlier occupation in cave 6, from which Alma Plain and San Francisco Red are the only unpainted types, and Mimbres Classic is the only painted type. The latter type comes from the talus in front of the cave.
Table 6.1

PAINTED AND INCISED POTTERY:
ALL PROVENIENCES - 1963 EXCAVATIONS

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<td>B/R (probably St. Johns Polychrome)</td>
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<tr>
<td>Pinedale Polychrome/B/R</td>
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<tr>
<td>Cloverdale Incised</td>
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<td><strong>TOTAL</strong></td>
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*Six Mogollon sherds from cave 3; three from caves 4/5.
Table 6.2

TULAROSA (/RESERVE)
BLACK-ON-WHITE DESIGN ELEMENTS
FROM 1963 EXCAVATIONS

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<td>Caves 4-5 (Rooms 21-34)</td>
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### Table 6.4
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CHAPTER 7
STONE ARTIFACTS

by
George A. Teague

Introduction

Included in this analysis are stone artifacts, manufacturing debris, and other stones that were collected and used by the inhabitants of Gila Cliff Dwellings. This latter class comprises raw material, building stones, and unusual stones such as quartz crystals.

In all, 1,490 items were accounted for and analyzed. However, there are in effect several collections involved, not just one. The Vivian excavations produced three accession categories of differing analytical value: catalogued artifacts, from which much of the proveniencing information had been lost (710 specimens); uncatalogued specimens which still retained field numbers (306 items, mostly flakes); and unprovenienced artifacts boxed together with the Vivian collection (374 artifacts, mostly flakes and pieces of unworked stone). There are some 35 stone artifacts on display at the park, but I was able to run down the provenience for only 3 of them. These three were analyzed and are included in counts; the other 32 may or may not have come from the site, and hence were excluded from the analysis. In addition, Custodian Campbell recovered 28 stone artifacts in conjunction with the stabilization of Room 31 in 1962, and Don Morris recovered 69 stone artifacts during stabilization of various rooms in 1968. The Campbell and Morris collections were analyzed and are included in this study.

The major emphasis of analysis was on description and inventory of artifacts, with little refinement. The reason for this will be given in the section of this study devoted to data integration.

Descriptions

Details of the collection are presented here, in no particular order save the grouping together of groundstone, flaked stone, and so forth.
Manos

Definition

A tabular piece of stone that is rubbed back and forth on another stone (metate) to grind food such as corn (Woodbury 1954:66).

Number

Seventeen whole manos; 15 mano fragments.

Shape in Plan View

Ovoid 6; rectangular or subrectangular 19; irregular or indeterminate 7.

Size of Whole Specimens

Range: length, 14–28 cm; width, 7–14 cm; thickness, 3–8 cm. Mean: length, 19 cm; width, 11 cm; thickness, 6 cm. It has been a convention in older analyses to list manos in one-hand and two-hand categories depending on a subjective evaluation of size. Following this criterion, there are 11 one-hand manos and 14 two-hand manos in the collection. The others are fragments indeterminate as to original size.

Material

Basalt, 3; vesicular basalt, 9; quartzite, 3; rhyolite, 6; sandstone, 8; granodiorite, 1; felsite, 1; unknown material, 1.

Metate Type

It can be inferred from examination of end wear that some manos were used with trough metates. Five specimens show this distinctive wear; another seven may have it; five definitely do not have it. We may assume that these latter five were used with slab or basin metates. The remaining specimens did not lend themselves to this analysis.

Stages of Wear

Bartlett (1933) was among the first to note that differing mano forms may reflect changes in a cycle of use wear. Elsewhere (Teague 1981:202), I have defined four subclasses of manos that are thought to
reflect stages of wear. These are: I, relatively thick manos used on one face; II, thinner manos used on one face; III, thin manos, often wedge-shaped in cross section, and used on both faces; IV, thin manos wedge-shaped or faceted in cross section, and used on both faces. The Gila Cliff specimens fall into the following order: I, 5; II, 14; III, 8; and IV, 5. These subclasses reflect the progressive deterioration of manos through use, and in this case describe something akin to a normal curve in distribution.

Remarks

Nine manos were shaped by pecking and battering to size. Four show the effects of sharpening of grinding surfaces by pecking. One has "finger grips," which is to say a pecked linear indentation along the edge. Four are entirely unshaped and are ambiguous as to evidence of wear; these four may be mano blanks, manos in an initial state of use, or they may not be manos at all. Three specimens have vestiges of red pigment adhering to grinding surfaces, indicating use of these tools for purposes other than food processing.

Handstones

Definition

Small, water-worn pebbles exhibiting various signs of use, including striations and polish.

Number

Sixteen whole specimens; three fragments.

Shape

Eighteen are ovoid pebbles shaped, if at all, only slightly by wear. One is a rectangular fragment shaped by pecking and battering.

Size Range of Whole Specimens

Length, 1.0-6.5 cm; width, 2.0-6.5 cm; and thickness, 1.1-3.8 cm.
Material
Chalcedony, 1; chert, 2; quartzite, 7; basalt, 6; unknown, 3.

Remarks
Assumed uses are fine grinding and polishing. One specimen has traces of hematite. Two are battered on ends, suggesting use as light hammerstones. Two have grinding surfaces renewed by pecking.

Abraders

Abraders, in this case, are flat pieces of lightweight basalt scoria worn to a wedge shape in cross section. The extreme roughness of the working surfaces suggests an analogy to rasps or very coarse sandpaper in the modern tool kit. Two specimens were found, measuring 11 cm by 7 cm by 1 cm and 4.4 cm by 3.3 cm by 1 cm.

Pestle

One pestle was found. It is a long, cylindrical natural formation of a stone which may be schist. The object is minimally dressed by pecking and smoothing along its length to produce a more regular form. Considerably grinding and battering wear on both ends led to its classification as a pestle. There may be ceremonial or symbolic implications as well. Dimensions are: length, 42.5 cm; diameter 4.5 cm.

Metates

Definition
Metates are heavy slabs of stone modified by a mano in the process of grinding (Woodbury 1954:50). Elaborated trough metates are frequently dressed to give a regular rectangular form with high sides, but dressing to shape is an option with all forms, including slab and basin metates. It is assumed that the primary function of the implements is grinding corn or other food.
Number

Two whole metates; four fragments.

Size of Whole Specimens

42 cm by 34 cm by 10 cm and 37 cm by 29 cm and 16 cm.

Material

Sandstone, 1; vesicular basalt, 1; rhyolite, 2; rhyolitic conglomerate, 2.

Remarks

The two whole specimens are undressed slabs worn down mostly in the middle sections. They could be classified as slab metates or incipient basin metates. Of the four fragments, three have been dressed on the exterior, and probably represent trough metates in various stages of wear. The average grinding surface area on the whole specimens is 550 cm$^2$. The total grinding surface from the collection is about 2,000 cm$^2$.

Two thousand square centimeters is a small amount of grinding surface for a site the size of Gila Cliff Dwellings. Judging from other archeological collections, we might expect on the order of a dozen or more metates with a collective grinding surface area of 15,000 cm$^2$ or 20,000 cm$^2$. An explanation for the dearth of metates may lie in their attractiveness to collectors. Metates would likely have had high visibility in the relatively shallow deposits at the site, and may accordingly have been spirited away by visitors in the pre-park days. Alternatively, the metates may actually reflect a relatively low level of importance for corn growing and processing at the site. This latter is considered unlikely owing to the sufficiently large number of manos.

Mortars

Mortars in this case are small pieces of stone with deeply ground indentations. In other collections similar items have been called small stone bowls. There are two specimens in the assemblage.
Specimen 1 is a small, round piece of coarse-grained sedimentary rock 4.4 cm in diameter and 2.4 cm high. A 1.2 cm deep hole has been worked into one side. The exterior has been roughly ground to shape.

Specimen 2 is called a mortar for convenience; it could have been grouped with the palettes. It was made by grinding an indentation 2 mm deep into the surface of a flat dense stone (probably basalt). The object is broken. Dimensions are: length, 6.5 cm; width, 4.3 cm; and thickness, 1.7 cm. It bears traces of a white mineral substance.

Groundstone Balls

Three stone balls were found. Materials are basalt, rhyolite and granite. They were pecked and ground to subspherical shapes, but have no obvious usewear. One has a small indentation at one side, but it is unclear whether the hole was drilled or is a natural feature of the stone. Diameters are 4.5 cm, 5.0 cm, and 8.5 cm. Weights are 135 gm, 140 gm, and 750 gm. Function and use are unknown.

Groundstone Axes

Definition

Axes are assumed to have been hafted at the grooves and used primarily as chopping tools (cf. Woodbury 1954:25). Terminology in the description below follows Kidder (1932:45). The Gila Cliff Dwellings specimens were shaped by pecking and fine grinding.

Number

Four damaged axes; one bit end.

Average Dimensions

Overall: length, 13.3 cm; width, 7 cm; thickness 4.1 cm; Bit: length, 7.7 cm; Poll: length 3.1 cm; Groove depth: 0.5 cm.

Material

All are of diorite.
Remarks

All have taken considerable abuse. The poll of one has been heavily battered, while the bit end is dulled and spalled, suggesting possible reuse as a wedge. All show heavy microspalling and dulling on bit ends. Two of the bits have been crudely resharpened by the percussion technique. Damage is so extensive on upper ends that axe types could not be determined with confidence. One appears to be a three-quarter grooved axe, and another may be a full-grooved axe.

Straightening Tools

Two straightening tools were found. These are small blocks of shaped stone with grooves worn across the faces. It is assumed, based on ethnographic analogy, that these tools were used for smoothing and straightening wood shafts (Woodbury 1954:101-111). Both specimens have been roughly dressed to subrectangular shape. Both are of quartzite. Dimensions are 8.7 cm by 5.7 cm by 5.5 cm and 4.5 cm by 4 cm by 0.6 cm. One exhibits battering at one corner.

Decorative Items

This class comprises beads, a pendant, tesserae, an obsidian discoidal object, and fragments of polished turquoise presumed to have come from decorative items. In all, 22 objects were analyzed.

Beads are small pieces of stone ground and polished to flat discs, and biconically drilled through the centers. Pendants are flat, square or trapezoidal pieces of stone drilled offcenter for suspension. Tesserae are flat, squared pieces of polished stone assumed to have been prepared for use in making mosaic patterns. Shell pendants decorated with stone mosaics are known from the study area; however, it may be difficult to distinguish tesserae from undrilled pendant blanks. The obsidian object was pressure flaked across the exterior surface, edge trimmed to circular shape (as evidenced by short flake scars on the interior surface), then heavily ground on edges to produce a regular disc-shaped object. It is lenticular in section. Further details are given below.
Beads

Fourteen stone beads and one bead blank were found. Materials are: turquoise, 1; green stone, probably turquoise, 1; black stone (shale?), 2. Diameter range is 0.15-0.50 cm. Thickness range is 0.10-0.30 cm.

Pendant

The drilled pendant fragment is of green stone. Length is 0.7 cm, thickness is 0.3 cm.

Tesserae

One is of turquoise, two are probably of turquoise. Average length is 6.6 cm. Average thickness is 0.18 cm.

Obsidian Disc

This object is 1.3 cm in diameter and 0.4 cm thick.

In addition to the above, two small chips of polished turquoise were recovered.

Stone and Mineral Specimens

The collection contains 113 exotic stone and mineral specimens. Such items are assumed by analogy to have functioned in ritual context, to have been gathered by site occupants as curiosities, or to have been procured as raw material for paint, decorations, or tools. Descriptions follow:

Malachite Nodules

Twenty-one examples, the largest of which is 2.5 cm in maximum dimension. Malachite is useful for decoration, and may be ground for paint pigment.

Crystals

Seven examples, the largest of which is 5 cm in maximum dimension. Four are quartzite. Two are probably quartzite, but are so badly worn
that material type could not be determined. It is unclear if wear was natural or induced by man. There is also a gypsum crystal.

**Fossil**

One unidentified tubular calcareous specimen 5.4 cm in length.

**Chalcedony Concretions**

Two smooth, rounded specimens. Polish is probably natural. Maximum dimension of the larger object is 2.2 cm.

**Tabular Chalcedony Specimen**

One sample, 4 cm in maximum dimension.

**Geodes**

There are two, one of chalcedony, the other a pocket of silica crystals within a calcareous matrix. The chalcedony specimen has some incidental flaking, but was clearly not used as a raw material source because the stone is porous and suffers irregular fracture.

**Obsidian Nodules**

Forty-six whole and partial specimens, the largest of which is 3.5 cm in maximum dimension. These were boxed with the Gila Cliff Dwellings lithics, but were not marked. They may have been collected as nonarcheological comparative specimens. Worked examples of similar small obsidian nodules were recovered during excavations, and are listed elsewhere.

**Galena Specimen**

One was found, measuring 2.5 cm in maximum dimension. Galena can serve as a decorative item, or be ground for pigment.

**Iron Oxide Specimens**

There are 30 pieces of hematite and limonite in the collection. I assume these served as source material for paint pigments. The largest piece is 8.3 cm in maximum dimension. The composite weight is 560 gm, of which 370 gm is hematite. The specimens have been variously gouged,
striated, scraped, and faceted. Obviously, cutting and scraping were used as reduction techniques, as was grinding.

Other Stone Specimens

There are two irregular, unworked rocks in the collection, the larger of which is 16.5 cm in maximum dimension. One is quartzite, the other an unknown metamorphic rock. These stones may have been gathered as raw material, but were never processed.

Pigment Processing Tools

Included here are paint palettes and pigment grinding slabs. There are 14 items in this class. Paint palettes are made of thin (less than 1 cm thick) pieces of fine-grained basalt or tabular sandstone which have been trimmed by grinding on one or more edges and on one or both flat surfaces. All have red pigment remaining on them. The one whole specimen is trapezoidal and measures 9 cm by 6.5 cm by 0.5 cm. It has tick marks incised on one surface along three edges. There are also five palette fragments. These items are assumed to have been used for grinding of pigment, or at other stages in the preparation of paint. They do not correspond in workmanship or degree of elaboration to more formal palettes found elsewhere in the Southwest, as for example palettes of the Hohokam pre-Classic period.

There were found also eight unmodified, or cursorily dressed, pieces of tabular stone with red pigment adhering. These pigment grinding stones tend to be larger than palettes, ranging from 7 cm to 23 cm in maximum dimension. Materials are rhyolite, rhyolite porphyry, and fine-grained basalt. Simple stone slabs bearing traces of pigments have been found elsewhere in Tularosa phase context (Kayser and others 1975).

It is worth noting that there are a number of other tools, classified and tallied elsewhere, that bear pigment traces on working surfaces or edges. They include two manos, a mano fragment, a handstone, and eight edge-damaged flakes. One of the flakes has an edge polished to a dull sheen through use, although whether this use was restricted to pigment preparation cannot be determined.
Painted Stones

Two stones were found which appear to have been painted with a red pigment wash. One is a thin tabular piece of chalcedony; the other is a rhyolitic pebble. Both have striations on surfaces, as well as paint, but are otherwise unmodified. Function is unknown.

Miscellaneous Groundstone

There are nine groundstone objects whose function could not be determined. Included are three spalls from polished stone tools. Surface treatment and material are similar to those of ground stone axes and shaft straighteners. There are also two small pebbles ground on all surfaces. It could not be determined if these objects were used like handstones as grinding tools, or if they were in the process of being shaped into implement blanks. One of the specimens appears to have been drilled in a tentative way. In addition, there are two sandstone fragments which are wedge-shaped in section. All surfaces were ground, and these items may have been used as abraders, tabular knives, or decorative items. Finally, there is in the collection a fragment of stone ground to a rectangular shape in section, as well as a fragment of a stone rod ground to a taper.

Building Material

The excavators collected four pieces of roughly shaped stone which are assumed to have been used in constructing features at the site. One is a rectangular block of felsite measuring 13.5 cm by 8.2 cm by 4.5 cm. It was probably a wall stone, and may have been retained in the collections because of its resemblance to a large mano. The other three items are pieces of edge-trimmed tabular rhyolite. One whole specimen measures 29.5 cm by 22 cm by 2.7 cm. These artifacts may have been used as closures for wall openings, as deflector slabs, or as cooking slabs. Two show marks of burning.
Cores

Of the 28 cores, 22 were randomly struck wherever a suitable angle of attack presented itself. Three were flaked unifacially from a common platform, and another three were struck bifacially from a common ridge. There is no apparent sophistication in core treatment. Platforms were occasionally prepared by splitting cobbles, and edges may have been renewed by crushing or grinding. As is often the case, intentional platform renewal can be difficult to differentiate from battering wear. Size ranges from 3 cm to 11 cm in maximum dimension and averages 6 cm. Seven are of chert, 18 of chalcedony, and 3 of rhyolite.

Core Tools

Five cores had clear evidence of use as tools. Two show heavy battering wear on surfaces, indicating use as hammers. Three others have wear along relatively sharp ridges (about 45° intersections), suggesting chopping use. Size, material, and other attributes are consistent with those of normal cores.

Flakes

This class includes, for convenience, flakes, broken flakes, flake fragments and flaking debris (see Sullivan and Rozen 1985). No attempt was made to distinguish among them (except to sort out biface thinning flakes), nor to conduct any sort of detailed debitage analysis. For reasons presented in the interpretive sections, it was felt that attempts at technological reconstruction would be fruitless in the Gila Cliff Dwellings case. Of the 828 flakes, 278 were without any provenience markings at all, and were merely counted. For the remainder, material types were tabulated with the following results: obsidian, 63 specimens; chert, 223; chalcedony, 191; quartzite, 5; rhyolite, 68. A 10 percent grab sample was measured, revealing a size range in maximum dimension of 1.1 cm to 6 cm, with an average size of 3.2 cm. Thirty-five percent of the flakes in the sample have some degree of cortex remaining. Fifty-one could be classified as bifacial
thinning flakes. These are characterized by flat profiles and flat, overlapping flake scars on exteriors, are generally fan-shaped, and often have lipped striking platforms.

Irregularly Flaked Pieces

These are relatively large chunks or spalls of stone which have been repeatedly struck and flaked on one or more sides. Function is impossible to assign with any confidence because flaking is poorly patterned or because pieces are missing signature attributes. We might assume they are pieces of thinned and broken cores, heavy thinning spalls, crude preforms, shattered work, or otherwise abandoned work pieces. Size ranges from 2 cm to 8 cm in maximum dimension, and averages 5.2 cm. Material types are: obsidian, 2; chert, 30; chalcedony, 28; and rhyolite, 7. Total count is 67.

Edge-damaged Flakes

These are flakes whose edges demonstrate microspalling, grinding, or crushing wear. Damage may have resulted from use of an otherwise unmodified flake as a cutting or scraping tool, from bag wear, or from other noncultural processes. A high number (8/80) have red ochre residue on edges and surfaces, indicating association with pigment processing. One flake has its edge polished by wear. Size range is 1.5 cm to 7.5 cm in maximum dimension, with an average of 4.3 cm. Materials are: obsidian, 3; chert, 43; chalcedony, 24; rhyolite, 10. Total count is 80.

Retouched Flakes

Twenty-seven flakes were recognized as having regular, systematic retouch bifacially or unifacially. To fit the category, flakes were required to have retouch scars extending at least 3 mm in from edges, with the further condition that there be five or more contiguous scars per tool. It is assumed that suitably formed flakes were modified or
resharpened and used for a variety of tasks. Size range is 2 cm to 45 cm in maximum dimension, with an average of 3.8 cm. Materials are: obsidian, 7; chert, 8; chalcedony, 8; quartzite, 1; and rhyolite, 3.

Edge-trimmed Flakes

This category includes small thin flakes, the edges of which were nibbled by pressure flaking to produce a more regular outline. Finished forms are triangular or lanceolate. Flaking is unifacial or bifacial, extends no more than 2 mm or so from edges, and does not run across faces. These items could have been used for impromptu projectile points or other tools which required symmetrical configurations. Size range is 1.8 cm to 4 cm in maximum dimension, with an average of 2.6 cm.

There is in addition an edge-trimmed flake which falls outside the above range. It is a large (8 cm) fragment of a very flat chert flake. The surface has traces of green and red pigment. This item may have been used as a tool and later recycled as a pigment grinding implement, or it may have been designed solely as an edge-trimmed palette. This object has a 0.7 cm wide band of dark material on both sides of two edges. This material is more likely fugitive paint than plant residue. Materials are: obsidian, 2; chert, 3; chalcedony, 2; and rhyolite, 1. Total count is eight.

Unifacial Tools (Fig. 7.1h, i)

These are flakes whose edges have been heavily modified unifacially into straight, convex, or concave forms. Flaking is regular and consistent and extends along at least 2 cm of each retouched edge. Angle of retouch ranges from acute to obtuse. Assumed functions are scraping, cutting, and shaping. Size range is 3 cm to 7 cm in maximum dimension, with an average of 5.1 cm. Materials are: chert, 7; chalcedony, 5; quartzite, 1; and rhyolite, 4. Total count is 17.
Figure 7.1. Flaked stone tools. (a) Drill Type 1; (b) Drill Type 2; (c) drill fragment; (d) Perforator Type 1; (e) Perforator Type 2; (f-g) denticulates; (h-i) unifacial tools; (j) Biface Type 1; (k) Biface Type 2; and (l) Biface Type 3. Length of (c) is 5.2 cm.
Bifacial Tools (Fig. 7.1j-1)

Nineteen bifacial tools were identified and grouped into four types. Descriptions follow.

Type 1

Broad heavy bifaces with corner notches. A lanceolate form is assumed, but the Gila Cliff Dwellings specimens are incomplete. Two were found, one of chalcedony, the other of rhyolite. Both are broken in a way that original length and width could not be determined. Thickness is 0.7 cm. Similar, but not identical, large bifaces were found at Tularosa Cave in pre-Pottery through Tularosa phase contexts (Martin and others 1952:Fig. 46e, h). These may have been used as hafted cutting tools. It is of note, however, that tools of similar form found in the Four Corners area are usually identified as early pottery period projectile points.

Type 2

Relatively straight-sided lanceolate bifaces with slightly convex to convex bases. Sides taper near distal ends to form blunt tips. Compare with Type M-2 forms found in pre-Pottery through Tularosa phase contexts at Tularosa Cave (Martin and others 1952:Fig. 51m). One complete specimen is 4 cm long. Width range is 2.5 cm to 3.5 cm. Thickness range is 0.5-1 cm. Seven are of chert and one is of chalcedony, for a total of eight.

Type 3

Subtriangular bifaces with convex to rounded bases. Sides range from straight to slightly convex. Tips are relatively sharp. Compare with Type M-1 forms found in pre-Pottery to Tularosa phase contexts at Tularosa and Cordova caves (Martin and others 1952:Fig. 51q). All are pressure-thinned. Size range: length, 3.5-5.5 cm; width, 2.5-3.2 cm; thickness, 0.4-1.3 cm. Material types: obsidian, 1; chert, 3; chalcedony, 2; rhyolite, 2; for a total of eight.

It should be noted that types 2 and 3 grade into each other.
Type 4

Type 4 is represented by one discoidal specimen, percussion- and pressured-thinned. It may not be a finished tool. Maximum dimension is 3.4 cm. Thickness is 1.2 cm. Material is chert.

In addition to the typed specimens, there are 30 tips, midsections, and fragments of bifaces which could not be otherwise classified. These most resemble the typed bifaces in gross characteristics, but some could equally represent fragments of projectile points. Materials are: obsidian, 4; chert, 15; chalcedony, 9; and rhyolite, 2.

Biface Preforms

A biface preform is a flake which has been grossly modified into an uncompleted semblance of one of the formal bifacial tool types. Size range is: length, 4-7 cm; width, 2-6 cm; thickness 0.7-2.4 cm. Materials are: obsidian, 1; chert, 7; chalcedony, 4; and rhyolite, 3, for a total of 15.

In addition to the above, 20 biface preform fragments were found. Materials are: obsidian, 1; chert, 13, chalcedony, 4; and rhyolite, 2.

Denticulates (Fig. 7.1f-g)

These are sawtoothed tools formed by pressure-flaking small, regularly spaced notches along flake edges. Similar objects were found in San Francisco through Tularosa phase contexts at Tularosa Cave (Martin and others 1952:182). Note however, the technological simplicity and the ubiquity of distribution throughout much of the Southwest, especially in the Ceramic period. All seven of the Gila Cliff Dwellings specimens are of chalcedony. Size range is: length, 3.5-6 cm; width, 1.5-4.2 cm; thickness, 0.3-0.9 cm.
Drills and Perforators (Fig. 7.1a-e)

These tools are assumed to have been used in a twisting or pressing motion to produce small holes in a variety of materials. Descriptions follow.

Drill Type 1

These are abruptly flanged, tapering shaft tools with rounded bases. Shafts are diamond-shaped in section. Two were found, one of chalcedony, one of rhyolite. Both are basal fragments. Maximum width is 2 cm, and maximum thickness is 0.6 cm.

Drill Type 2

These have constricted convex bases with notching, and constricted tapering shafts. They may well be reworked projectile points. Two were found, one of chalcedony, the other of rhyolite. They can be compared with Type 3c drills from pre-Pottery levels at Cordova Cave (Martin and others 1952:Fig. 49k). One of the Gila Cliff Dwellings specimens in broken; the other measures 5.2 cm by 1.8 cm by 0.5 cm.

Drill Fragments

Three drill fragments were found. One is of chert and two are of chalcedony. The fragments are slender, bifacially flaked shaft segments with biconvex or diamond-shaped cross sections. Bases are missing, and these fragments may have come from types 1 and 2 drills.

Perforator Type 1

One specimen was found. It is a wide-based flake tapered at the narrow end by flaking to form a sharp tip. It is of chert and measures 3.4 cm by 1.5 cm by 0.6 cm. Similar tools have been found at Tularosa phase sites (Martin and others 1957:Fig. 42b).

Perforator Type 2

One example was found, a chaledony flake which was unifacially notched at two places, leaving a sharp tip formed by the adjacent
notches. Similar tools have been called gravers in other reports. The Gila Cliff Dwellings specimen measures 3 cm by 2 cm by 0.6 cm.

Projectile Points (Fig. 7.2a-o)

Sixty-three relatively small, finely thinned bifacial objects were classified as projectile points, following archeological conventions. The assumption is that these tools were hafted onto shaft ends to give a sharp point to arrows, darts, or spears. There may have been other usages intended by the makers. There is a fine, and usually subjective, line separating projectile points from other bifacial tools in typologies. Descriptions follow.

Type 1
Number: 3. Description: leaf-shaped with straight or slightly rounded bases. Materials: chert, 2; obsidian, 1. Size Range: length, 2.5-4.5 cm; width, 1.5-2.0 cm; and thickness, 0.4-0.6 cm. Comparisons: the form is too generalized to permit close reference, but compare with the Pelona Point from pre-Pottery midden levels at Bat Cave (Dick 1965:27).

Type 2
Number: 1. Description: leaf-shaped with relatively broad straight base. Size: length, 3.5 cm (broken); width, 2 cm; thickness, 1 cm. Material: chert. Comparisons: form is too generalized to permit diagnostic comparisons.

Type 3
Number: 1. Description: triangular, convex base, low side notches. Material: chert. Size: length, 3.3 cm (broken); width, 2 cm; thickness, 0.3 cm. Comparisons: similar to San Pedro points from southwestern Arizona (Sayles and Antevs 1941:Plate XVI); San Pedro points from pre-Pottery and pottery levels at Bat Cave (Dick 1965:25); San Pedro points from the Moist Midden at Ventana Cave (Haury 1950:288).
Figure 7.2. Projectile points. (a-b) Type 1; (c) type 2; (d) type 3; (e) type 4; (f-g) type 5; (h-i) type 6; (j) type 7; (k) type 8; (l-m) type 9; (n) type 10; and (o) type 11. Length of (a) is 4.5 cm.
Type 4

Number: 1. Description: straight-sided point fragment. Base has been snapped off and retrimmed. Rudimentary side notches near base. Material: chert. Size: length, 3.8 cm (broken); width, 2 cm; thickness, 0.6 cm. Comparisons: reworking renders close reference difficult but compare with San Pedro Point from Ventana Cave (Haury 1950:288); San Pedro Point from southwestern Arizona (Huckell 1984:Fig. 5.28).

Type 5

Number: 9. Description: triangular, convex base, low side notches. Similar in most ways to Type 4, except for cruder workmanship and greater reliance on percussion finishing. Materials: chalcedony, 2; chert, 2; rhyolite, 5. Size Range: length, 2.6-4.2 cm (all broken); width, 1.8-2.5 cm; thickness, 0.4-0.8 cm. Comparisons: similar to Dick's (1965:25) San Pedro, Small point type. Consider also the range of variation in San Pedro points from Ventana Cave (Haury 1950) and from southeastern Arizona (Sayles 1983). Compare also with Type E1 points from pre-Pottery and early pottery levels at Cordova Cave (Martin and others 1952:Fig. 46).

Type 6

Number: 17. Description: triangular with low side notches and expanding base. Bases are slightly convex. Pressure-flaked serrations on edges of one specimen. Materials: obsidian, 2; chert, 8; chalcedony, 6; rhyolite, 1. Size Range: 1.8-3.3 cm (whole specimens only); width, 1.1-2.2 cm; thickness, 0.6-0.2 cm. Comparisons: similar to San Pedro, Small point from Bat Cave (Dick 1965:25); various pre-Pottery and Ceramic period types at Tularosa and Cordova caves (Martin and others 1952); early Ceramic period points from the SU Site (Martin 1943:206-207); points from the midden at Ventana Cave (Haury 1950:293); and early pottery horizon points from southeastern Arizona (Sayles 1983:135). Similar points are also known from preceramic contexts in southern Arizona (Huckell 1984:personal communication).
Type 7
Number: 1. Description: presumably triangular, convex base, deep corner notching. Material: chert. Size: length, 2.8 cm (broken); width, 2.2 (broken); thickness, 0.4 cm. Comparisons: similar to Type B1 points from pre-Pottery and ceramic period levels at Tularosa and Cordova caves (Martin and others 1952:148). Note, however, that the general form is common to many horizons in the western United States; for example, compare Elko series points from the Great Basin and Marcos series points from Texas. In short, this type is of limited diagnostic value.

Type 8
Number: 4. Description: small, subtriangular points with expanding stems, low side notching, and convex bases. Material: all obsidian. Size Range: length, 1.5-2.3 cm; width 1.4-1.7 cm; thickness, 0.3-0.4 cm. Comparisons: similar to Type 8 points from pre-Pottery and early pottery levels at Bat Cave (Dick 1965:26); points of the Early Pottery horizon from southeastern Arizona (Sayles 1983:Fig. 11.3e); point Type D from pre-Pottery and early pottery levels at Tularosa and Cordova caves (Martin and others 1952:1150); points from terminal Archaic-early Basketmaker context at En Medio Shelter (Irwin-Williams 1973:Fig. 6).

Type 9
Number: 2. Description: small triangular points with straight or slightly concave bases. Material: chert. Size Range: length, 1.6-1.7 cm; width, 0.8-1.2 cm; thickness 0.2-0.3 cm. Comparisons: similar to many small, poorly differentiated triangular points found throughout the greater Southwest in late Ceramic horizons. In the immediate area, compare with points from the Tularosa phase at Higgins Flat Pueblo (Martin and others 1956:Fig. 53).

Type 10
Number: 3. Description: small, triangular, corner-notched points with constricted bases. Material: all obsidian. Size Range: length, 1.5-2.1 cm; width, 1.0-1.8 cm; thickness, 0.3-0.5 cm. Comparisons: a
similar point was reported from Tularosa phase context at Pine Flat Cave (Gifford 1980:172).

Type 11

Number: 1. Description: extended triangular form, with straight edges and slightly concave base. Material: obsidian. Size: length, cm; width, 0.9 cm; thickness, 0.2 cm. Comparisons: similar to points from Tularosa phase sites in western New Mexico (Martin and others 1957:Fig. 42).

Projectile Point Fragments

There are 31 bases, tips, and midsections which could not be put into type categories. Formal characteristics and techniques of manufacture suggest that these objects are in fact fragments of projectile points; however, some may be pieces of broken bifaces other than projectile points. Materials are: chert, 9; chalcedony, 8; obsidian, 10; and rhyolite, 4.

Data Integration

Introduction

Since we lack information on the context of the Gila Cliff Dwellings artifacts and their relationship to one another, few defensible conclusions can be reached other than those involving inventory and description.

Most of the artifacts have lost useful provenience information. As it happens, most of the groundstone (about 5 percent of the total collection) retains some degree of proveniencing, as do a quantity of flakes. Unfortunately, inspection of these flakes, and comparison of them with inventoried specimens elsewhere, indicates mostly large flakes may have been kept and small flakes discarded, introducing an analytical bias. It might be well to mention in passing that keeping any flakes from a Ceramic period site in the early 1960s represented advanced technique on the part of Vivian and his staff. Be that as it may, the
flaked stone assemblage in general did not fare well after recovery. For unknown reasons, most flake tools, including projectile points, were grouped together in a bulk accessioning system which obscured the context or place of origin of the artifacts. Only a fraction of flaked artifacts (about 7 percent of the total collection) have endured with some sort of provenience intact. Provenience retention followed no discernible system, a problem which renders reconstructions suspect at best. Where documented, only horizontal proveniencing is available, and that at the fairly gross level of room or cave. Interpretations are further complicated by the fact that site occupation by two quite different cultural groups has been detected through analysis. Given the state of our knowledge on lithic artifacts from the Mogollon country, it is impossible to separate the two with any precision. With the exception of projectile points and some groundstone tools, any artifact in the collection could reasonably be assigned to either occupation. This obviously precludes any in-depth treatment of technology, trade, or other questions that requires quantification. Thus, the collection must be understood to contain members of two artifact populations which cannot be easily separated. Nonetheless, we can offer some subjective interpretations.

Culture-Historical Affiliations

Although the ceramic assemblage falls entirely within the Tularosa phase, initial examination of the lithic collection left me with the impression that some of the artifacts, in particular projectile points, dated from an earlier period. Subsequent analysis sharpened this impression.

Mogollon stone technology was conservative, changing little through time, except for variations in projectile points (Martin 1979). Among flake tools in general, there is a tendency, noted elsewhere in the region, for projectile points, bifaces, and unifacial tools to decrease in size through time, with larger forms occurring mainly in Archaic/pre-Pottery contexts (specific references by item are given in the text, but see also Jelinek 1967:110-111, and Roney 1985). Many of the large bifaces and heavy unifacial tools from Gila Cliff Dwellings
would be at home in an Archaic period assemblage. However, these forms are not outside the range of variation to be expected for later Ceramic period assemblages, and their presence is at best suggestive.

Differences between assemblages are mostly a matter of differing quantities of tool types. I was not able to sort artifacts into stratigraphic components or associational tool kits, however. Most artifacts, with the exception of projectile points, are consistent with Tularosa phase artifacts from other sites. Included are trough metates (as well as slab or basin forms); small and large ("two-hand") manos; small mortars; groundstone balls; grooved axes; straightening tools; crude palettes; beads and pendants; and a variety of utilitarian flaked stone tools.

Most of the projectile points, in contrast, are similar to those of the Archaic and pre-Pottery traditions. These points (types 3, 4, 5, 6) have strong affinities in style with preceramic San Pedro points from elsewhere in southern New Mexico and southern Arizona. There are also four points (Type 8) which are similar to points from pre-Pottery/Early Pottery horizons in the same area. Only six points (types 9, 10, 11) fall neatly within Tularosa phase typologies. The large number of points which agree with Archaic styles is strongly suggestive of a substantial Early period occupation, but the extent of Archaic tools and manufacture debris in the collection cannot be even approximately estimated without better contextual information. It is worth noting that the ratio of Archaic style points to Tularosa phase style points (28:6) may not indicate anything like a predominance of Archaic tools in general, but may instead indicate a shift in subsistence focus, with projectile points assuming a larger role in the early occupation. It must be remarked also that larger, notched points are commonly found on Tularosa phase sites, where they are assumed to have been collected from earlier sites by the Tularosans. To make the list of possibilities complete, consider also that the large points we call Archaic may eventually be found to extend later in time than we now think. For the time being, however, it is reasonable to draw a distinction between the large notched points and the smaller triangular ones.

Dates for the San Pedro complex vary, but it may be assumed that projectile point styles were firmly established by 1000 B.C., and may
have extended as late as A.D. 500 (Irwin-Williams 1979; Cordell 1984:114). Whatever the exact dates, the important thing is that projectile point styles and quantities suggest the Gila Cliff Dwellings collection has members of two distinct assemblages, one of the Late Archaic/pre-Pottery period, the other of the Tularosa phase Mogollon.

One other observation is of moment. A quantity of simple, edge-trimmed flakes, as described in the text, was found. Technologically similar items have been found elsewhere in Historic period context (Shenk and Teague 1975; Whittaker and Fratt 1984). It is entirely unclear at present whether edge-trimming is a purposive technique diagnostic of Protohistoric and Historic period manufacture, or whether such objects would be commonly found in prehistoric collections if a search were made for them.

Material Types and Sources

Fine-grained stone useful for flaked tools is widely available in the study area, as are basalts and various metamorphic and sedimentary rocks of the sort used in the manufacture of groundstone tools. No formal comparative studies were undertaken, but chippable stone was seen to occur abundantly in cobble form within 1 mile (1.6 km) of the site.

Flaked stone material types enumerated in the text follow a sort of folk taxonomy invented by local archeologists to address the problem of contradictory or overly inclusive definitions found in standard mineralogical texts. The salient characteristic of the Gila Cliff Dwellings flaked stone is, of course, a microcrystalline structure that lends itself to conchoidal fracture. Included are three varieties of quartz: quartzite (grainy texture at fractures, opaque); chert (fine-grained, relatively brittle, opaque); and chalcedony (fine-grained, waxy textured, translucent). These stones are sometimes difficult to distinguish from one another. Two igneous stone types are present also. Rhyolite is similar to chert in gross appearance, but usually has a tougher structure. It is marked by phenocrysts. Obsidian, commonly known as volcanic glass, is black, lustrous, and passes light easily. Obsidian found at the site came as small nodules.
Nodular obsidian is known to have been used as raw material at other Mogollon sites. For example, specimens were recovered from the Tularosa phase Pine Flat Cave (Gifford 1980:172). Deposits of similar raw material occur near Clifton and Globe, Arizona. Closer to home, sources of nodular obsidian have been reported at Antelope Wells, Mule Creek, and Red Hill, all in southwestern New Mexico (Findlow and Bolognese 1980). The Antelope Wells obsidian may have been exploited as long ago as the Archaic period. There may be other unreported deposits in the region as well.

High grade turquoise sources have been found 40 miles (64 km) to the south near Silver City, New Mexico (Talmage and Wootton 1937), and there are other sources to the north (cf. Weigand, Harbottle and Sayre 1977). Other green and blue cuprous minerals are found throughout southwestern New Mexico, as are iron and lead ores (Lasky and Wootton 1933).

In summary, stone of the kind found at Gila Cliff Dwellings is at least potentially available in a zone extending no more than 40 miles (64 km) from the site. Thus, no elaborate exchange networks need be invoked to account for the supply of lithic raw materials to the site. Exact sourcing of materials would, needless to say, require more sophisticated physical and chemical analysis.

**Technology**

Taken as a whole (and without regard to the mixing of artifacts from disparate occupations), we can say that local stone was reduced to produce flakes at the site, and that flakes were modified into finished tools there also. Tools may have been produced offsite as well, but there is ample manufacturing debris in the Gila Cliff Dwellings collection, including 28 cores, 777 flakes, and 51 biface thinning flakes. There are also irregularly flaked pieces and tool preforms.

There is no evidence of stockpiling of lithic raw materials; in all likelihood, raw material was tested for suitability at quarries before being imported to the site.

Manufacturing technology is casual, and involves multiple striking of cores until they were no longer useful. Platform preparation is
unrefined, and symmetrical highly finished shaping is restricted to bifacial tools. Cores were recycled as hammer stones. Core tools are a very minor element in the collection. Stone flaking resulted in production of a large proportion (161/276) of well finished specialized tools such as projectile points, drills, and unifacial and bifacial cutting and scraping tools. Projectile points and point fragments are especially prominent, making up one-third of the flake tool assemblage (94/276).

There is a suggestion that obsidian and chalcedony are more frequent in the Tularosa phase assemblage than in the earlier assemblage. Given the small numbers of diagnostic artifacts, this remains, however, little more than a speculation. It would seem that chert was processed more efficiently than chalcedony, since about twice as many chalcedony waste flakes per chalcedony tool were noted in comparison with the chert flake:chert tool ratio.

Intrasite Spatial Distributions

An attempt was made to plot horizontal locations of artifacts in the hope of gaining some insight into patterns of use and function within the site. This effort was doomed to failure for two reasons. First, as has been discussed, it is difficult, if not impossible, to separate earlier from later occupations at the site on the basis of artifact form and style (with the exception of a few artifacts). This problem is compounded by a lack of vertical separation in the deposits. Second, only 521 artifacts retained provenience sufficient to assign them to the rooms or caves from which they came. Worse, of this number two-thirds are flakes. Clearly, meaningful quantification was impossible. For the record, the areas of densest distribution (areas containing more than 15 stone artifacts) are as follow: Cave 2—rooms 1, 7; Cave 3—extramural space at the back of the cave and rooms 9, 10A; Cave 4—rooms 17, 23; Cave 5—Room 27 and the back wall suite of rooms 29, 30, 31. Caves 1 and 6 have only a few flakes scattered in extramural areas.

Artifacts were divided into five complexes in a further search for patterned differences in distribution. The complexes are: 1. Grinding
(manos, metates, handstones); 2. Tool Manufacture (cores, flakes, irregularly flaked pieces, preforms); 3. Flake Tools (retouched flakes, edge-trimmed flakes, unifacial and bifacial tools, denticulates, drills, projectile points); 4. Ceremonial/Decorative (stone balls, painted stone, mineral specimens, decorative items like beads); 5. Paint (pigment, paint grinding tools, mortars, palettes).

Separate examination of stone complex distributions revealed a pattern that almost exactly mirrors the distribution of all stone artifacts. That is, distribution of each class of artifact was centered on the rooms which contained the most artifacts in general—rooms 1, 7, 9, 10A, 17, 23, 27, 29, 30, and 31, and the Cave 3 extramural space.

I next inspected the collections for an index of diversity, reasoning that the presence or absence of complexes might be suggestive of differing use or function of spaces. As it turned out, the diversity of stone objects was parallel with the distribution of artifacts on the whole. Spaces which had members of at least four of the five stone artifact complexes are: rooms 1, 9, 10A, 17, 27, 29, 31, and 34.

All of this leaves the fairly unhelpful statement that provenienced artifacts are clustered in a poorly differentiated way in some parts of the site, but not in others. There are ways to account for these distributions, but we must accept that there are problems due to sample size or sample bias. Possible factors involved are:

1. More extensive excavation in selected areas.
2. Differential recovery space, there being a greater volume of deposits in Room X than Room Y.
3. Differential artifact recovery rates introduced by the excavators or imposed upon them by circumstance.
4. Different retention rates of artifact classes in field or lab.
5. Nonsystematic rates of survival for provenience designations. For example, most projectile points have lost provenience while most groundstone artifacts have retained it.
6. Differing context of recovery spaces. For example, deposits may represent trash dumping as opposed to in situ discard or loss. There may be other agencies implicated as well. See Schiffer (1983) for a discussion of this problem.
Of course, the spotty record of stone use that has survived may indeed be an accurate reflection of intensity and diversity of activities at the site. Even if this were true, we cannot sort earlier occupation uses from those of the later occupation. In any case, the data are not available to allow assessment of the factors listed above. If any useful information can be gleaned from the distribution of provenienced stone artifacts, it is a list of rooms which did not contain stone artifacts (at least, as far as we know). These are: rooms 2, 4, 6, 11, 12, 14, 15, 18, 19, 21, 26, 28, 32, 33, 36, 37, 38 and 39. It is assumed that, lithic flakes and other artifacts being quite numerous, there is a high probability of at least one occurring in each excavated space. The fact that some rooms seem not to have produced any suggests that these rooms may have been subject to lower impact from archeology, and will have a higher probability of containing intact deposits. Alternatively, there may have actually been no stone artifacts in a particular room owing to thin deposits, lack of use involving deposit of artifacts, or previous unrecorded excavation or vandalism.

Conclusions

The important findings of the stone analysis are these:

1. There are strong indications (by way of a predominance of early period projectile points) that the site was occupied in the Late Archaic/pre-Pottery Mogollon period, at some time prior to A.D. 500. The major occupation of the site occurred later during the Mogollon Tularosa phase. Projectile points aside, the stone collection could be considered consistent with those from other Tularosa phase sites. There is the possibility, suggested by a quantity of small edge-trimmed flakes, of ephemeral aboriginal use of the site during the Protohistoric/Historic period, but evidence is far from conclusive.
2. Deposits of raw material comparable to that used at Gila Cliff Dwellings are known to exist within 40 miles (64 km) of the site. Thus, there are no necessary indications of participation in elaborate regional networks of stone exchange.

3. Tools were made and refurbished onsite. Technology is conservative and poorly refined for the bulk of the collection, although there was clearly the capacity in the manufacturing repertoire for production of highly finished, symmetrical tools. Projectile points make up a disproportionate part of the flaked tool inventory.

4. A study of intrasite stone artifact distributions was inconclusive. There are some areas of the site where artifacts cluster in high density, and with considerable diversity, but the meaning of these clusters is unknown.

Acknowledgements

Bruce Huckell, Michael Schiffer, Alan Sullivan, and Joe Ben Wheat looked at the stone artifacts and gave their opinions on typology, for which I am grateful.

George A. Teague
Chapter 8
BONE ARTIFACTS

by
Gloria J. Fenner

Artifact types for the 57 bone tools, ornaments, socioreligious items, and scraps from Gila Cliff Dwellings were based on previously published descriptions of Mogollon and other artifact types. Species identifications of bird bone artifacts had previously been done by Charmion McKusick. Christine Szuter, a University of Arizona graduate student, graciously volunteered to do other needed identifications; she was aided in this work by Sandi Olsen. It is with gratitude that the work of all of these individuals is acknowledged.

Utilitarian Objects

Awls

More of the bone artifacts were classified as awls than as any other object. These 25 items did not differ from awls described in the literature of contemporary or other comparative sites, but perhaps there was more of a variety in this collection. However, the latter observation may be due to differences in typology and/or lack of detail in published descriptions. Basically, there are three awl types: those that are unsplit (head or shaft); split, with or without further shaping; and splinter. The unsplit awls are only modified to make the point. Two are heavy-duty awls, one probably deer bone (Odocoileus virginianus) and the other looks much like a fox ulna awl reported in the Reserve area (Martin, Rinaldo, and Bluhm 1954:146); both of these are on exhibit and could not be properly identified. The third specimen is a tiny rabbit (Sylvilagus sp.) bone awl, the small point apparently broken and chipped to shape (Fig. 8.1a).
Figure 8.1 Bone artifacts: (a) Unsplit awl; (b) half-split awls (2); (c) quarter-split awl; (d) splinter awl; (e) shaped splinter awl; (f) die; (g) shorter tubes; (h) claw; (i) generalized tool; (j) end scraper; and (k) rib scraper.
Eleven awls are classified as split long bones. Four are split in half (Fig. 8.1b) and include two distal metatarsals without further shaping of the head, although the shaft is cut down (notched) to a quarter-split size. The material is *Odocoileus* cf. *O. hemionus*, and *Artiodactyla* cf. *Odocoileus* sp./*Antilocapra americana*. The tips of both are missing. Two others are proximal metatarsals and both heads are somewhat ground down and rounded off; the shafts taper to less than half-split size. Both are *Odocoileus* cf. *O. virginianus*. One has a blunt, chipped, heavy point; it is 9.0 cm long, 1.7 cm wide, and 1.0 cm thick. The second is polished from handling and the point is very fine, highly polished from use, and a tiny bit is broken off; it is 8.0+ cm long, 1.6 cm wide, and 1.1 cm thick. Five awls are quarter-split (Fig. 8.1c). These are similar to the half-split except that the articular heads have been worked down more and they are longer awls; all tips are missing. One has heavy (use?) scratches on all surfaces at a right angle to the length. Two are *Odocoileus* cf. *O. virginianus*, one is *Odocoileus* cf. *O. hemionus*; two are unidentified large mammals. The longest is 9.7+ cm; widths range from 1.1 cm to 1.6 cm, averaging 1.4 cm, thicknesses from 0.6 cm to 1.0 cm, averaging 0.8 cm. The two shaped splinter awls are basically quarter-split segments of unidentified mammal long bone shafts that are nicely ground to shape (Fig. 8.1e). The butt of one is cut straight across and somewhat spatulate. The longer one is 12.5 cm long and 1.0 cm wide; the incomplete awl is 8.0+ cm long and 1.3 cm wide.

Four specimens are common splinter awls (Fig. 8.1d). Two have incisions near the butt end on one or both edges and one of these has a lot of use scratches on the convex side of the butt end. Lengths range from 8.0 cm to 10.3 cm, averaging 9.2 cm; widths from 0.6 cm to 1.2 cm, averaging 1.1 cm; and thicknesses from 0.4 cm to 0.6 cm, averaging 0.5 cm. Two are *Artiodactyla*, and two are unidentified large mammal.

Six awls are fragments and could not be classified to type. Four are tips (one *Artiodactyla*, three medium-large mammal). There are also two large mammal long bone shaft fragments, a highly polished quarter-split piece and a half-split one. Finally, one awl is missing and could not be classified at all.
Ulna awls, split metapodial awls, and long bone awls with the articular head highly modified or removed, as well as splinter awls, are found at contemporary sites in the Mogollon area, including O Block Cave and Cosper and Hinkle Park Cliff-Dwellings (Martin, Rinaldo, and Bluhm 1954:91, 146-147); Higgins Flat, Apache Creek, and Valley View Pueblos (Martin, Rinaldo, and Barter 1957:82-84; Martin and others 1956:114-117); Starkweather Ruin (Nesbitt 1938:107); and Red Bow Cliff-dwelling (Gifford 1980:67-68). A tiny "bird bone" awl has been reported from Hawikuh (Hodge 1920:79, Fig. 7).

Scrapers

Two end scrapers were recovered from Gila Cliff Dwellings. These were made from large mammal long bone shaft sections. One is a half-split segment; one long edge on the concave side is highly polished from use. It is 5.0+ cm long, 1.9+ cm wide, and 0.7+ cm thick. The other is a wide, smoothed splinter; the working end is rounded in plan and flattened from use on the concave side (Fig. 8.1j). It is 11.4 cm long, has a maximum width of 1.7 cm, and is 0.6 cm thick. Two somewhat similar tools, called chisels or fleshers, were reported from Higgins Flat Pueblo (Martin and others 1956:117-118), and "chisels" found at Hawikuh seem to be comparable to the first end scraper described above (Hodge 1920:110-112).

One of the most interesting bone artifacts from Gila Cliff Dwellings is a Bison bison rib, that is, spokeshave type, scraper. This incomplete specimen consists of the shaft and costal end of a right rib. The end is somewhat ground down into the cancellous bone. The transverse section is lenticular. The very edges are polished along about 20 cm of the central portion, but the flat sides retain the fine, longitudinal graininess of the bone. It is 30.0+ cm long, 5.9 cm wide, and 2.0 cm thick. Beamers of whole bison ribs were recovered at Gran Quivira's Mound 7, and Hayes (1981:148, Fig. 201) reported on their ethnographic distribution.
Antler Tine Tools

Five antler tines were apparently used for some kind of rubbing action, as their tips are polished and have fine use striations and/or a tiny, smoothed facet—nor the chipped and scarred tip one would expect from use as flakers. The longest, and only complete, specimen is 16.2 cm long. The three not on exhibit were identified as Artiodactyla. From what can be determined from illustrations and text (see, for example, Kidder 1932:278), similar tools are found at other sites, but usually they are included with tine flakers. An exception to this is one occurrence at Red Bow Cliff-dwelling that is described exactly like these (Gifford 1980:69).

Flakers

Two artifacts have tips that are sufficiently scarred or chipped to suggest that they were used as flaking tools. One is an Artiodactyla antler tine tip (incomplete), the other a heavy splinter from a metapodial shaft, also Artiodactyla, altered only at the slightly tapered end. The latter is 12.5 cm long, 1.3 cm wide, and 0.8 cm thick. Antler tine flakers are a common tool in the literature, although, as mentioned above, some of them may not be flakers. They have been reported from the contemporary sites of Higgins Flat Pueblo (Martin and others 1956:119; Martin, Rinaldo, and Barter 1957:84), Hinkle Park Cliff-Dwelling (Martin, Rinaldo, and Bluhm 1954:147), Apache Creek Pueblo (Martin, Rinaldo, and Barter 1957:84), and Site 7, Sapillo Creek Canyon (Cosgrove 1947:16); the latter flaker was bone.

Miscellaneous Tools

Another unusual tool recovered from Gila Cliff Dwellings is a flat, narrow, elongated segment of bone with sides that taper slightly toward each end. The ends are rounded, the edges smoothed; it is nicely finished. It is classified as some kind of spatulate smoothing tool because of the slight scratches on both ends, parallel to the length.
It is 8.9 cm long, 0.9 cm wide, and 0.4 cm thick. Nothing quite like this was found in a literature search.

Another artifact is called a generalized bone tool because of the use wear, but it did not fit any of the usual tool categories and could have been used for any number of things (Fig. 8.1i). It is a half-split left metatarsal (proximal end and medial shaft segment) of *Odocoileus hemionus* that is otherwise little shaped except by use. One end is blunt, rounded, "pointed," and flattened; it is a knife-like form with somewhat uneven edges. All of the edges are worn, rounded, and sometimes polished from use, and there are many and varied use scratches. It is 17.1 cm long, 2.2+ cm wide, and 0.9 cm thick.

**Summary**

In general, the types and styles of utilitarian bone and antler tools recovered from Gila Cliff Dwellings are common in some variation in the area through time. In particular, the two half-split metapodial awls with a notched shaft are quintessential Mogollon awls (Wheat 1955:139) that were first used in the earliest Mogollon components. Deer ulna and shaped splinter awls are as early in the Pine Lawn Valley (Wheat 1955:138-142), and splinter awls were recovered from pre-Pottery levels at 0 Block Cave (Martin, Rinaldo, and Bluhm 1954:Fig. 45). An ulna awl was recovered from the San Pedro Level III at Bat Cave (Dick 1965:65). Split awls with the articular head modified appeared in the Pine Lawn Valley in the San Francisco phase (Wheat 1955:142-143). Except for the very small rabbit bone awl, all of the Gila Cliff Dwellings awl types also continued to be used through the Mogollon sequence, as evidence from contemporary Tularosa phase sites indicates.

Bone end scrapers, or "fleshers," also appeared as early as the Pine Lawn phase in the Pine Lawn Valley (Wheat 1955:143). A more interesting tool is the bison rib scraper or beamer. Wheat (1955:143) lists the rib scraper as being present in the Pine Lawn Valley and Mimbres areas in his Mogollon 1 and 3 periods, although I have only been able to track down its occurrence at the Swarts Ruin (Cosgrove and Cosgrove 1932:61) on the basis of the published reports he cites.
Socioreligious Artifacts

Whistle/Flute

This specimen consists of one end of a bone tube, including part of a squared hole (or stop) cut into the flatter side. Between this partial hole and the cut end of the tube are numerous fine scratches that tend to be parallel to the tube's long axis near the hole, and at right angles to it near the end. The bone is a right tibiotarsus, central shaft, of a large, young adult turkey (*Meleagris gallopavo*). The tube is 4.0+ cm long and the "diameter" is 0.9 cm by 1.3 cm. Similar specimens have been illustrated in the Hawikuh bone report (Hodge 1920:Pl. 35a, m).

Die

An elliptical, flat piece of bone is incised with a linear design on one side and is polished (Fig. 8.1f). The incised lines are colored with red pigment. This die is 2.1 cm long, 1.1 cm wide, and 0.3 cm thick. An ovoid die with a single incised line was recovered from Apache Creek Pueblo (Martin, Rinaldo, and Barter 1957:81), inhabited earlier in the Tularosa phase than Gila Cliff Dwellings, and a very similar die, with incised lines blackened with charcoal, came from Red Bow Cliff-dwelling (Gifford 1980:68). Two oblong segments of bone from Reserve phase levels of 0 Block Cave were also classified as dice (Martin, Rinaldo, and Bluhm 1954:147), but they are different in form from the specimens just described.

Tubes

Three bone tubes are in the Gila Cliff Dwellings collection. The longer type consists of one specimen, a turkey (*M. gallopavo*) right radius (small adult female) with both articular heads cut off straight and smoothed all over. It is 9.8 cm long and 0.5 cm to 0.9 cm wide. Similar tubes have been recovered from pre-Pottery through Reserve phase levels of 0 Block Cave (Martin, Rinaldo, and Bluhm 1954:149).
The shorter type of tube is unusual, if not unique in Mogollon collections, and both specimens are sections of femur shaft of Lynx rufus (Fig. 8.1g). One tube was originally filled with a material that still adheres to the inside in the form of a dark crust with occasional shiny black flecks. The tube was apparently cracked lengthwise (into two pieces) prehistorically, as the broken edges are discolored by the filler material. One end, for about a third of the length, is heavily scratched at right angles to the length, and darkened. Scratches elsewhere on the surface are more random and much less dense. The same end is finished by grinding to a rounded end with a thin edge. The other end is also rounded, but still shows the chipping used to shape it. The tube is 4.5 cm long and the "diameter" is 0.9 cm by 1.1 cm.

The second tube is split lengthwise on one side only. The ends are finished and rounded, but not even. Half the tube is wrapped by vegetal bindings. The other half is encrusted with material that appears similar to that on the interior of the preceding tube, including the shiny black flecks. About half of the length of this tube is filled with what may only be dirt and fine rootlets. The tube is 3.4 cm long, the "diameter" 1.1 cm by 1.2 cm.

Summary

Wheat (1955:144) indicated that bone whistles have a northern distribution among the Mogollon, and if the bone artifact fragment here tentatively identified as a whistle or flute is one, it would be an unusual occurrence. In the comparative literature of contemporary sites, dice are more common than tubes. Chronologically, incised ovoid dice may appear later in time, while tubes are present from the pre-Pottery period on.

Ornaments

Beads

Beads were the only type of bone ornament in the Gila Cliff Dwellings collection. Two are small, nicely made specimens; they are
0.5 cm long and maximum diameter is 0.7 cm. One is made from the ulna shaft of a medium size bird, the other bone is unidentified. A third short, tubular bead is a little larger in diameter, 0.6 cm long by 1.2 cm. It is made from a right tibiotarsus shaft of turkey (M. gallopavo), large adult male. The fourth bead is longer, 1.7 cm, and 1.0 cm in diameter. It is made from a long bone shaft from a large bird, with one end cut on a slant, the other uneven and chipped. Plain tubular bone beads have also been found in Steamboat Cave (Cosgrove 1947:13) and 0 Block Cave, the latter called tubes (Martin, Rinaldo, and Bluhm 1954:149). Wheat (1955:144) indicates that beads occur as early as his Mogollon 1 in the Pine Lawn Valley.

Unclassified Artifacts

Altered Claw

A worked claw of a mountain lion (Felis concolor) could have been a socioreligious or ornamental artifact. It is a right distal fore phalanx with the keratinous portion. The claw has been cut and ground on the concave underside to form a thin and pointed hook (Fig. 8.1h). It is 4.5 cm long, 3.5 cm wide, and 1.3 cm thick.

Unidentified Objects

Four artifacts were functionally unidentified and similar items were not found in the literature search. One was a segment of Artiodactyla antler tine, the butt end very slightly rounded; it is possibly a cylinder or part of a flaker or other tool. It is 3.4+ cm long and 1.3 cm in diameter. Another length of Artiodactyla antler tine is similar to an awl handle, but the pit in the narrower end is very shallow; both ends are finished. It is 6.5 cm long and 1.5 cm in diameter. The third specimen consists of two pieces of a long, narrow, flat Artiodactyla antler object with rounded ends; it is heavily charred. It is 17.7+ cm long, 1.4 cm wide, and 0.7 cm thick. A "left" dew claw has notches cut near the proximal end on each side; the material is Odocoileus cf. O. virginianus.
Miscellaneous Worked Bone

This category of artifacts includes scraps left over from making artifacts (2) and very fragmentary pieces of unidentified artifacts (4). The scraps are the cut right femur shaft (posterior), *Odocoileus hemionus*, and a cut, distal condylar head and part of the shaft of a right femur, *Lepus* sp. The fragments are a highly polished edge of a split, heavy long bone shaft (large mammal); the split section of a long bone shaft (large mammal); a tapering, nicely finished segment of a thin long bone shaft splinter (medium-large mammal); and a right femur of a small adult female turkey (*Meleagris gallopavo*) with the shaft cut at an angle.

Discussion

With few exceptions, the bone artifacts are quite typical of other Tularosa phase bone complexes, and often represent only the more recent examples of long-lived Mogollon forms. This is particularly true of the awls, die, end scrapers, tine tools, and flakers. None of the bone artifacts provided additional evidence of the early occupation. Only three of the artifact types add to the previously established Tularosa phase material trait list: the worked mountain lion claw, the small wrapped and/or filled split tubes, and the bison rib beamer. The latter tool type is of particular interest, for it is rare prehistorically, although it has been reported from the early historic sites of Pecos (Kidder 1932:237; elk rib), Las Humanas (Hayes 1981:148; bison), and possibly Hawikuh (Hodge 1920:112, Pl. 25f; bison rib "knives"). The question seems to be whether the spokeshave type of scraper made from bison rib occurs prehistorically in the Mogollon area.

Bison bones certainly appear on Mogollon faunal lists, at least as early as the San Francisco phase, at such sites as Tularosa Cave (Martin and others 1952:499), Doolittle Cave (Cosgrove 1947:45-46), the Swarts Ruin (Cosgrove and Cosgrove 1932:4), Turkey Foot Ridge (Martin and Rinaldo 1950b:350), Mogollon and possibly Harris villages (Haury 1936:6, 50), O Block Cave (Martin, Rinaldo, and Bluhm 1954:Fig. 79), one of Martin and Rinaldo's (1950a:492) Reserve phase sites, and even in the
Point of Pines area, in Tule Tubs Cave (Gifford 1980:Table 36), although
the latter site has later occupations that may account for it. Hough
(1914:5) also reported a bison horn, hide used in a moccasin, and bison
hair cordage from Tularosa Cave.

The undifferentiated (Pine Lawn through Reserve phases) Mogollon
Levels I and II of Bat Cave contained bison artifacts and faunal
material, the latter in such abundance and variety that there is no
doubt that the animal's range included the Plains of San Agustin (Dick
1965:64, 90-91, 99). It was even suggested (Dick 1965:91) that the
killing was done so close by that the butchering was actually done in
the cave. The earliest significant evidence of bison in Bat Cave was in
the upper half of Level III, classified as San Pedro I (Dick 1965:91,
99). These animals could also have been hunted in the rolling
grasslands south of the Mogollon Mountains. Based on early Spanish
accounts and older evidence at Casas Grandes, Di Peso (Di Peso, Rinaido,
and Fenner 1974[8]:243) has suggested that the Arizona-Sonora Desert
formed the prehistoric western boundary of bison habitat.

The question remains, however, as to whether the Gila Cliff
Dwellings bison rib beamer represents a prehistoric occurrence. The rib
scrapers at the Swarts Ruin are not identified in the report as bison,
nor do they appear to be wide or heavy enough (Cosgrove and Cosgrove
1932:Pl. 68f-k). Furthermore, the illustrated specimens seem to be
shaped from parts of ribs and would not, therefore, be a spokeshave type
of scraper. This leaves the three historic occurrences above. This tool
type and material combination is, as far as I have been able to
determine, a Plains artifact. The only available provenience data from
Gila Cliff Dwellings is that the artifact came from room 17—nothing is
known about its context within the room. This leaves three
possibilities: (1) it is prehistoric and indigenous; (2) it is
prehistoric and a trade item; (3) it was left on the site during
protohistoric or historic times by transient Apaches. Since there is no
current evidence that this is a Mogollon tool type (in particular, it
was not found among the many bison tools in Bat Cave), nor any other
evidence of Apache use of the caves, it seems most likely that the
second suggestion is the correct one. In any case, it is a very rare
occurrence (Stanley J. Olsen 1983:personal communication).
The 57 bone artifacts from Gila Cliff Dwellings were functionally classified as utilitarian (37, 64.9 percent), socioreligious (5, 8.8 percent), and ornamental (4, 7.0 percent) or were functionally unclassifiable (11, 19.3 percent). Few rooms had much in the way of bone artifacts, and these were room 1 with five utilitarian and one unclassified; and room 16 with three utilitarian and one ornament. It seems strange that about a third of the awls were recovered from trench 4. The incised die was a surface find in cave 6. Three of the four artifacts classified as socioreligious came from trenches.
Chapter 9
SHELL ARTIFACTS

by
Gloria J. Fenner

The 878 shell artifacts were classified on the basis of comparison to published artifact descriptions, while biological identifications were made by the author, using Keen (1958) and the comparative collection in the Department of General Biology, University of Arizona, courtesy of Dr. Walter B. Miller.

Ornaments

Beads

A total of 840 shell beads was recovered from Gila Cliff Dwellings, including 831 disk beads, 3 tubular, 3 figure-8, 2 whole shell, and 1 dentate. The disk beads have been divided into two sub-types, by far the greater number (827) having a smaller diameter, with only four having a larger diameter. Two of the former type are components of miniature pahos (see wood, reed, and gourd artifacts, p. 198), and another is a part of a feather circlet (p. 238). Two groups (of 70 and 62 specimens) are strung on cordage and another single small disk bead was strung with a figure-8 shell bead and some stone beads. Individual small disk beads range from 0.2 cm in diameter and 0.1 cm thick to 0.4 cm by 0.2 cm, while the larger disks are 0.7 cm to 1.2 cm in diameter and 0.1 cm to 0.3 cm thick. One each of the latter is Spondylus princeps and Haliotis sp.

The tubular Vermetid shell beads include two shorter (1.1 cm and 1.4 cm) and one longer (5.5 cm) examples. The ends of the former are not entirely straight and even; both are polished. The ends of the longer bead are cut off squarely and evenly and are slightly worn or smoothed; there is an irregular perforation about 2 cm from one end. The bilobe beads are not a well formed "figure-8," but are somewhat elongated (1) or barely have the indentations at the sides (2). All
have biconically drilled holes. The complete, extant specimen is 0.9 cm long, 0.4 cm wide, and 0.2 cm thick. One is on a strand with stone and one shell disk beads. One of the whole shell beads, the *Nassarius* sp., is not a whole shell in the strict sense of the bead type, but has been ground down so much on all sides that perforations are formed in addition to the drilled perforation for suspension. The other bead is *Olivella dama*. The dentate bead, *Chama echinata*, is 0.9 cm long, 0.6 cm wide, and 0.3 cm thick.

Beads similar to these Gila Cliff Dwellings specimens have been found at other contemporary sites, with the possible exception of the ground *Nassarius* sp. bead. Higgins Flat Pueblo has produced both the smaller and larger disk beads, figure-8, and whole shell *Olivella* beads (Martin and others 1956:112; Martin, Rinaldo, and Barter 1957:78); single whole shell *Olivella* beads have been found at Tularosa and Cordova caves and a tubular bead came from a Georgetown phase level in Tularosa Cave (Martin and others 1952:184); and Red Bow Cliff-dwelling had larger and smaller disk beads, figure-8 beads, and whole shell *Nassarius* (unworked) and *Olivella* beads (Gifford 1980:69-70). The Starkweather pueblo complex included both sizes of disk beads, *Olivella* whole shell beads, and figure-8 beads (Nesbitt 1938:109). Cosgrove (1947:151-152) reported both sizes of disk beads and *Olivella* whole shell beads for the Upper Gila, and tubular and *Olivella* beads for the Hueco Mountains. One of the larger size disk beads, found in Mule Creek Cave, was identified as *Spondylus*. Only small disk and *Olivella* whole shell beads (loose and strung on cotton cordage) were reported from U-Bar Cave (Lambert and Ambler 1961:80). Medio Period Casas Grandes had all of the bead types reported from Gila Cliff Dwellings, although the *Nassarius* were not worked (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[6]:414, 420, 422, 424-425, 437), but including both *Spondylus princeps* and *Chama echinata*.

**Pendants**

Five pendants were recovered from the Gila Cliff Dwellings. Two (Fig. 9.1a) are geometric (one irregularly alate, of *Aequipecten circularis*; the other roughly trapezoidal, possibly freshwater clam).
Both have biconical holes; the alate pendant is 1.6 cm long, 2.1+ cm wide, and 0.1+ cm thick. One of the two zoomorphic (frogs, Glycymeris gigantea) pendants was encrusted with turquoise mosaic. They are 3.9 cm by 3.9 cm and 2.6 cm by 2.3 cm. Front and rear legs of the frogs are indicated by simple incised lines; the ground perforation in the umbo was used for suspension (Fig. 9.1b). Although found with nine tinklers, the whole shell pendant (Pyrene strombiformis) is not classified as one of them because the spire is not ground down as for a tinkler and there is no drilled or sawed perforation (Fig. 9.1c). It has a fairly large, irregular hole in the body and is 1.8 cm long by 1.5 cm in diameter.

A tabular, freshwater clam pendant was recovered from a Georgetown phase level of Tularosa Cave (Martin and others 1952:184); triangular and rectangular shell pendants have been reported for Red Bow Cliff-dwelling (Gifford 1980:70), and the former shape for U-Bar Cave (Lambert and Ambler 1961:81). A frog pendant and Aequipecten circularis whole shell pendants have been reported from Higgins Flat Pueblo (Martin and others 1956:110). Medio Period Casas Grandes produced tabular, frog-shaped zoomorphic (including one with turquoise mosaic), and whole
shell *P. strombiformis* pendants (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[6]:447, 455, 459).

**Tinklers**

Thirteen shell tinklers were recovered from Gila Cliff Dwellings. They range in size from 1.7 to 3.6 cm in length and from 1.2 to 2.6 cm in diameter at base. The suspension perforations of seven are sawed, four are drilled, and one is both sawed and drilled. Nine tinklers were found in a cache with a whole shell pendant under a boulder in the east end of the wall between rooms 10 and 10A. Five of these had been broken along the aperture, reworked, and new perforation added; two drilled had originally been sawed, one had been drilled both times, and one that was sawed had originally been drilled. The shells have been identified as *Oliva incrassata* (1), *Oliva sp.* (cf. *O. incrassata* or *O. spicata*, 1), *Conus gladiator* (1), *Conus cf. C. gladiator* (1), *Conus princeps* (1), *Conus perplexus* (7), and *Conus regularis* (1).

*Conus* tinklers have been recovered from Higgins Flat Pueblo (13, *C. gladiator*) (Martin and others 1956:112), Starkweather pueblo (Nesbitt 1938:110), U-Bar Cave (Lambert and Ambler 1961:81), and at Casas Grandes in Medio Period provenience that also produced all of the *Conus* species mentioned as well as *O. incrassata* and *O. spicata* tinklers (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[6]:467).

**Bracelets**

Sixteen of the 19 bracelet fragments from Gila Cliff Dwellings have narrow bands, ranging in width from 0.4 cm to 0.7 cm, averaging 0.6 cm. All but one have a trianguloid cross section with a flattened base and more or less rounded corners; one is trapezoidal in section. Three pieces with the umbo are ground, resulting in a small hole through the shell. All are plain and all are *Glycymeris gigantea*.

Two bracelet fragments have heavier bands, 1.0 cm wide; one section is ovoid and the other rectanguloid. Projected exterior diameters are 5.5 cm and 6.5 cm. Both are plain and both are *G. gigantea*. One bracelet is missing.
Bracelets of one or both band widths have been reported from Higgins Flat Pueblo (Martin and others 1956:112; Martin, Rinaldo, and Barter 1957:78), Apache Creek Pueblo (Martin and others 1956:112), Tularosa and Cordova caves (Martin and others 1952:184), Starkweather pueblo (larger and thicker) and San Francisco phase context (smaller, thinner; Nesbitt 1938:108), and Medio Period Casas Grandes (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[6]:500, 502-509).

Tessera

One rectangular shell artifact is classified as a tessera. It is 1.0 cm long, 0.7 cm wide, and 0.4 cm thick. It is made from a thick shell, like Glycymeris gigantea, but it is not now identifiable. Shell tesserae have also been found in Medio Period proveniences at Casas Grandes (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[6]:512).

Discussion

All of the 878 Gila Cliff Dwellings shell artifacts are here classified as ornaments, although the 10 found as a trove under the east end of the wall between rooms 10 and 10A might be considered a ritual offering. Shell artifacts were distributed through the rooms and open areas of caves 2 through 5, and with the exception of the tinklers in the cache, there was no concentration of any one form.

In comparison to contemporary Mogollon sites with published descriptions of shell artifacts (only six such sites), the Gila Cliff Dwellings complex is unusual in the variety of both forms and identified shell types. Except for the frog pendants and single tesserae, the forms are very basic to the Southwest in general. Forms with the widest distribution are the disk beads (particularly the smaller size), Olivella whole shell beads, and bracelets. Higgins Flat Pueblo (Martin and others 1956:110-112; Martin, Rinaldo, and Barter 1957:78) had the two sizes of disk bead, figure-8 and Olivella whole shell beads, frog and whole shell pendants, both kinds of bracelet, and tinklers. Red Bow Cliff-dwelling (Gifford 1980:69-70) had the two sizes of disk bead,
figure-8 and Olivella whole shell beads, and geometric pendants. Tularosa Cave (Martin and others 1952:184) also produced four forms, but only one was from a level dating later than the Georgetown phase. The Starkweather pueblo complex (Nesbitt 1938:108-109, Pl. 49-50) included larger, thicker bracelets, two sizes of disk beads, Olivella beads, figure-8 beads, and Conus tinklers. Farther afield, Los Muertos (Haury 1945:146, Figs. 88-98, Pl. 68-73) had all forms except the tubular bead and dentate pendant, as well as many artifacts not found at Gila Cliff Dwellings. To the south, U-Bar Cave (Lambert and Ambler 1961:80-81) had the smaller disk and whole shell Olivella beads, geometric pendant, and tinkler forms, while Medio Period Casas Grandes (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[6]; see individual descriptions above for page references) produced all of the forms represented at Gila Cliff Dwellings and many more besides.

Eleven species, 10 genera, and one family were among the lowest-level classifications of shell from Gila Cliff Dwellings. One possible freshwater clam and 833 probable marine shell beads were not further classified. All of these are listed in Table 9.1. As mentioned above, the Mogollon sites to which this list was compared had far less variety, which could not be accounted for by lack of identification to the species level. Higgins Flat Pueblo had four and Tularosa Cave (mainly early contexts) had only three genera, respectively. Over the area as a whole, however, eight of the Gila Cliff Dwellings genera have been identified (excluding Chama and Pyrene). Only at Higgins Flat Pueblo were any shells identified to species, and these were Conus gladiator, Aequipecten circularis, and Glycymeris maculata (Martin and others 1956:112). Except for one artifact, the latter is probably incorrect as the adults of this species are not large enough for bracelets (Keen 1958:43). Elsewhere, the Gila Cliff Dwellings list of genera is partly duplicated among the shells found at Los Muertos (Haury 1945:146), with eight genera, as well as freshwater clam, and at Medio Period Casas Grandes (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[8]:Fig. 187-8), where the list of identifications encompasses all of those at Gila Cliff Dwellings.

Although some of the shell artifact forms found at Gila Cliff Dwellings appeared earlier in the Southwest than did others, none is a
characteristically earlier type that would provide evidence of an early occupation of the caves. In fact, Martin and others (1956:109-110) indicate that the figure-8 bead, Conus tinkler, thick bracelet, and carved frog effigy are primarily characteristic of later phases. This is probably also true of the small dentate bead form. They further suggested that the shell trade increased in the Reserve area in the Tularosa phase (Martin and others 1956:107, 109), and the Gila Cliff Dwellings data support this observation.
Table 9.1  
Classification of Shell

<table>
<thead>
<tr>
<th>Classification</th>
<th>Species</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pelecypoda</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycymeridae</td>
<td><em>Glycymeris gigantea</em> (Reeve, 1843)</td>
<td>21</td>
</tr>
<tr>
<td>Pectinidae</td>
<td><em>Aequipecten circularis</em> (Sowerby, 1835)</td>
<td>1</td>
</tr>
<tr>
<td>Spondylidae</td>
<td><em>Spondylus princeps</em> Broderip, 1833</td>
<td>1</td>
</tr>
<tr>
<td>Chamidae</td>
<td><em>Chama echinata</em> Broderip, 1835</td>
<td>1</td>
</tr>
<tr>
<td><strong>Gastropoda</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haliotidae</td>
<td><em>Haliotis</em> sp.</td>
<td>1</td>
</tr>
<tr>
<td>Vermetidae</td>
<td><em>Vermetid</em></td>
<td>3</td>
</tr>
<tr>
<td>Columbellidae</td>
<td><em>Pyrene strombiformis</em> (Lamarck, 1822)</td>
<td>1</td>
</tr>
<tr>
<td>Nassariidae</td>
<td><em>Nassarius</em> sp.</td>
<td>1</td>
</tr>
<tr>
<td>Olividae</td>
<td><em>Oliva incrassata</em> (Lightfoot, 1786)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><em>Oliva</em> sp.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><em>Olivella dama</em> (Wood, 1828 ex Mawe MS.)</td>
<td>1</td>
</tr>
<tr>
<td>Conidae</td>
<td><em>Conus gladiator</em> Broderip, 1833</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><em>Conus cf. C. gladiator</em></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><em>Conus princeps</em> Linnaeus, 1758</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><em>Conus perplexus</em> Sowerby, 1857</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><em>Conus regularis</em> Sowerby, 1833</td>
<td>1</td>
</tr>
<tr>
<td><strong>Unidentified</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probable marine shell</td>
<td></td>
<td>833</td>
</tr>
<tr>
<td>Freshwater clam</td>
<td>1</td>
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</tr>
</tbody>
</table>

182
The components of this group of 239 artifacts were identified and typed using published descriptions of Mogollon perishable artifacts. The pertinent reports are cited throughout. Lack of funds prohibited identification of materials, with the exception of seed beads identified by Lisa Huckell.

**Utilitarian Objects**

**Atlatl**

The distal rectangular end of an atlatl with a flush spur was recovered from the excavation (Fig. 10.1c). The long channel appears to be lightly charred, perhaps for a decoration. The convex underside, in contrast, seems to be coated with a pitchy black paint, most of which is worn off, but which has stained the wood a dark brown. The butt is plano-convex in cross section. Width is 2.8 cm, thickness 0.9 cm, and the distance from the butt to the spur end is 3.1 cm. A similar atlatl fragment was recovered from pre-Pottery levels in Tularosa Cave (Grange in Martin and others 1952:373-374). In contrast, an atlatl from the Guadalupe Mountains in southeastern New Mexico has a raised spur and rounded butt end (Mera 1938:29, Pl. 11, No. 1).

**Darts**

Two dart foreshafts and one probable bunt are in the collection. Both foreshafts are tapered toward both ends and are nicely finished; one of these has a side only slightly tapered, and its more tapered half is also polished (Fig. 10.1a). The three complete ends are rounded and blunt. The complete specimen is 9.0 cm long and 1.1 cm in diameter. These are most similar to the "blunt burred" foreshafts described by

183
Figure 10.1  Wood artifacts:  (a) atlatl foreshafts, (b) bunt, (c) atlatl, (d) pendant, (e) arrow mainshafts, and (f) arrow foreshafts.
Grange (Martin and others 1952:380-381); most of these were recovered from the pre-Pottery through San Francisco phase levels of Tularosa Cave. Cosgrove (1947:54) reported dart foreshafts from the Upper Gila that were more sharply pointed and generally longer.

The bunt is very crude and probably unfinished (Fig. 10.1b). Bark is still on the cylindrical head, which has a rounded end; the object is slightly curved overall. It is 7.0+ cm long, 1.0 cm in diameter. Bunts have been found in the pre-Pottery through San Francisco phase levels of Tularosa and Cordova caves (Grange in Martin and others 1952:382) and Pine Lawn and Three Circle phase context at O Block Cave (Brown in Martin, Rinaldo, and Bluhm 1954:181-185). The bunts reported by Cosgrove (1947:52) are from one Upper Gila cave.

Arrows

The Gila Cliff Dwellings collection encompasses 39 fragmentary compound arrows that agree in all relevant respects with those described for Tularosa and Cordova caves (Grange in Martin and others 1952:340-343, 384-389). There are 31 examples of wood foreshafts (Fig. 10.1f) and 13 of reed mainshafts (Fig. 10.1e), some obviously being parts of the same arrow.

Sixteen foreshafts have a shouldered tang, 10 are tapered, and 5 are unclassified. Two of the first group and four of the second (plus one possible) have remnants of pitch used to hold the tang in the socket of the mainshaft. A single shouldered foreshaft is the only example with the tip notched to receive a stone point. Both ends of one of the tapered foreshafts are fire-hardened and another has a sinew-reinforced tip. One is painted with allover red pigment, which in turn seems to be covered with an allover pitchy black paint, only remnants of which remain. Four complete foreshafts range in length from 9.6 cm to 22.6 cm, averaging 18.3 cm; however, there is one specimen on exhibit at the Monument that is 23.5+ cm long, excluding the tang, which could not be measured. Diameters range from 0.6 cm to 0.9 cm, averaging 0.7 cm; eight complete tang lengths range from 2.7 cm to 8.2 cm, averaging 5.5 cm.
There are five proximal end mainshaft fragments and each has a wood plug, four with U-shaped nocks, one V-shaped. Four have evidence of sinew reinforcement, as do five distal fragments. Only three proximal ends retain evidence of fletching, all using three quill segments. From the proximal end, sinew wrapping for fletching begins at 3.3 cm, 2.3 cm, and 0.5 cm; ends at 8.4 cm, 8.3 cm, and 4.4 cm; with the space between the wrapping being 4.2 cm, 4.5 cm, and 2.7 cm long. Three proximal ends are painted: one has a red band 0.8 cm wide, 5.2 cm from the proximal end; one is red from the proximal end for a distance of 3.2 cm; and the third is painted in the area between the fletching sinews with two 0.2 cm wide lines and a solid band 1.6 cm wide, in a pitchy black pigment (Fig. 14.2c). One additional mainshaft fragment is painted solid red in an area about 2.3 cm long. None of the mainsahfts is complete, but the longer fragments measure 20.4+ cm, 23.5+ cm, and 30.2+ cm; diameters range from 0.6 cm to 1.0 cm, and average 0.8 cm.

One unusual specimen has probably been reworked and tampered with: the foreshaft is apparently reworked and does not fit into the reed it was found with, while a tapered piece of wood is inserted into the broken mainshaft from the proximal end.

The Gila Cliff Dwellings arrows are not so elaborately painted as the ceremonial arrows reported for the Upper Gila area by Hough (1914:63-66) and Cosgrove (1947:62-65), by Haury (1934:106-108) for the Sierra Ancha, Fulton (1941:16-19) for Winchester Cave, and Lambert and Ambler (1961:70-71) for U-Bar Cave. Elaborate designs are apparently a function of ceremonial use, rather than a regional idiosyncracy, as Cosgrove (1947:65) suggested. Complex designs aside, these Gila Cliff Dwellings arrows compare favorably with others in the area, except for Bat Cave, where all but one foreshaft was notched to receive a stone point (Dick 1965:82). In adjacent areas, some U-Bar Cave examples are painted along the mainshaft and the distal end and some are fletched with two feathers (Lambert and Ambler 1961:71). In the Sierra Ancha, Haury (1934:108) found reinforcement of the proximal end of the mainshaft by stuffing the reed with reed splinters, instead of using a wood plug. Cosgrove (1947:62), however, also described this technique. Ferdon (1946:19) has reported a pitch-covered arrow shaft from a Jornada
Mogollon cave site in the Guadalupe Mountains of southeastern New Mexico.

Digging Stick

The three digging sticks from Gila Cliff Dwellings may be less similar to Reserve area artifacts than other items are. The "smooth point" digging sticks described by Grange (Martin and others 1952:392) and Brown's (Martin, Rinaldo, and Bluhm 1954:189-190) flat blade type may come closest. All of the Gila Cliff Dwellings examples have a flattened blade, rounded tip type of distal end. One complete specimen is 31 cm long and 2.1 cm in diameter; the longest, however, is 39.5+ cm. Two of the flattened blades were produced by splitting off a large splinter--unless this occurred during use. Less than a fourth of the digging sticks described for the Upper Gila and Hueco by Cosgrove (1947:148) had flattened blades, the rest having sharp points. Gifford's (1980:88) Point of Pines area digging sticks are likewise pointed (2) and flattened (1), while a single example reported by Lambert and Ambler (1961:68) was pointed and wedge-shaped.

Trowel

This implement corresponds most closely to the "wedge-shaped" (cross section) type described for the pre-Pottery levels of Tularosa Cave by Grange (Martin and others 1952:392). However, the Gila Cliff Dwellings example is unfinished, in the process of being hollowed out by the use of fire or live coals. The outline is more or less rectanguloid, and it is 30.7 cm long, 14.5 cm wide, and 4.5 cm thick. Other types of wood and bark trowels and scoops were found in pre-Pottery through San Francisco phase levels of Tularosa and Cordova caves (Grange in Martin and others 1952:394) and from Hinkle Park Cliff-Dwelling and from Three Circle phase context in O Block Cave (Brown in Martin, Rinaldo, and Bluhm 1954:192). Cosgrove (1947:145-146) reported "tree-shell trowels" for both the Upper Gila and Hueco, including some with the concave surface charred. He suggested that they
may have functioned to carry embers for parching, rather than being a
result of the method of manufacture.

Farther to the east, two objects described as wood "paddles" were
found in the Guadalupe Mountains (Mera 1938:59, Pl. 11, No. 7).
However, the one specimen for which dimensions are given is smaller and
thinner than the Gila Cliff Dwellings trowel. The collection from the
cave in which it was found was aceramic, if not preceramic. Still
farther east, Sayles (1935:Table 8) lists a "fire shovel," or scorched
wooden scoop, as a trait of his "Big Bend Cave Dwellers," who also lack
pottery. Pearce and Jackson (1933:121, Pl. 9b) described this implement
as the outer peeled surface of oak, charred on one side; this is also
thinner than its Mogollon counterparts. Similar or related tools have
been commonly found in Basketmaker II cave sites of northeastern Arizona
(Kidder and Guernsey 1919:183; Guernsey and Kidder 1921:90–91, Pl.
38g–i; Nusbaum 1922:115–116, Pl. 59; Guernsey 1931:107). While the
preceding distribution seems to be pretty much preceramic, related tools
have also been found in Pueblo III context in a cave near Jemez Springs,
New Mexico (Alexander and Reiter 1935:43–44).

Burried Sticks

Grange (Martin and others 1952:406) has suggested that these
objects were used as "feather carding devices," and the classification
has been supported by Brown (Martin, Rinaldo, and Bluhm 1954:195). Six
of these sticks were forthcoming from Gila Cliff Dwellings. Five have
the bark peeled off and one has remnants of the bark. One end of each
is shredded; the non-burred end of five is charred. Four range in
length from 4.4 cm to 16.5 cm and average 10.1 cm. Each one of them has
at least a few fine fibers caught in the burred portion. These fibers
are almost always light-colored to white; only one black fiber was
observed; most of the fibers are very fine. One also has a couple tiny
bits of a white, fluffy material—one hates to say "cotton" without a
proper identification, but that is what it looks like and it is worth
mentioning. One stick also has tiny bits of feathers, both white and
brown. The variety of materials suggests that these tools may have been
used to "card" a number of things. Perhaps, too, they were used as yarn
smoothers. Artifacts called "frayed pegs" have been recovered from cave sites in Texas and are described as sticks with one end frayed by pounding (Mera 1938:33-34, 46. Also see Sayles 1935:Table 8; Fulton 1941:34, Pl. 11c-d; Bohrer in Caywood 1962:Fig. 21d).

Spatulate Tools

Each of these objects is different from the others and none is comparable to published artifacts. A particularly well-shaped and nicely smoothed implement could have been a weaving tool. It is plano-convex in section with rounded edges; there is no obvious use wear. It is 16.7+ cm long, 1.3 cm wide, and 0.5+ cm thick.

Another implement may have been split lengthwise. The edges and one side are rough, but the slightly concave side and complete end are smooth and finished; this end is slightly rounded. It is 13.0+ cm long, 1.5+ cm wide, and 0.7+ cm thick. A third tool is smoothed on all surfaces; the cross section is rectangular and one end is beveled in side view. It is 11.0+ cm by 1.0 cm by 0.5 cm. The final tool is also finished smoothly on all surfaces. It is oval in section and has a blunt point; it is 20.2+ cm long, 1.1 cm wide, and 0.5 cm thick.

Lap Board(?)

This nicely shaped, though fragmentary and burned, plank may correspond to what Grange (Martin and others 1952:442, Fig.145f) tentatively described as a lap board. The extant side edge is rounded, the end edge somewhat beveled. It is 23.5+ cm long, 5.3+ cm wide, and 1.1 cm thick. Cosgrove (1947:146, Fig. 138j) has reported planks for the Upper Gila and all of these objects seem to correspond descriptively, regardless of their function.

Fire Drill Hearth

Wood fire drill hearths are a widely reported item from cave sites. This particular tool has a round cross section and three complete and one partial sockets. The complete end is slightly charred and looks
like it could have been used as a fire stick. It is 15+ cm long and 1.1 cm in diameter. Unlike the Gila Cliff Dwellings specimen, most of the reported fire hearths have a channel or notch cut into the edge of the socket, and most are plano-convex or flat in cross section (Bohrer in Caywood 1962:82; Fulton 1941:33; Lambert and Ambler 1961:68; Gifford 1980:88; Granger in Martin and others 1952:394; Brown in Martin, Rinaldo, and Bluhm 1954:192; Hough 1914:66). Cosgrove (1947:147) described hearths with round to oval cross sections and "cylindrical" hearths have been reported for the Reserve area, where they appear in San Francisco phase levels in Tularosa Cave, range early to late in Cordova Cave, and occur in pre-Pottery and Pine Lawn levels of O Block Cave.

Stake

A wood stake was found in situ, embedded upright in the floor of room 1. According to field notes, it is one of a pair spaced 9-3/8 inches apart, the west one 7 feet 8 inches from the west cave wall and 12 feet from the north. This is one of three such sets (the others were in rooms 24 and 29). The stake was originally full-round and has a fire-hardened tip, which is rounded and blunt. The stake is 21.8+ cm long and 2.1 cm by 1.1 cm around.

Potrests

Two loose coils are similar to specimens elsewhere classified as potrests (Cosgrove 1947:35, Fig. 66b; Gifford 1980:85; Martin and others 1952:456; Haury 1934:Pl. 46b). One is composed of small twigs wrapped in a coil, with the ends tucked in. It is 12 cm by 9 cm by 1.6 cm. The second is made of a handful of plant stems; one still has some roots, and leaves are also present. These are bent in a single, loose coil with the ends tucked in, forming a simple overhand "knot." It is 17 cm by 11 cm by 1.5 cm.
Gourd Containers

Seven small gourd fragments with cut and rounded edges have been classified as ladles (6) and a vessel. The former were made by cutting off the stem end, slicing the gourd lengthwise, and scraping out the seeds and pulp (Gifford 1980:82). Vessels were made by cutting away the neck to leave a round opening (Grange in Martin and others 1952:447). Hough (1914:10) has reported both forms for the Upper Gila.

Summary

A wide variety of utilitarian implements has been recovered from Gila Cliff Dwellings, most of them classifiable as weapons but also including ordinary, domestic agricultural tools and household implements and containers. Of particular interest are several items that are evidence of an occupation that precedes the Tularosa phase cliff dwellings. These are the atlatl fragment and the dart parts, as well as the gourd vessel fragments (Grange in Martin and others 1952:447). It may also be that the wood trowel is part of this early component, although its temporal distribution is a little confusing. Bark and wood trowels were recovered from Hinkle Park Cliff-Dwelling, which is classified as Transitional Reserve-Tularosa phase, and Brown (Martin, Rinaldo, and Bluhm 1954:192, 209-210) indicates that this extends the temporal range. In his summary, however, Martin (Martin, Rinaldo, and Bluhm 1954:214) states flatly that they are pre-Pottery. The wedge-shaped wood trowel was only found in pre-Pottery levels at Tularosa Cave and since only the concavo-convex form was reported by Brown, perhaps the former is indeed earlier. The Gila Cliff Dwellings example came from a room in Cave 4, and if early it is out of context.

Socioreligious Objects

Pahos

Many of the artifacts assumed to be socioreligious, particularly the pahos, were identified and classified on the basis of published
descriptions (Grange in Martin and others 1952; Cosgrove 1947; Hough 1914; Lambert and Ambler 1961; Gifford 1980; Vivian, Dodgen, and Hartmann 1978; Bohrer in Caywood 1962). This is by far the largest single group of artifacts in the wood/reed/gourd class, encompassing 72 specimens. These include 38 twig pahos (25 unpeeled, 13 peeled), 12 stub pahos (11 peeled, 1 unpeeled), 3 crook pahos, 1 carved wood paho, 4 reed pahos, 7 ring pahos, 1 corncob-on-a-stick, 1 reed stalk on a reed stem, a bundle of fir branches, 2 miniature pahos, and 1 bundle paho(?).

The unpeeled twig pahos from Gila Cliff Dwellings have been subdivided into three types. Thirteen are loops and coils (Fig. 10.2a), derived from a category described by Cosgrove (1947:125, Fig. 118k). These are thin, unpeeled twigs wrapped while flexible into loose (7) or tight (6) coils. One of the latter is at one end of a twig that has been split lengthwise. Dimensions of the loose coils range from 4.4 cm by 3.8 cm to 10.6+ cm by 9.3 cm; the latter range from 1.0 cm by 0.8 cm to 2.2+ cm by 1.5 cm. Five unpeeled twig pahos are classified as "twined," a category that actually includes a variety of manipulations, with the final effect being similar (Fig. 10.2b). Form is also the reason two specimens made of yucca, instead of twigs, were included. The largest is 15.6+ cm long and 2.5 cm wide. Straight, unpeeled twig pahos (Fig. 10.2c) have been described by Cosgrove (1947:125), as well as Hough (1914:91-92) and Gifford (1980:91, 92), and are related as well to some items described by Grange (Martin and others 1952:358, 437). Five of the seven Gila Cliff Dwellings examples have a knotted attachment, including unspun fiber bundle; unspun fiber with quill remnants; fine, 2-ply fiber cordage; and medium, 2-ply fiber cordage (2). Since unpeeled twig pahos are usually just broken segments with no finishing of the ends, it is not certain which are complete. However, the lengths of the straight pahos range from 9.0 cm to 24.0 cm, diameters from 0.3 cm to 1.2+ cm.

Peeled twig pahos are either painted (9; Figs. 10.2d, 14.2b) or unpainted (4). Both types have been described elsewhere (Cosgrove 1947:124-125, where unpainted but peeled twigs are grouped with unpeeled twig pahos; Grange in Martin and others 1952:354, 422-423, 437-438; Lambert and Ambler 1961:75; Gifford 1980:91-92). None of the Gila Cliff
Dwellings painted sticks has two finished ends and they range from 6.0+ cm to 24.8+ cm in length and 0.5 cm to 0.8 cm in diameter, averaging 0.6 cm. Painted patterns include black lines; solid black and black lines on solid green; solid black combined with unpainted; allover green, red; solid green and red blocks; solid black and red blocks. The only complete unpainted, peeled twig paho is 11.2 cm long and 0.5 cm in diameter; the others range up to 18.9+ cm in length and the range in diameter is the same as the previous group, the average 0.7 cm. One has an encrustation of unidentified dark brown-black material on the butt end.
Stub pahos were first described for the Upper Gila by Hough (1914:92-93) and have also been reported by Cosgrove (1947:126), who gives the better description. Eleven of the Gila Cliff Dwellings stub pahos are peeled (Fig. 10.2f); one of these is painted with a broadline black pattern. Complete butt ends are partly cut through, then broken off; unevenly cut; rounded like a broom handle; and slightly rounded (1 each). Only one is complete; it is 16.6 cm long and 0.9 cm in diameter. They do range up to 20.9+ cm in length and 1.4 cm in diameter. The single unpeeled stub paho (Fig. 10.2e) has one end cut off in a rounded form; it is 7.3+ cm long and 1.1 cm in diameter.

Hough (1914:93-95) and Cosgrove (1947:127) also identified the crook paho in the Upper Gila, and it has also been reported for the Reserve (Brown in Martin, Rinaldo, and Bluhm 1954:205) and the Point of Pines (Gifford 1980:91) areas. The Gila Cliff Dwellings examples are all made of peeled twigs (Fig. 10.3a). Two have larger crooks, 5.2 cm and 5.4 cm across, and one is small, 1.6 cm. The latter is 47.8 cm long.

The only specimen that comes anywhere near to what Grange (Martin and others 1952:423) calls a carved paho (elsewhere called a roundel staff paho) is a peeled and pithy wood fragment that is shouldered (Fig. 10.3b); neither end is intact. The maximum diameter is 1.1 cm.

One reed paho has been reported in the Hidalgo County (New Mexico) cave study by Lambert and Ambler (1961:75), and Dodgen (Vivian, Dodgen, and Hartmann 1978:109-110) described two "reeds with sinew wrappings" for Chetro Ketl. The four specimens from Gila Cliff Dwellings (Fig. 10.3c) were classified as pahos because of trait similarities to wood pahos described elsewhere. Specifically, they were painted and the sinew wrappings contained feather remnants. Because of their rarity in the literature, they are described in more detail here. The butt of #158 is at a node and is painted red; 0.5 cm below the butt is a sinew wrapping, also painted red; and another 5.7 cm below this, an unpainted sinew wrapping with the remnants of two quills on opposite sides of the reed. It is 9.1+ cm long and 0.5 cm in diameter. The butt end and sinew (which is 3.3 cm from the butt) of #177 are painted black; there are the remains of white, downy feathers in the sinew. There is a node near the butt end and the septum has been pierced. This paho is
Figure 10.3 Pahos: (a) crooks, (b) carved, (c) reed, (d) simple ring, (e) woven ring, (f) netted ring, (g) corncob-on-a-stick, (h) miniature, (i) bundle, (j) reed stalk on reed stem, and (k) fir.
11.9+ cm long and 0.6 cm in diameter. One end of an uncatalogued reed paho is bound so tightly with black-painted sinew that the reed is crushed. About 3.9 cm from this sinew is an unpainted sinew wrapping that contains traces of white downy feathers. The reed is 9.1+ cm long and 0.4 cm in diameter. Another piece of an uncatalogued reed paho is bound at what is now the middle with red-painted sinew; the pigment extends onto the reed on one side of the sinew for about 2.5 cm. There are remnants of downy white feathers in the binding. This specimen is 13.8+ cm long and 0.8 cm in diameter.

The category of ring pahos has been expanded from a single item so classified by Cosgrove (1947:119) for the Hueco. However, it has been suggested that similar rings from Tularosa Cave may have been ceremonial (Martin and others 1952:358, 440-441, 502), and, in fact, Brown (Martin, Rinaldo, and Bluhm 1954:205) called one a ring paho. Here, they are described as a simple ring paho (Fig. 10.3d). Hough (1914:59, Pl. 2, Nos. 3-6) also reported these, but suggested a utilitarian function. Four of these small rings range from 1.9 cm to 3.6 cm in diameter, averaging 2.7 cm; a fifth is 2.1 cm by 1.4 cm. One is made of six yucca leaf strips Z-twisted together with the ends tucked in to make a closed ring, except for one end, which is charred. Another small ring is made of fine fibers that seem to be spun as a heavy cord; this is wrapped around with narrow strips of yucca and contains remnants of feathers. Another is a yucca strip in a small coil tied in a square knot. A fourth specimen is made of fine, unpeeled, vine-like material in a coil, with one end simply wrapped once around and back. Finally, a ring of fiber is twisted and tied in a double overhand knot. The ritual use of small rings in recent times by Puebloans can be found in Parsons (1939:277, 306-307) for Hopi, Zuni, Laguna, and Zia.

Another specimen included in the larger category of ring pahos is a woven loop (Fig. 10.3e) and has not been described elsewhere. It is included with pahos because of its gross similarity to the great variety of unusual odds and ends so classified, as well as its size, which seems to preclude a utilitarian function. This is an elongated twig loop laterally woven with fibrous material which crosses in the middle (in a
figure-8); it is also looped around the closed end. This item is 4.1 cm long and 1.2 cm wide.

A single netted ring has been reported, but as a cord-netted hoop, not as a paho (Grange in Martin and others 1952:440, Fig. 164c). A fiber-netted hoop (Grange in Martin and others 1952:440, Fig. 164a) and another netted with yucca strips (Hough 1914:59, Pl. 12, No. 2) are much larger and probably utilitarian. The Gila Cliff Dwellings specimen (Fig. 10.3f) is only 6.7 cm across in its greatest dimension, which is actually a little bigger than it originally was, due to breakage. The frame is an unpeeled twig bound in a ring by a fiber wrapping. Onto this is built the knotted netting with a rectangular net pattern and a square(?) central hole. Both warps and wefts are 2-ply, S-spun, Z-plied, hard fiber cordage. Small netted rings used as prayer offerings have been noted at several Pueblo villages in modern times. Often they represent miniature shields and are used in a war cult or war god context. At Acoma, for example, they are offered with miniature bow and arrow prayer-sticks to Masewi, one of the twin war gods (White 1932:64, 127, Pl. 15t), and at Zuni they have a similar use that includes miniature weapons and gaming implements attached to prayer-sticks set out on mesa-top altars and hilltop cairn shrines of the War Brothers (Parsons 1939:305-306). Parsons (1939:Fig. 2) also illustrates their use as an offering attached to a Zuni war god figure and documents a war spirit image with a netted shield on the back, found on the altar of the Oraibi Snake Society (Parsons 1939:337). At Hopi a netted ring of yucca is used in conjunction with the war cult (Parsons 1939:277). Miniature bows and arrows or netted shields are given to the sun at winter solstice ceremonies at Santo Domingo, Cochiti, Laguna, and Acoma, and spring ceremonies at San Felipe (Parsons 1939:305). Finally, the Jemez War Chief and Oraibi and Isleta chiefs put down a netted ring to keep wind and sandstorms from their fields.

Corncobs mounted on sticks have been described by Grange (Martin and others 1952:428), Brown (Martin, Rinaldo, and Bluhm 1954:206), Lambert and Ambler (1961:73), and Gifford (1980:81). Both of the Gila Cliff Dwellings corncobs were impaled on unpeeled sticks (Fig. 10.3g).
Sayles (1935:Table 8) also lists them on his "Big Bend Cave Dweller" trait list.

Grange (Martin and others 1952:356, 429, 494) has described the next category and tentatively classified the elements as pahos. A reed stalk segment is 11.3 cm long and is cut at both ends. It is impaled on a reed stem with the whole being about 20 cm long (Fig. 10.3j). The diameters are 1.5 cm and 0.6 cm, respectively.

The bundle of evergreen branches (Fig. 10.3k) has not been described in the literature, but has been included among the pahos on the basis of analogy to the widespread ritual use of evergreens by present-day Southwestern Native Americans. This consists of two small branches tied together around the middle with hard fiber cordage. The whole is 24 cm long and 12 cm wide. The cordage is 2-ply, S-spun, Z-ply.

The next two pahos are called miniature because of the fine diameters of the materials used (Fig. 10.3h). Cosgrove (1947:124) described grass stem pahos for the Upper Gila, and they are apparently unique to this area. The examples he described were decorated in various ways, but none was threaded on small shell disk beads as the Gila Cliff Dwellings pahos are. One is a doubled-over grass stem, the other a tiny peeled stick, neither greater than 0.2 cm in diameter.

The final item is a bundle of what seem to be segments of roots (Fig. 10.3i). This is included among the pahos on the basis of the classification of six rough twigs tied up with cotton cordage and classified as a "prayer stick bundle(?)" (Bohrer in Caywood 1962:86, Pl. 3j), from Tonto National Monument. These are similar in appearance to the Gila Cliff Dwellings segments. In addition, unworked twigs and roots were found in a medicine man's kit in Tularosa Cave (Martin in Martin and others 1952:452, Fig. 168). Hough (1914:10) also referred to roots that had been gathered and dried in prehistoric times, with Yucca sp. and wild gourd identified. The Gila Cliff Dwellings bundle is 11.4 cm long and is tied up with yucca fiber; the root(?) elements number three.
Reed Cigarettes

Reed cigarettes are a widely distributed and oft described ceremonial artifact in the American Southwest. Grange (Martin and others 1952:352), for example, has listed both the common traits and variations of these items and he and others have described them for specific subareas and given distributional lists (Grange in Martin and others 1952:351-354, 416-421; Gifford 1980:77-79; Lambert and Ambler 1961:73; Hough 1914:107-110; Fulton 1941:20-24; Vivian, Dodgen, and Hartmann 1978:115, 177; Brown in Martin, Rinaldo, and Bluhm 1954:180, 202-203, 209-210; Cosgrove 1947:121-122). The 23 specimens from the Gila Cliff Dwellings do not differ in any characteristics from traits found elsewhere, although proportions and combinations of traits may vary.

In sum, 22 of the Gila Cliff Dwellings examples have a single node close to one end; only one node is centrally placed. Fourteen of the total have pierced septa, eight are not pierced, and one is too incomplete to determine. Overall, 15 are burned at the end opposite the node; the remainder do not have any evidence of charring. One specimen that is burned at both ends may have been burned subsequent to ritual use on the butt end, since this charring is on the outside surface only. Of the group with pierced septa, 12 are burned; 7 have some sort of filling, either unidentifiable burned material (3); fine, crushed tobacco(?) or other herbal material, or small splinters of reeds (3). All of these also have the node near one end. The burned specimens range from 2.7 cm to 3.9 cm in length, averaging 3.5 cm; from 0.8 cm to 1.3 cm in diameter, averaging 1.0 cm; and the node is placed at the butt end (2) or from 0.9 cm to 2.9 cm from it, averaging 2.1 cm. The unburned specimens are 8.2 cm and 8.9 cm long, 0.8 cm in diameter, and the nodes are 2.5 cm and 3.2 cm from the butt.

There are seven reed cigarettes with unpierced septa that have the nodes situated closer to one end. Three of these are burned and are 4.4 cm to 8.8 cm long, 0.8 cm to 0.9 cm in diameter, and the two measured nodes are 0.9 cm and 1.3 cm from the end. Most of the four unburned cigarettes are incomplete. One is 6.0 cm long; diameters range
from 0.8 cm to 1.4 cm; nodes are placed 0.9 cm to 2.2 cm from the butt end. One of these has small reed splinters stuffed in the long end and another has a wrapping of cotton cordage at the node end, the only example of this in the whole collection. A single unburned reed cigarette has a central node and it also has a stuffing of reed splinters. It is 6.7 cm long, 0.7 cm in diameter, and the node is 3.3 cm from one end.

A longitudinal sliver of reed with the node at one end is too incomplete to determine whether or not the septum was pierced. It is not burned.

**Tablitas**

Hough (1914:105-106) first described these artifacts for the Mogollon, followed by Cosgrove (1947:132-134), Grange (Martin and others 1952:354, 421-422), and Brown (Martin, Rinaldo, and Bluhm 1954:200-202, 209), but the most recent and comprehensive survey for the entire southwestern United States was written in Vivian, Dodgen, and Hartmann (1978). In the discussion of the Mogollon area (Vivian, Dodgen, and Hartmann 1978:24-31), tablitas are defined as "thin, flat carved wooden objects, slats or slabs, usually painted or otherwise decorated, that occur singly or as composites of two or more joined pieces" (Vivian, Dodgen, and Hartmann 1978:25). They are further described as probable parts of ritual items such as headdresses, altar pieces, and wands made of slats from the bloom stalk of the yucca, agave, and sotol for the most part, and sometimes wood. Black and green are the most common colors. This type of paraphernalia is apparently earlier in the Mogollon area than in the Anasazi.

The Gila Cliff Dwellings collection includes 13 tablita fragments, 10 of which have straight edges and 3 of which have at least one curved edge (Fig. 10.4a). The former have been called slats; those ends that are complete are rectangular. One specimen is painted with green, black, and white pigments (Fig. 14.2a); another white with a black end; and two pieces that were originally part of the same composite object are painted yellow with black ends. Only 2 of the 10 have complete
lengths, which are 9.0 cm and 8.4 cm; five complete widths range from 1.6 cm to 4.0 cm and average 2.5 cm; thickness varies from 0.1 cm to 0.5 cm, averaging 0.3 cm. There are seven pairs of small holes on five slats, one single hole, and one set of three; three slats have fiber cordage ties, including the single example with two slats tied together in a composite piece. Only one specimen has remnants of pitch adhesive.

The three examples with curved edges include one complete specimen that is an arc that has five holes drilled along one edge; it also has pitch adhesive on one side. This is 6.2 cm in overall length, 2.0 cm wide, and 0.4 cm thick. A second specimen has one straight and one curved edge, a pair of holes with fiber cordage, and is 6.4+ cm long,
2.3 cm wide, and 0.3 cm thick. The third piece is apparently a disk segment with a nicely rounded edge.

**Miniature Bow(?)**

Miniature ceremonial bows have been described widely in the literature of the Mogollon and adjacent areas (Hough 1914:100-101; Cosgrove 1947:130-132; Grange in Martin and others 1952:348-350, 413-414; Brown in Martin, Rinaldo, and Bluhm 1954:185, 188-189; Fulton 1941:20; Lambert and Ambler 1961:71; Gifford 1980:93), as well as elsewhere in the southwestern United States. The Gila Cliff Dwellings specimen is similar in many ways to these examples, in that it is a twig less than 35 cm long, with the bark removed and surface smoothed, a round cross section, tapering toward both ends, and lacking string notches. It is 29.5 cm long and 0.8 cm in maximum diameter. However, it does not have the good curvature of most illustrated specimens, is slightly charred at one end, and is not painted. Unpainted miniature bows have been reported by Grange (Martin and others 1952:414), Fulton (1941:20), and Gifford (1980:93).

**Split-stick Wand**

This specimen is merely a splinter of soft wood from a flat surface, with irregularly spaced incised lines at right angles to the length (Fig. 10.4b). However, this small fragment closely resembles the split-stick wands described by Cosgrove (1947:132, Figs. 41, 124). These are lath-like sections split from yucca bloom stalks; the decoration includes line work that is burned in. Hough (1914:Fig. 217, Pl. 22, No. 11) has illustrated what he called a flat staff or plume staff and a "long tablet" or painted wood strip.

**Pith Cylinder**

These objects have been described for the Upper Gila by Cosgrove (1947:119); they were not painted, although other "pith offerings" were. Grange (Martin and others 1952:434) reported wood cylinders, but
apparently none was pithy material or painted. The Gila Cliff Dwellings item (Fig. 10.4c) is 2.9 cm long, 1.2 cm by 1.0 cm in "diameter," is perforated lengthwise through the center, and is painted solid green. Examples illustrated by Cosgrove (1947:Fig. 112d) were apparently so perforated.

Juniper Berry Skewer

This incomplete specimen consists only of four berries impaled on a portion of the skewer or shaft. The distribution of this artifact is very limited: Tularosa and Cordova caves (Grange in Martin and others 1952:350-351, 414-418, 494), where they were found in relative abundance; and two caves in the Upper Gila south of Gila Cliff Dwellings (Cosgrove 1947:150).

Cut Reed Section

This is a long, rectangular, cut section of reed; a node is flush with one end. There are tiny splatters of pitch on the interior, or concave, side, and it appears that something covered with powdered specular hematite may have rested on the interior surface, where there is a tapered, narrow, linear pattern of this material. The reed is burned at one corner. It is 10.4 cm long and 1.5 cm wide. Finely ground specular hematite was associated with ritual objects and collections in Winchester Cave, where an arrow shaft was painted with it (Fulton 1941:19); at Double Butte Cave, which produced pahos painted with it (Haury:1945:198, Figs. 127-128); at Steamboat Cave, where it was used in a pigment on a split-stick wand (Cosgrove 1947:132, Fig. 124f); and at Casas Grandes, where it was brushed on the surface of a ceramic bowl that contained a medicine man's kit and where larger crystals were found in two troves of ceremonial goods (Di Peso and Fenner in Di Peso, Rinaldo, and Fenner 1974[8]:240). Lambert and Ambler (1961:73) reported a reed tube containing a "black metallic powder."
Dice

Wooden dice have been reported for the Mogollon area by Grange (Martin and others 1952:355-356, 423, 428) and Brown (Martin, Rinaldo, and Bluhm 1954:204), while Hough (1914:127) and Gifford (1980:79) have described reed dice. Some of these were decorated or marked by burning, painting, or incising. The wood die from Gila Cliff Dwellings is an unpeeled, split twig section, plano-convex in transverse cross section (Fig. 10.4d). It is 3.0 cm long, 1.5 cm wide, and 0.7 cm thick. The reed die is a section of reed sliced lengthwise and is 2.0 cm long, 1.0 cm wide, and 0.5 cm thick. There are three short transverse incisions on the convex side (Fig. 10.4d).

Summary

Nearly all of the artifacts in this category were ritual accoutrements. The exceptions were the reed and wood dice, used for gaming, and possibly the cut reed section, which may not have been of this nature but had some specular hematite powder on its surface, a material that has been associated with ceremonial items elsewhere. The ritual artifacts were overwhelmingly in the nature of offerings, in contrast to paraphernalia, such as the tablita and split-stick wand fragments. The reed cigarettes vary from assemblages from other Mogollon sites in that almost all lack decorative attachments. But overall, the socioreligious artifacts of wood and reeds from Gila Cliff Dwellings easily duplicate such items found at other Mogollon sites, except for the cut reed section.

Based on phase assignments made at other Mogollon sites, it seems possible, if not probable, that several of these socioreligious artifacts were the result of occupations earlier than the Tularosa phase. These include twig pahos with a variety of fiber bindings, the juniper berry skewer, and the wood die, all of which were recovered from pre-Pottery levels in Tularosa Cave and continued to the San Francisco phase, when they decreased in frequency (Martin and others 1952:364, 366, 495). A wood die was recovered from the Transitional Reserve-Tularosa phase site of Hinkle Park Cliff-Dwelling (Martin,
Rinaldo, and Bluhm 1954:180), so it is possible that this artifact continued in use through the Tularosa phase, as its presence at Gila Cliff Dwellings would suggest. In addition, reed stalks on reed stems and the netted ring pahos are Pine Lawn to San Francisco phase occurrences at Tularosa Cave (Martin and others 1952:454, 494-495). Brown (Martin, Rinaldo, and Bluhm 1954:209) observed that black was the only pigment color used for tablitas until the Three Circle phase, after which additional colors were applied. On this basis, one might infer that the painted tablitas from Gila Cliff Dwellings belong to the Tularosa phase occupation.

**Ornaments**

**Beads**

Five Juniperus sp. seeds are perforated lengthwise for use as beads. Similar items have been recovered from Red Bow Cliff-dwelling (Gifford 1980:80, Fig. 63).

**Pendant**

A rectangular bark pendant with slightly convex sides and rounded corners and a hole in the center of one end is very similar to a ponderosa pine bark pendant recovered from a pre-Pottery level of Tularosa Cave (Grange in Martin and others 1952:441, Fig. 149c). The Gila Cliff Dwellings specimen is 6.9+ cm long, 7.1 cm wide, and 2.1 cm thick; the hole diameter is 0.6 cm.

**Unclassified Artifacts**

**Cut Reeds**

This is a category of 14 objects called reed tubes by Grange (Martin and others 1952:446): sections of reeds cut at both ends, either open at both ends or at one end (that is, with a node at one end). They are distinguished from reed cigarettes by having no nodes
(7), by having two nodes (5), by being longer than the range for cigarettes (1), or having the node at, instead of near, one end (1). An example of the first type was found in place as the mouthpiece for a stone pipe in Bat Cave (Dick 1965:Fig. 57e). Among the Gila Cliff Dwellings examples, none of the septa are pierced. Complete lengths range from 4.0 cm to 18.9 cm, averaging 9.2 cm; diameters are 0.6 cm to 1.2 cm and average 0.9 cm. One incomplete reed is 22.4+ cm long.

Wood Cylinders

These objects have previously been described for the Reserve (Grange in Martin and others 1952:358, 434, Fig. 162e-i; Brown in Martin, Rinaldo, and Bluhm 1954:196, 198) and Upper Gila areas (Cosgrove 1947:152-153). These are short, straight sections of twigs with the bark peeled off and the ends nicely finished. Grange (Martin and others 1952:358) said that they have variously been described as nose plugs, gaming sticks or counters, and toggles used with burden straps. One of the six Gila Cliff Dwellings specimens is tapered. Both ends of three and one end of one are partly cut through and then broken the rest of the way; the other end of the latter specimen is round with a hole in the center. The ends of the other two cylinders are rounded in one case and flat in the other. These objects range from 3.2 cm to 9.1 cm in length and average 6.8 cm; diameters are 0.6 cm to 1.2 cm, averaging 0.8 cm.

Unidentified Objects

Eight specimens in the Gila Cliff Dwellings collection were functionally unidentified. Similar items were not found in the literature search. One was a split section of peeled twig; the ends are curved toward the flat (split) side, resulting in a broad U-shaped object. Both rounded ends are slightly charred. It is 12.7 cm long, 1.1 cm wide, and 0.3 cm thick. The second is an eroded and worm-eaten section of wood, roughly rectangular in section; both pointed ends are charred. It is 9.1 cm long, 1.5 cm wide, and 1.2 cm thick. A cylindrical, peeled section of twig has one end whittled down to a flat
tang across the diameter. It is 7.4 cm long and 0.6 cm in diameter; the
tang is 1.4 cm long, 0.2 cm thick. The fourth object is a burl that is
whittled and smoothed over almost the entire surface; it is slightly
charred in one spot. The length is 6.7 cm, the width 4.9 cm, and the
thickness 2.9 cm.

A curved fragment, possibly from a disk, seems to be made of a
heavy leaf, such as an agave or broadleaf yucca. A peeled and smoothed,
straight stick has one end rounded, the other possibly broken but
apparently more or less complete. It is 15.8 cm long and 1.3 cm in
diameter. Another piece of shaped wood is wedge-shaped in lengthwise
section and plano-convex in lateral cross section; one end is rounded
like a broom handle. It is 6.0 cm long, 1.8 cm wide, and 1.1 cm thick.
A wood tablet is a flat, apparently rectangular piece of wood, thicker
than the tablita fragments. It is 9.3 cm long, 2.4 cm wide, and 0.6 cm
thick.

Miscellaneous Worked Wood

This category differs from the preceding in that the 23 components
are possibly unfinished, are barely worked, or are very fragmentary.
There are three broad categories: sticks (6), coils (13), and fragments
(3). The sticks have the lesser twigs removed; four are unpeeled and
two mostly peeled. The range in (complete) length from 6.7 cm to
42.1 cm and average 18.8 cm, in diameter from 1.1 cm to 1.8 cm,
averaging 1.4 cm. The coils include a group of 12 twigs (4 unpeeled and
unsplit, 6 unpeeled and split, 2 peeled and split) whose arcs range from
3.5 cm to 18.0 cm, and an unpeeled and split twig that overlaps into a
complete, irregular circle 5.3 cm by 3.6 cm.

Summary

The wood cylinders and cut reeds are the only items that have phase
assignments elsewhere in the Mogollon area. The former first appeared
in pre-Pottery levels at Tularosa Cave and continued at least into the
San Francisco, when they decreased in frequency, and they were found in
both the Plainware and later levels at Cordova Cave (Martin and others
1952:365). Since individual specimens occurred in Three Circle phase context at 0 Block Cave and Transitional Reserve-Tularosa phase Hinkle Park Cliff-Dwelling, it is probable that their use continued through the Tularosa phase (Martin, Rinaldo, and Bluhm 1954:180), as evidenced by their presence at Gila Cliff Dwellings. Cut reeds, or reed tubes as they were called in the Tularosa Cave report (Martin and others 1952:364-365), were found in Pine Lawn through San Francisco phase levels and later mixed levels. Their relative abundance at Gila Cliff Dwellings suggests that they continued through the Tularosa phase.

Discussion

During the course of identification and analysis of these artifacts it quickly became apparent that this collection was readily comparable to the wood, reed, and gourd artifacts already described in the Mogollon literature. This was useful for the identification of Gila Cliff Dwellings material, but this part of the artifact collection did not serve to expand the known variety of Mogollon artifacts, except perhaps temporally. And even here, there is some question, because of inadequate provenience data, as to whether some types or styles of artifacts continued into the Tularosa phase. So in this regard, it is unfortunately the case that phase assignment elsewhere has been used to shed light on some of the Gila Cliff Dwellings artifacts, instead of the latter providing new data or support for the known Mogollon sequence. A Gila Cliff Dwellings occupation earlier than the known Tularosa phase component was first and most obviously indicated by the atlatl equipment. Other artifacts that have been dated early (up to and including the San Francisco phase) elsewhere are the wood trowel, twig pahos with fiber bindings, the netted ring paho, the reed stalk on reed stem paho, gourd containers, and the bark pendant. These few items represent caves 2, 3, 4, and 5.

The simple functional classification used to organize these 239 artifacts includes three groups—utilitarian (68, 28.5 percent), socioreligious (115, 48.1 percent), and ornamental (6, 2.5 percent)—and a category of unclassified artifacts (50, 20.9 percent). The small sample of artifacts found in rooms does not allow much in the way of
interpretation. Only five rooms had six or more artifacts: room 1 had 4 utilitarian, 6 socioreligious; room 16 had 6 of each (and 1 unclassified); room 17 produced 2 utilitarian, 6 socioreligious artifacts; room 21 was perhaps the most suggestive, with 6 socioreligious; and room 27 had 8 utilitarian and 7 socioreligious (plus 5 unclassified). About the most that can be wrung from all of this is the suggestion that ritual equipment was kept in domestic rooms. Probably only rooms 16, 17, and 27 should be considered in this regard, since there is some question as to whether room 1 was actually a room, but rather just an enclosed public area. The indication with room 21, on the basis of these artifacts, is that it had a ritual function.
Coarse hand-spun twine, presumably from wild plants, varies considerably in texture, from hard and barely worked, to soft and fuzzy. Without botanical identifications, it is uncertain whether this is a result of spinning technique, wear, or material. The spin, twist, and number of plies are given below.

The site collection is treated as a unit. A number of proveniences were combined during cataloging, so there are no consistently comparable provenience lots. Distribution of loose fragments of cordage is as follows:

Cave 2 148
Cave 3 341
Cave 4-5 153

The notation system used below is as follows. Lower case letter (s,z) indicates direction of spin. Upper case letter (S,Z) indicates direction of twist. Number preceding letters indicates number of plies; lack of number indicates single ply. Parentheses enclose individual twined elements combined to make whole cord.

Table 11.1
CORD SPIN AND TWIST

Single-Ply
s 31
z 36

Two-Ply
2s-Z 462
2s-S 140
Three-Ply

s-Z  5
z-S  1
(z)(2s-Z)S  1
(s)(2z-S)Z  1

Four-Ply

2(2s-Z)S  6
4s-Z  2
2(2s-Z)Z  2
2(2z-S)Z  11
(2z-s)(2s-s)Z  1

Five-Ply

(s)(2(2z-s))Z  1

Six-Ply

3(2z-S)Z  3

Eight-Ply

4(2s-z)S  2
8s-Z  1

Cord Size

Diameter of the most common cord (2-ply) was measured, under the assumption that thickness of twine may relate to use. Caliper measurements are for the tightest portion of the piece. In most cases the measured twine was given a twist to reduce it to the approximate original diameter; many pieces appeared to have loosened with age.

Diameter of 2-ply twine:

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>4</td>
</tr>
<tr>
<td>1.0</td>
<td>136</td>
</tr>
<tr>
<td>1.5</td>
<td>207</td>
</tr>
<tr>
<td>2.0</td>
<td>155</td>
</tr>
<tr>
<td>3.0</td>
<td>58</td>
</tr>
<tr>
<td>4.0</td>
<td>8</td>
</tr>
<tr>
<td>5.0</td>
<td>1</td>
</tr>
<tr>
<td>8.0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>570</strong></td>
</tr>
</tbody>
</table>
Knots Included

Bow - 1; square - 36; granny - 6; overhand - 20; half-hitch - 5; slip - 2; figure-8 - 1.

Soft, Noncotton Fiber

Three specimens of soft fiber cord have 2-ply, S-spun, Z-twist elements as their foundation. These include a 4-ply cord of two 2-ply elements S-twisted together, a single fragment of 2-ply cord, and a possible net fragment composed of six 2-ply cords (three to a side) tied together in a square knot. Four other pieces include one Z-spun thread, two 2z-S cords, and one 5z-S piece.

Wool Yarn

The collection contains one fragment of 2-ply, Z-spun, S-twist blue yarn.

Raw Material

Numerous miscellaneous wads and loosely twisted bundles of partially processed noncotton fibers (probably yucca), dull yellow to brown, were collected, as well as miscellaneous bark pieces partially processed into bast fiber.

Loosely Twisted Fiber

Loosely spun fragments of fiber included three single-ply Z-spun, two single-ply S-spun, one 2-ply z-S, or bark or bast; also included were three single-ply cornhusk strips, two S-spun and one Z-spun.

Knotted Cord Artifacts

Artifacts made from multiple strands of cordage include:
1. A loosely z-twisted hard fiber cord with one figure-8 knot and one overhand knot, dividing this 13 cm piece into three equal intervals (Fig. 11.1c).

2. Two cotton cords and two hard fiber cords tied together with: loop with a running knot; two overhand knots; and a square knot. The cotton cord pieces are 4-ply, z-S. The hard fiber cords are 2-ply s-Z that were dyed red after twisting (Fig. 11.1f).

3. Two 2-ply S-spun Z-twist hard fiber cords tied together by a square knot. One light brown piece is 1.5 mm in diameter; another is loosely woven, 6 mm in diameter.

4. Two 2-ply z-S cords and one single-ply Z-spun thread laid parallel and tied loosely in a square knot.

5. A ball of 2-ply s-Z hard fiber cordage 343 cm long and 1.5 mm in diameter, spliced with a square knot 41 cm from the outside free end (Fig. 11.1e).

6. A ball of 1 mm diameter cordage loop-netted about a small stone (Fig. 11.1d). Cordage is 2-ply, z-S spotted at intervals with red pigment, giving the appearance of tie-dye. Ball is 1.7 to 1.9 cm across, with 18 cm of free cord leading from it.

7. Tassel of 15 red dyed cords gathered and knotted in the middle with two overhand knots (Fig. 11.1a). Each cord is made from a single-ply s-spun thread, doubled back and Z-twisted upon itself. These elements extended 10 cm to 12.5 cm from the knotted center, which is encircled once by a single-ply Z-spun cotton thread.

Probable Netting Fragments

A loose wad of 87 pieces of 2s-Z fiber cordage, 1 mm to 2 mm in diameter, is probably the remnants of netting. These are light to dark brown. Eight pieces are tied together with square knots. One piece has a third cord spliced in at right angles. Three pieces are held together in small unequal loops tied around them with a single half-hitch. These may be netting fragments; their total length is 77 feet (23.5 m).
Figure 11.1 Cord artifacts: (a) red-dyed cord tassels, (b) flat braid, (c) hard fiber cord with two knots, (d) cord-wrapped stone and fiber, (e) ball of wild fiber cord, (f) wild fiber and cotton cords tied together; (b) is 9 cm long.
Braided Fiber

Flat braid, 7 mm to 13 mm wide, is made from elements of probable shredded yucca leaves. Three are made of three elements; one incorporates four elements. Length of pieces is 6 cm to 54 cm. Two pieces have overhand knots.

A small fragment is of four narrow (2 mm) elements of split leaves, probably yucca. Two small pieces of three strand braid come from the same provenience.

Animal Cordage

Sinew Cord

One 39 cm long fragment of 4-ply, s-Z sinew cord 2 mm in diameter comes from the collection.

Hair Cord

Fragments of spun or braided human hair cordage are as follows:
1. A bundle of fragments of 2-ply, s-Z cordage 1 mm or less in diameter. There are no knots in these; they may be stock material or remains of loop-netting, probably the former.
2. A bundle of 20 short strands of 2-ply, s-Z cordage, and 13 short 3-element braids of cords or untwisted strands. These range from 4 mm to 17 mm long.
3. Six pieces of 2-ply, s-Z cordage, two of which are tied in overhand knots.
4. One piece of 6-ply, z-S cordage.
5. Three pieces:
   2-ply, s-Z, 1 mm diameter, 27.5 cm long.
   2-ply, no spin, Z twist, 2 mm diameter, 11 cm long.
   6 cords of 2-ply, no spin or loosely S spun cords, S-twisted into single cord, 2 mm diameter, 127 cm long.
6. Multiple strands of 2-ply, s-Z cordage. These include: 14 short pieces, 2-5 cm long; two 2-ply cords loosely tied to one 2-ply
cord in a granny knot; a 5.5 cm section of seven 2-ply cords loosely
S-twisted into one.

7. Short (4.3 cm) section of five 2-ply, s-Z cords.
8. A bundle of pieces of 2s-Z pieces, 1 mm or less thick, and up
to 7 mm long, which is probably stock for netting.

Composite Cordage
(Fig. 11.2a)

This category includes yucca cordage wrapped in fur or split
feathers, presumably portions of blankets or capes.

There is one small fragment of cordage made of a very thin (0.4 mm)
single strange of thread (yucca?) S-twisted with loosely S-spun light
brown fur. One end is loosely tied in a square knot, in which a single
strand of hair cord is entangled.

The remaining fur-wrapped cordage consists of 26 loose pieces of
multiple-strand hard fiber cordage wrapped in hide strips, some of which
still have fur attached (rabbit?). Construction of cordage is as
follows: 2-ply, z-S hard fiber cord, averaging 5 mm to 7 mm in
diameter. This is wrapped with downy feathers, quills flattened or
split, and ends tucked under first and last wraps.

Total count of strands is not available since much of this cordage
is in matted or tangled bundles, probably the remnants of several
blankets or robes (Fig. 11.2a).

Cotton Cordage

Cotton Yarn

A few fragments of cotton yarn have been collected from caves 2 to
5. All thread is z-spun, S-twisted in yarn of 2-ply (24 pieces), 3-ply
(4 pieces), 4-ply (8 pieces), 8-ply (2 pieces), 9-ply (1 piece), and
12-ply (1 piece). There are 10 specimens of a single 3-spun thread,
Figure 11.2 Fur-wrapped cord and cloth: (a) fur-wrapped cord, (b) cotton cloth, (c) embroidered cloth, and (d) tie-dye design (selvage at top).
including one tightly-rolled ball, 2.5 cm in diameter. Colors of thread are white, tan, brown, black, gray-black, red, and light blue.

Cotton Cord

There are a few short pieces of loosely z-spun cotton cord tied in an overhand knot.

Cloth

As in other Mogollon sites, Gila Cliff Dwellings has both cotton (28 pieces) and noncotton (13 pieces) plain weave cloth.

Noncotton Cloth

All but one piece of noncotton cloth are of single-ply s-spun yarn in plain weave. Warp count ranges from 8 to 25 per inch (3 to 10/cm) with most having 15 to 25 warps per inch (6 to 10/cm); weft count is 8 to 18 per inch (3 to 7/cm). All are small pieces, from 2 cm by 3 cm to 17 cm by 18 cm; none have selvage remaining. The largest piece had been folded into a pad measuring 9 cm by 10 cm; within one fold was a small piece of animal skin with hair. One specimen is composed of two pieces sewn together with a whipped stitch.

One specimen has warps and wefts in pairs with over-2-under-2 twill weave; warp and weft count is 15 per inch (6/cm).

Another piece is a 3 cm wide band of coarse yarn, tied in a square knot to form a ring. Warps are four (3-ply, S-spun, Z-twist) yarns. Weft is one 2-ply, S-Z yarn woven over-1-under-1 through these.

Cotton Cloth

All but one piece of cotton cloth are plain weave (over-1-under-1), made with single-ply z-spun yarn (Fig. 11.2b). Warp count ranges from 18 to 30 per inch (7 to 12/cm) with a mode of 28 per inch (11/cm). Weft count ranges from 15 to 25 per inch (6 to 10/cm) with a mode of 20 per inch (8/cm). Fragments range from 2.5 cm by 2.5 cm to 15 cm by 36 cm in
size. None are large enough to indicate the shape or type of garment. Only two pieces have selvage; it is a simple twined technique, as illustrated by Kent (1982:Fig. 139B).

Two pieces are decorated, one with embroidery and one by tie-dye. Both techniques are previously unreported in this area.

The embroidered piece (Fig. 11.2c) is decorated with 2-ply, s-Z blue and brown cotton yarn stitched onto fine plain weave. One blue band is bordered by two adjacent brown bands in what appears to be an interlocking scroll pattern. Each band is formed by thread crossing four warps, dipping under one warp, and crossing four warps. After moving up one and over one, to stagger the design, the same intervals are followed in the opposite direction. This fabric was part of the wrapping for the room 27 infant burial. All embroidery described by Kent (1982:183-191) is from the Anasazi, Sinagua, and Salado areas, and none is of the same pattern of weave of this piece, although blue and brown colors have been reported.

The tie-dye design (Fig. 11.2d) is on a 13 cm by 38 cm strip of brown cotton plain weave with selvage remaining on one end. The pattern consists of undyed white circular spots, 8 mm in diameter, in evenly spaced rows; in addition there is a cruciform negative figure in the fabric. This appears to be the only piece of tie-dye cloth known for the Mogollon area. Only 11 pieces have been previously reported in the Southwest; 9 are PIII Anasazi, 1 is Sinagua and 1 is Salado (Kent 1983:195).

Another unusual fragment from the room 27 burial is a 3.5 cm by 7.5 cm piece of heavy yarn woven in a 2/2 twill pattern. This apparently was matted onto skin or hide still retaining brown hair, possibly the baby's scalp.

Covering of Infant Burial

Covering of a "disturbed infant burial, along the trail between room 23 and 25" has two layers. The infant was apparently laid on a mat of coarse fur. Below this was a folded piece of fur-wrapped cord blanket. The fur strips, which are quite soft, are simply wrapped around 2-ply s-Z noncotton plant fiber. Two-ply, s-Z cord without fur
wrapping is twined over these fur-wrapped warps at about 2 cm intervals. Each twined loop encloses three warps. A fragment of over-2-under-2 twill matting was associated with the bundle.
Chapter 12
FIBROUS ARTIFACTS

by
Gloria J. Fenner

This group of 311 specimens is primarily composed of knots, and none of the classifications differed from fibrous material found in the published Mogollon literature. As was true of the wood, reed, and gourd artifacts, no proper ethnobotanical identifications have been made.

Utilitarian Objects

Carrying Net

A portion of a carrying net or netted bag is made of coarse hanks of coarse, hard fibers that are very loosely S-spun. Seven of these elements are Z-twisted and knotted together. A yucca strip is tied to one element with a "double overhand" knot. The fibrous material of the netting is probably broadleaf yucca or agave, but it has not been properly identified. There are no remnants of a liner associated with the netting. Very similar items were reported by Bluhm and Grange (Martin and others 1952:214, 226) for Tularosa (5), made of yucca strips, and Cordova (1) caves, made of shredded bark; Dick (1965:80) for Bat Cave, made of yucca leaves; Cosgrove (1947:71, Fig. 81f) for both the Upper Gila and Hueco; and Lambert and Ambler (1961:52-55, especially Fig. 33d) for U-Bar Cave.

Needle

This item consists of the naturally sharp tip of an agave or yucca leaf with its cleaned and Z-twisted fibers. The length of the needle proper is 6.8 cm, the diameter is 0.3 cm; the total length, including the fibers, is 21 cm. Similar specimens have been reported for the Reserve area at Cordova Cave and O Block Cave (Grange in Martin and others 1952:408; Brown in Martin, Rinaldo, and Bluhm 1954:196).
Potrest

A bundle or hank of grass loosely formed in a coil is similar to potrests retrieved from Tularosa and Cordova caves (Grange in Martin and others 1952:456, 490), from Red Bow Cliff-dwelling (Gifford 1980:85), and from Ceremonial Cave in the Hueco Mountains (Cosgrove 1947:35, Fig. 66b). The Gila Cliff Dwellings specimen is 18 cm in diameter and 3 cm thick.

Fiber Knots

There are 285 specimens included in this category. Materials include fibrous hanks (probably broadleaf yucca and agave), narrowleaf yucca (not a proper identification) strips, partly shredded material (again, yucca/agave), combinations of strips and fibers, cornhusks, a cornstalk, and a bark strip and twigs. Two large lots (1 of 180 and 1 of 29) of knots include the full range of fibers to more leafy material, but again the yucca/agave type.

Having discussed the specimens as specimens, additional descriptive data derive from the knots themselves. The total here is composed only of identified fibrous knots (that is, excluding incomplete knots), and includes each knot separately (some specimens have more than one knot), as well as knots found as parts of other artifacts (for example, pahos). The total does not include knotted cordage. There are, then, 302 identified fibrous knots of the following types:

<table>
<thead>
<tr>
<th>Knot Type</th>
<th>Specimens</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square knots</td>
<td>251</td>
<td>83.1%</td>
</tr>
<tr>
<td>Overhand knots</td>
<td>9</td>
<td>3.0%</td>
</tr>
<tr>
<td>Half-hitch knots</td>
<td>8</td>
<td>2.6%</td>
</tr>
<tr>
<td>Lark's head knots</td>
<td>7</td>
<td>2.3%</td>
</tr>
<tr>
<td>Bastard knots</td>
<td>7</td>
<td>2.3%</td>
</tr>
<tr>
<td>Bow knots</td>
<td>5</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

224
"Double overhand," 5, 1.7 percent
4 fibrous knots
Other artifact, 1 knot
Carrick bend knots, 4, 1.3 percent
Fibrous knots
Granny knot, 1, 0.3 percent
Fibrous knot
Figure-8 knot, 1, 0.3 percent
Fibrous knot
Sheet bend (?) knot, 1, 0.3 percent
Fibrous knot

"Double overhand" knots are made up of the following combinations of simple knots: half-hitch over an overhand (2), overhand over a half-hitch (2), and two overhands. The percentages compare very favorably with those from Tularosa and Cordova caves (Bluhm and Grange in Martin and others 1952:205, 219-220, Fig. 76), where square knots account for 91.4 percent of the former and 83.8 percent of the latter knots, with overhand knots second in frequency at 5.5 percent and 11.0 percent, respectively. However, granny knots were much more common in these caves than they were at Gila Cliff Dwellings. Square knots also had the highest frequency in O Block Cave, Y Canyon Cave, Hinkle Park Cliff-Dwelling, and Cosper Cliff-Dwelling, followed by the overhand (Bluhm in Martin, Rinaldo, and Bluhm, 1954:164-165), and at Bat Cave the sequence was the same (Dick 1965:71). In Pinnacle Cave, square knots represented about half of the identified types, with overhand knots having a proportion of 14.7 percent; in U-Bar Cave, in contrast, it was overhand 46.2 percent and square 44.2 percent (Lambert and Ambler 1961:56). The latter authors suggested that the noncordage knots represent "sandal ties, handles, carrying loops, netted carriers, bag and gourd ties," and the like (Lambert and Ambler 1961:56). At Fate Bell Shelter, on the east edge of the Big Bend area of Texas, the proportion was 59.3 percent square and 23.0 percent overhand (Pearce and Jackson 1933:92).

When the category of fiber knots was cataloged, individual specimens from different proveniences at Gila Cliff Dwellings were often lumped together under the same number. For this reason little can be done by way of studying the distribution of different kinds of knots.
Fibrous Raw Material

There are two categories of raw materials, numbering something over 14 specimens. There were four lots of basketry splints (split twigs) gathered in coils or arcs. Four such lots were recovered from Tularosa Cave (Martin in Martin and others 1952:456-457). The second category encompasses multiple specimens that are difficult to separate and count, being hanks of "bast" fibers, the unspun raw material of cordage.

Summary

The fibrous artifacts classified as utilitarian consist almost entirely of knots. Previously reported grass coil potrests and bundles of basketry splints are for the most part early (Pine Lawn-San Francisco phases). Those at Gila Cliff Dwellings may indicate a continuation through the Tularosa phase.

Socioreligious Objects

Leafy Bundles

The grounds for classifying these artifacts as ritual are tenuous, the main one being a generic affinity to the little odds and ends of Mogollon artifacts that have previously been called "ceremonial." The corn leaf or husk bundles seem particularly good candidates, and Hough (1914:92, Figs. 189-190), in fact, referred to small bundles of cornhusks that contained food and were tied to pahos. Parsons (1939:284) documents such a use at Laguna, where they enclose meal in a wrapping of cornhusk, and at Hopi, where food (meal, pollen, and honey) for the prayer-stick is wrapped in a small cornhusk package and tied to it. Corn leaves, in fact, are described as a common wrapping in ritual at Zuni, Laguna, and Hopi (Parsons 1939:277). The yucca leaf coil bears some resemblance to the "owl" fetishes of Aztec West Ruin (Morris 1919:46) and Antelope House (Magers in Morris 1980:515).

Two of the Gila Cliff Dwellings specimens are corn leaves or husks that appear to be small packages. They probably do not contain
anything, but are too brittle to unfold in any case. The husks are first folded lengthwise; one was then folded back and forth on itself in a zigzag manner, while the other has the ends folded in toward each other. They measure 5.5 cm by 4.1 cm by 1.8 cm and 4.6 cm by 3.0 cm by 1.3 cm. A third specimen consists of two thick hanks of a coarse fibrous material (shredded corn leaves/husks?) tied together with yucca strips; the resulting object looks like a large knot but is not. It is 7.6 cm by 6.2 cm by 4.0 cm. The fourth specimen is a wide yucca leaf folded in a flattened coil, wrapped around the middle with a partly fibrous yucca strip. It is 5.8 cm by 2.5 cm by 1.5 cm.

Hough (1914:9) has also reported "neatly folded bundles of dried green leaves" from Tularosa Cave, and Gifford (1980:82, Fig. 65) found five bundles each of different materials cut, stacked, and/or wound back and forth into bundles, each wrapped and tied tightly around the middle.

Unclassified Artifacts

Unidentified Objects

These five artifacts were functionally unidentified. One consists of five strips of yucca leaf joined with three square knots and tied to a section of twig with an overhand knot; it is 8.5 cm long. Another consists of yucca fiber wrapped tightly around two parallel stick fragments to bind them. There are three different layers of bindings, two side-to-side, separated by one parallel to the sticks. The third item is a broad yucca leaf loop. The leaf is doubled over, the open (nonloop) end wrapped with a partly shredded yucca leaf. There is also a partly macerated(?) section of cornstalk bent/folded back and forth on itself, and a crushed cornstalk section, crudely coiled.

Discussion

These 311 fibrous artifacts have been classified into two broad functional groups—utilitarian (302, 97.1 percent) and socioreligious (4, 1.3 percent)—and a category of unclassified artifacts
(5, 1.6 percent), nearly all quite mundane things. Types of knots used at Gila Cliff Dwellings are quite comparable to those of the Reserve area, although there is more of a variety from the former. The yucca/agave spine needles mainly came from "Late" (San Francisco through Tularosa phase) levels at Cordova Cave, as well as the Reserve phase of O Block Cave (Grange in Martin and others 1952:408; Brown in Martin, Rinaldo, and Bluhm 1954:196). Grass coil potrests, on the other hand, seem to have appeared a little earlier at Tularosa and Cordova caves, in Pine Lawn-Reserve levels (Grange in Martin and others 1952:490). The carrying nets seem also to be a little earlier in Tularosa Cave, most occurring in pre-Pottery through San Francisco phase levels, while the Cordova Cave specimen was "Late" (Bluhm and Grange in Martin and others 1952:230).
Chapter 13
BASKETRY AND SANDALS

by
Keith M. Anderson

Baskets

Coiled Basket Fragments (Fig. 13.1a–c)

Two-rod-and-bundle Bunched Foundation (Total: 8)

These are the predominant type of coiled baskets, totaling four fragments of basket walls and four normal centers. No rim fragments are preserved. All have simple, uninterlocked stitches with slight slant to the right (/) or with no consistent slant. Only one (Fig. 13.1a) has more than one color splint; this wall fragments has a diagonal pattern of alternate stepped light and dark lines, 9 to 13 splints wide. Occasional split stitching appeared on one specimen. Splints range from 1.2 mm to 3.2 mm wide (0.047 inch to 0.126 inch), with from 8 to 21 per inch.

Bundle Foundation (Fig. 13.1e)

Two fragments, one from the basket wall and one from the rim, are from room 1. Stitches are simple and uninterlocked, with right slant (/). Splints are 3 mm to 4 mm wide; bundles are 1 cm to 1.1 cm in diameter.

One piece of adobe (Fig. 13.1d) from room 17 has the impression of the curved wall of a coiled basket matching the two-rod-and-bundle fragments in size and appearance. The impression shows a clear right slant in the basket stitches, which run 9 to 10 per inch.

Twilled Ring Baskets

There is part of the rim of globular ring basket with a strip of ornamental braid, 1.2 cm to 1.4 cm wide, below the rim (Fig. 13.1f). A similar specimen was reported from Bear Creek Cave in the Blue River
Figure 13.1 Baskets and matting. Coiled baskets: (a-c) two-rod-and-bundle foundation, (d) impression in adobe, (e) bundle foundation, and (f) twilled ring basket. Matting: (g) twilled mat fragment.
drainage by Hough (1914:Fig. 179). Interior rim diameter is approximately 10 cm. Plaiting strips on both body and rim braid are 2 mm to 3 mm wide. Plaiting interval on the rim braid is over-2-under-2; on the body it is over-3-under-3.

Twilled Matting (Total: 11)

All of these fragments of mats are made with the same over-3-under-3 weave. Elements range in width from 3 mm to 6.2 mm, and average 4 to 5 mm wide. Those with selvage have the standard self-rim, turned back 90° and woven into the body of the mat (Fig. 13.1g). All but one have a straight weave from square or rectangular mats; the exception is curved triangular design, perhaps the center of a circular mat.

Sandals

Plaited Sandals

(Fig. 13.2a-c)

These are square-toe wide splint sandals, four intact and three fragments, that conform to types described for Tularosa Cave (Martin and others 1952:266-276). All are started with three or four yucca strips 1 cm to 2.6 cm wide, doubled over at the toe, making seven to eight elements plaited over one, under one. The heel is doubled up and over to provide a reinforced pad. Two have heel and toe loops; one loop encircled the second toe, a second loop encircling the instep is tied to this. A third loop was attached to the middle loop, running around the back of the wearer's heel. One has three yucca loops along each side, through which ties crossed the foot. Length ranges from 20 cm to 27 cm; width from 9 cm to 11 cm. One small fragment consists of short portions of yucca strips.
Figure 13.2 Sandals: (a-c) plaited sandals, (d) miniature plaited sandal, (e) two-warp wickerwork sandal, and (f) four-warp wickerwork sandal.
Miniature Plaited Sandal
(Fig. 13.2d)

Two pieces of a band made of loosely plaited yucca leaves go together to form what appears to have been a miniature sandal about 15 cm long and 4.3 cm wide (Fig. 13.2d). Three yucca strips 4 mm wide are folded over each other to make six elements which are plaited in over-1-under-1 interval.

Two-warp Sandals

One incomplete sandal and one fragment are made of partially crushed broad yucca leaf strips woven continuously around two yucca leaf warps, as described and illustrated for Tularosa Cave (Martin and others 1952:259-263; figs. 87-88). The complete specimen (Fig. 13.2e) has three twisted yucca cord ties encircling middle toe, instep and heel. This sandal is 19.8 cm long and 11.3 cm wide. The other is about one-half of a smaller, narrower (8.7 cm) sandal with no ties.

Two-warp Fiber Sandal

Similar to the yucca strip wickerwork sandals in construction, this is about one-half of a sandal made of heavy, loosely s-twist plant fiber 8 mm to 10 mm wide. Width is 11.7 cm.

Four-warp Sandals

Of sandals made with four warps, only one (Fig. 13.2f) is complete; the others are fragments of various sizes. Four are of bast fiber warp and over-1-under-1 weft; a fifth end-fragment is of partially crushed yucca leaves. The whole specimen has multiple-cord instep and toe ties remaining; no ties are left on the fragmentary specimens. Width ranges from 6.1 cm to 8 cm.
Multiple-warp Cord Sandals

One complete scallop-toe sandal is made with 10 warps of 2-ply z-spun S-twist (yucca fiber?) cords; wefts are single-ply, s-twist cords of the same material, woven over-1-under-1. Multiple cord toe and instep ties are attached to the sole, which is 25.5 cm long and 10 cm wide.

The central portion of a similar sandal has six warps remaining, of 2-ply, Z-twisted cords; wefts are single-ply, S-twist in an under-1-over-1 weave.

Sandal Fragment

This is a fragile fringe of fiber pendant from two 2-ply, Z-twist cords. These appear to be the edge of a cord sandal.

Small Plaited Fragments

Three small objects are of no discernible utilitarian use. Two that look like small incomplete sandals are of over-1-under-1 plaiting made from two elements doubled back from one end. One is of narrow leaf (3 mm) yucca and one is made of grass stems. A piece of a similar item is made of broader leaves (6 to 10 mm). The third small object is part of a band made from two yucca leaves interwoven to form a zigzag pattern.

Summary

Of this relatively small sample of basketry and sandals, the twilled baskets and plaited sandals probably belong with the Tularosa phase occupation. At Tularosa Cave and sites of comparable age, these techniques have been found during this period (Martin and others 1952:136, 251). The two rod-and-bundle basket fragments last from pre-Pottery times through the Tularosa phase, and so could be early or late (Martin and others 1952:250). The wickerwork and multiple-warp sandals appear to date earlier (Martin and others 1952:Fig. 83) and quite probably belong with the use of the cave that preceded the cliff dwellings.
Chapter 14
FEATHER ARTIFACTS

by
Gloria J. Fenner

This was one group of perishable artifacts for which there were extant identifications, done by Charmion R. McKusick. These 32 specimens were identified and typed on the basis of comparisons to previously published descriptions and those of McKusick.

Utilitarian Objects

Trimmed Feathers

Fifteen feathers are trimmed for use to fletch arrows; 14 of these have also been split lengthwise, some with the rachis stripped at each end (for lashing to the arrow). The trimming on most of the feathers has been done with heat. Identifications are common turkey (Meleagris gallopavo), 10; duck (Anatidae sp.), 2; red-tailed hawk (Buteo jamaicensis), 2; and scarlet macaw (Ara macao), 1. Cosgrove (1947:63) has described trimmed feathers for arrow fletching and Gifford (1980:94) reported exactly similar evidence at Red Bow Cliff-dwelling.

Feather Wrapping from Textiles

There were seven whole feathers curled from use as feather cordage. All were Meleagris gallopavo. Additional details on feather cordage are found on page 217.

Socioreligious Objects

Pahos

Although not all have been specifically identified as pahos, a variety of feather artifacts comparable to the Gila Cliff Dwellings
specimens has been previously reported for the Mogollon area. For example, Cosgrove (1947:122, Fig. 116b) has reported on an item made of three pairs of large yellow and small red Ara macao feathers tied together with cotton cordage, from the Upper Gila. Hough (1914:6-7, Figs. 3-4) described a paho of two jay feathers attached to cordage and what he called a "trade bundle of parrot feathers" from Tularosa Cave. Tularosa Cave (Martin in Martin and others 1952:455-456) later produced two more artifacts that combined feathers and cordage. The pahos described by Gifford (1980:207) were small bunches of feathers tied together. The earliest occurrence of Mogollon feather pahos seems to be in pre-Pottery times (Martin and others 1952:365). The distribution of Ara macao feathers is discussed further, below. In the Jornada Mogollon area, an "ornament" described as a cordage fringe with tiny feathers woven in was found in Rock Fall Cave (Mera 1938:45, Pl. 16, No. 3). This reference cited what was thought to be a similar specimen from a Basketmaker cave in Marsh Pass, in northern Arizona (Kidder and Guernsey 1919:164, Fig. 77); this specimen is called a pendant. Gila Cliff Dwellings has produced a group of six pahos that are tied to/with a length of cordage. Two of these are a single color (dark brown, unidentified, 1 possibly duck; Fig. 14.1a), one is composed of two differently colored feathers (red, Ara macao; unidentified, brown with a white tip; Fig. 14.1b), and two are multicolored (Fig. 14.1c). The latter are particularly interesting, as the feathers of which they are composed are tied together, one on top of the other, in the same color order: red on top (scarlet macaw, A. macao), then green (thick-billed parrot, Rhynchopsitta pachyrhyncha), black, and tan in one case and white in the other (both mallard, Anas platyrhynchos). A sixth paho, recorded in the field catalog, is missing. Two other pahos are also small bunches of feathers, but are not pendant. One of these is composed of seven mallard (A. platyrhynchos) feathers, the other of eight unidentified black and white feathers. The ninth paho is quite as interesting as any of the others. It is a small circlet of eight scarlet macaw contour feathers that also has one small shell disk bead strung with the feathers (Figs. 14.1d, 14.2d). All of the details of construction are not clear, but the feathers are tied on individually, not strung. The rachis of each is folded over the foundation fibers and
Figure 14.1 Feather pahos. Pendant: (a) single color, (b) bicolor, and (c) multicolor; and (d) circlet.
tied by wrapping with what is either fine sinew or a hard fiber strand. The use of feathers for twig and reed pahos is described elsewhere in this report (see pages 192, 194). Six of the nine pahos have cotton cordage. Parsons (1939:276) documents the ritual use of cotton for pendant offerings and tie-strings at Hopi and Isleta, but in fact it is mentioned throughout her tomes.

It is possible that the two multicolored pahos had some kind of ritual symbolism. If so, it was more likely color-directional than dependent on the kinds of birds whose feathers were used, as both the black and the white/tan feathers came from the same kind of bird. The colors, on the other hand, read red-green-black-white/tan from top to bottom. (Pigments used to paint twig pahos duplicated the black, red, and green.) While it is stretching the evidence to derive a ritual circuit for the Gila Cliff Dwellers on the basis of two feather pahos, it is nonetheless of passing interest to suggest what could have been.

Among the Western Puebloans and the Papago, red is used in the ritual circuit. Hopi and Zuni have an anti-sunwise circuit beginning in the north with yellow, and progressing to west (blue or green), south (red), and east (white); zenith and nadir bring the total to six directions (Parsons 1939:99, 172, 218, 365, 957). Wyman (1983:234-235) lists a sunwise circuit for the Papago, beginning in the east with white, then south, green or blue; west, black; and north, red. If the Gila Cliff Dwellings colors are compared to the Papago, they would not represent a circuit, but would jump (top to bottom) from north to south and then west to east. Using the Western Puebloan colors, only three match, the prehistoric sequence using black instead of yellow for one of the cardinal directions. Reading from top to bottom, we would have a sunwise circuit of south-red, west-green, north-black, and east-white/tan. Nor do these colors coincide with the black-yellow-green-red sequence painted on an anthropomorphic stone figure found in the Great Kiva at Hooper Ranch Pueblo (Martin and others 1962:69-74).
Figure 14-2. Artifact details: (a) painted wood tablita fragment; (b) painted wood pahos; (c) painted arrow mainshaft, and (d) circlet paho of macaw feathers.
Unclassified Artifacts

Perforated Feather

A single large feather is perforated through the rachis. It is either a part of something else, from which it has become separated, or it may be in the nature of raw material, perforated and never used. It is identified as red-tailed hawk, *Buteo jamaicensis*.

Discussion

Feathers are much more rarely found in the Mogollon literature than are other kinds of perishables, and it is assumed that this reflects their original frequency as a portion of all easily decomposable items. The feathering of arrows and feather cordage/blankets have probably been described more than other functional categories, and it is probably the pahos that add most to the known variety of Mogollon material culture. Feathers on sticks appeared as early as the pre-Pottery levels in Tularosa Cave and increased through time (Martin and others 1952:365). Bundles of feathers and feathers tied to lengths of cordage are the most common varieties reported in the Mogollon area. The two multicolored bundles of feathers in the same color order seem to be unique for any area, as is the tiny circlet of scarlet macaw feathers.

The *Ara macao* feathers are of particular interest. Hargrave (1970) has reported the distribution of macaw skeletal material in the American southwest (to which one can add an *A. macao* from Gila Cliff Dwellings), and feathers expand on the spatial, though not the temporal distribution, as observed by McKusick (Di Peso, Rinaldo, and Fenner 1974[8]:283). As was true of the osteological material, most of the macaw feathers are *A. macao*. Hough (1914:6) reported an *Ara militaris* feather from the Upper Gila, but nothing is known about the identification of the specimen, and a green feather is not automatically military macaw. The accompanying list (Table 14.1) of occurrences of *A. macao* feathers probably is not exhaustive, since there are many reports that were not examined; too, there are surely unreported feathers in any number of museum collections. Any otherwise unidentified macaw feathers
### Table 14.1

**SITES WITH SCARLET MACAW FEATHERS**

<table>
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<tr>
<th>SITE*</th>
<th>TOTAL FEATHERS</th>
<th>SINGLE &amp; LOOSE FEATHERS</th>
<th>MULTIPLE FEATHER ARTIFACTS</th>
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<td>2. Lavender Creek, San Juan Co., Utah</td>
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</tr>
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</tr>
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<td>1</td>
</tr>
<tr>
<td>6. Chetro Ketl</td>
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<td>--</td>
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<tr>
<td>7. LA 4294, Navajo Reservoir</td>
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</tr>
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<td>8. White Rock Canyon</td>
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<td>9. Inscription House</td>
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<td>11. Antelope House</td>
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<td>12. Walnut Canyon, NA 739</td>
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<td>15. Hidden House</td>
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<td>16. Tularosa Cave</td>
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<td>17. Gila Cliff Dwellings</td>
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<td>18. Site 6, Water Canyon</td>
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<td>20. Tonto, Lower Ruin</td>
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</tr>
<tr>
<td>21. Feather Cave</td>
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</table>


** = a "skirt" of many hundreds of feathers.
described as being red, yellow, and/or blue are here classified as *A. macao*. Only the single Tonto Lower Ruin feather was not described by color (Pierson in Caywood 1962:49), nor could it be located for examination. All other feathers were identified as *A. macao*. Collections stored at the Western Archeological and Conservation Center from likely dry sites were searched as well, resulting in the inclusion of one of the more elaborate feather artifacts found in the Southwest (a feathered wand or paho from Tonto National Monument). The items in columns 2 and 3 equal the totals in column 1; sites are listed from north to south.

While all of the scarlet macaw feathers found at Gila Cliff Dwellings could have come from the single bird that died here, there is still the question of where the bird came from. The obvious source is Casas Grandes (called Paquimé in early Spanish reports), by far the largest center of macaw aviculture in the Greater Southwest, located less than 200 miles to the south (Di Peso in Di Peso, Rinaldo, and Fenner 1974[8]:183-185; McKusick in Di Peso, Rinaldo, and Fenner 1974[8]:276-278). Whether or not a Gila Cliff Dweller ever saw Casas Grandes, Paquimians were within at least 45 miles to 50 miles of the former site, as they obtained serpentine and chrysotile asbestos from the Red Rock area and probably collected White Signal and/or Burro Mountains turquoise as well (Di Peso 1974:629, 748-749 [Fn. 45], Fig. 5-2; Di Peso in Di Peso, Rinaldo, and Fenner 1974[8]:187). Closer still, the Paquimians obtained sepiolite from Salt Creek in the Sapillo Creek area (Di Peso in Di Peso, Rinaldo, and Fenner 1974[8]:189).

The three classes into which the 32 feather artifacts were grouped are utilitarian (22, 68.8 percent), socioreligious (9, 28.1 percent), and unclassified artifacts (1, 3.1 percent). Spatially, feathers were distributed from caves 1 to 5. Unfortunately, most of them had been so catalogued that it was not possible to separate the specimens out by provenience so that a finer distributional study is not possible. Four
pahos that included A. macao feathers were recovered from trenches 2, 3, and 4 in cave 5. Other pahos were recovered from rooms 1 and 40 and Trench 1 in cave 3.
Chapter 15
FAUNAL REMAINS

by
Charmion R. McKusick

As is usual in collections excavated from rockshelters and caves, the faunal specimens are very well preserved. However, the residents of Gila Cliff Dwellings broke mammal bones into such small pieces to extract marrow, that specimens seldom exceeded 1.5 inches in length. Some rodent specimens are extensively punctured because they were introduced to the site in the form of owl pellets. Macaw specimens, as well as others, were damaged by the chewing of coyote canine teeth.

Fish, Amphibians, and Reptiles

One specimen, a dentary, may be reptile, but does not agree with any available comparative specimens. One specimen of bone is from an amphibian the size of a spade-footed toad. Two fragments of the carapace of a chelonian are in the size range of box turtle.

Birds

Information on the seasonal occurrence of the avian species is derived from Robbins, Bruun, and Zim (1966) and Lowe (1964). Table 15.1 show the distribution of avian species at Gila Cliff Dwellings while Table 15.2 lists the edible meat from all the avian species.

Dabbling Ducks

Anatidae sp., surface-feeding ducks, 14 feathers. The duck specimens are finely-penciled breast feathers.

Anas platyrhynchos, mallard, 11 feathers. Mallards are common transients and winter residents in the Southwest.
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<th>CAVE 1</th>
<th>CAVE 2</th>
<th>CAVE 3</th>
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<td></td>
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</tr>
<tr>
<td>Meleagris gallopavo merriami</td>
<td>33</td>
<td>68.74</td>
<td>280.50</td>
<td>97.88</td>
</tr>
<tr>
<td>Turkey, Total</td>
<td>33</td>
<td>68.74</td>
<td>280.50</td>
<td>97.88</td>
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<tr>
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<tr>
<td>Band-Tailed Pigeon</td>
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<td>2.08</td>
<td>0.20</td>
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<tr>
<td>Zenaidura macroura</td>
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<td>4.17</td>
<td>0.40</td>
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<tr>
<td>Mourning Dove</td>
<td>2</td>
<td>4.17</td>
<td>0.40</td>
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<tr>
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<td>1</td>
<td>2.08</td>
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</tr>
<tr>
<td>Thick-Billed Parrot</td>
<td>1</td>
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<td></td>
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<tr>
<td>Ara macao</td>
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<tr>
<td>Scarlet Macaw</td>
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<tr>
<td>Strix occidentalis</td>
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<tr>
<td>Spotted Owl</td>
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<td>Colaptes auratus collaris</td>
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<td>Red-Shafted Flicker</td>
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<tr>
<td>Cyanositta stelleri</td>
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<td>Steller's Jay</td>
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<td>2.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corvus cryptoleucus</td>
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<td>2.08</td>
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<td><strong>TOTALS</strong></td>
<td><strong>48</strong></td>
<td><strong>286.58</strong></td>
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* Minimum Faunal Count
Anas cyanoptera, cinnamon teal, minimum faunal count (MFC) - 1, 2.08 percent of the avian collection. Cinnamon teal would have been available as a spring migrant, and possible summer resident.

Mergansers

Mergus merganser, common merganser, MFC - 1, 2.08 percent of the avian collection. Mergansers are fish-eating diving ducks which are most common in this area during the winter months.

Mergus serrator, red-breasted merganser, MFC - 1, 2.08 percent of the avian collection. Formerly more common, this merganser would have been attracted by the beaver ponds which existed in prehistoric times.

Vultures

Cathartes aura, turkey vulture, 1 feather, MFC - 1, 2.08 percent of the avian collection. Turkey vultures are dependent upon gliding on the thermals of summer, and are only found at that season. They often nest in caves and rockshelters.

Hawks and Eagles

Buteonine hawks, particularly red-tailed hawks, and golden eagles are commonly found as burials in western pueblo sites in the A.D. 1200s and 1300s. The complete absence of hawk and eagle bone in this site, and the scarcity of feathers is most unusual, if not unique. This lack of remains suggests that such remains, when and where present, are related to the activities of a kin group or society not present at this site or, if members were present at the site, their integrative functions took place elsewhere.

Buteo jamaicensis, red-tailed hawk, 1 feather. Red-tailed hawk is the most common buteo in the area, and its feathers are frequently found in collections from southwestern dry sites. Red-tailed hawk is available year-round, and may nest in rockshelters.
Aquila chrysaetos, golden eagle, 1 feather. Golden eagles are widely but sparingly distributed. Like red-tailed hawks, their remains are commonly found in western pueblo archeological sites.

Quail

Cyrtonyx monteumae, Mearns' quail, MFC - 2, 4.17 percent of the avian collection. These mountain quail are fairly common on open slopes under pines or oaks of the Upper Sonoran zone, higher in the summer.

Turkeys

Meleagris gallopavo, common turkey, 117 feathers, MFC - 33, 68.74 percent of the avian collection. Large Indian domestic turkeys have been known in the Southwest from about A.D. 500. The feral form, Merriam's wild turkey (M. g. Merriami), has been present since as early as A.D. 600. Gila Cliff turkeys are distributed by sex and age stage as follows:

Table 15.3

<table>
<thead>
<tr>
<th>AGE AND SEX</th>
<th>TURKEY, GENERAL</th>
<th>MERRIAM'S WILD</th>
<th>L. I. DOMESTIC</th>
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<tbody>
<tr>
<td>Adult Male</td>
<td>9</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Young Adult Male</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>Immature Male</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Juvenile Male</td>
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<td></td>
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</tr>
<tr>
<td>Adult Female</td>
<td>7</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Immature Female</td>
<td></td>
<td>1*</td>
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</tr>
<tr>
<td>Immature, Sex?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Butchering marks.
Only two of the Gila Cliff turkeys were identifiable as domestics. From the evidence of collections from archeological sites along the Mogollon Rim, it is apparent that domestic turkeys, kept mainly to produce feathers, were seldom, if ever, eaten, and sometimes occur as burials. In contrast, wild turkeys were hunted, presumably plucked, and then butchered for food. No wild turkey burials have been identified. It is probable that the vast bulk of turkey specimens at Gila Cliff come from wild birds.

Turkeys were apparently hunted during the fall season, as evidenced by the number of sub-adult males. During this hunting season, the young are still following the hen. Male and female offspring from the same clutch of eggs are in quite different stages of development. The males are larger than their mother, but are still osteologically immature. The female poults, on the other hand, mature much earlier. They are the same size as their mother, and are osteologically well developed.

The collection did not include any egg shells or small juvenile turkeys. Apparently, turkeys were not raised at all prehistoric settlements where their remains are found. Turkey raising is difficult at best, and many areas are too hot for successful hatching. Even in prehistoric times it was easier to bring well-started poults into some settlements than to raise them. Many historic pueblo tribes eat neither eggs nor fowl. Although it appears that turkeys were sometimes eaten at the Gila Cliff Dwelling settlement, as may have also been ducks, quail, and doves, all the available meat from avian sources totaled only 286.58 pounds. Of this, 280.5 pounds, or 97.88 percent, came from turkeys. When compared with the total meat available from mammalian sources, meat from fowl constituted less than 1 percent of the total.

One reason that turkey and ducks would have been desirable additions to the diet is that corn-based subsistence requires fat to satisfy hunger. This pattern will be covered more fully in the section on deer.

Coots

Fulica americana, American coot, is listed in the Southwest Bird Lab Files from the Morris excavation. The coot material has
subsequently disappeared, and therefore is not considered in the numerical totals. Coots are year-round residents on deep ponds and accord well with the occurrence of mergansers at this site.

Doves

Doves are commonly found throughout the Southwest in small numbers at human habitational sites. Doves are especially attracted by ponds and waterholes.

_Columba fasciata_, band-tailed pigeon, MFC - 1, 2.08 percent of the avian collection. This large pigeon is locally common in the summer months in pine and oak woods. In late summer small bands of these birds move throughout the mountain foothills harvesting acorns.

_Zenaidura macroura_, mourning dove, MFC - 2, 4.17 percent of the avian collection. A year-round resident, this is the commonest native dove.

Parrots

Both species of parrots represented in the Gila Cliff Dwellings avian collection occur only as cranial material. For this reason, Hargrave questioned whether live macaws were ever at Gila Cliff Dwellings. Upon reexamination of this collection, it is apparent that the cranium and premaxilla were penetrated by the canines of a carnivore while still articulated. Coyote canines match the impressions exactly, but the damage could have been done by a coyote-sized dog. Probably both parrots were originally buried, and were later dug up and eaten, except for the beak and a head with beak which did not offer any food value.

_Rhynchopsitta pachyrhyncha_, thick-billed parrot, 1 feather, MFC - 1, 2.08 percent of the avian collection. Thick-billed parrots formerly were present in southern Arizona and New Mexico as casual visitors. There are no recent reports, due to the cutting of the
forests in northern Mexico. The remains consist only of a premaxilla from Room 30.

Ara macao, scarlet macaw, 18 feathers, MFC - 1, 2.08 percent of the avian collection. Scarlet macaws were traded in from the humid tropical lowlands of Mexico, many of them through the trading center of Casas Grandes, Chihuahua (McKusick 1974:281).

Roadrunners

Geococcyx californianus, roadrunner, 1 feather. A common and conspicuous resident of the desert and foothills.

Owls

Bubo virginianus, great horned owl, 11 feathers. This large owl is one of the most commonly found in avian collections from southwestern archeological sites. They are available year-round.

Strix occidentalis, spotted owl, MFC - 1, 2.08 percent of the avian collection. This rather rare owl would have been available in the area year-round.

Woodpeckers

All woodpeckers identified from the Gila Cliff Dwellings were available in the area year-round. The salmon linings of the wing and tail feathers of the red-shafted flicker make it the most common woodpecker in collections from southwestern archeological sites. Second most common are the red-scalped woodpeckers, such as the acorn woodpecker and the ladder-backed woodpecker.

Colaptes auratus cafer, red-shafted flicker, 3 feathers, MFC - 1, 2.08 percent of the avian collection.

Melanerpes formicivorus, acorn woodpecker, 3 feathers.
**Sphyrapicus thyroideus**, Williamson's sapsucker, 1 wing feather of a male.

*cf. Dendrocopos villosus*, hairy woodpecker, 1 feather.

*cf. Dendrocopos scalaris*, ladder-backed woodpecker, 1 feather.

**Jays and Crows**

*Cyanositta stelleri*, Steller's jay, MFC - 1, 2.08 percent of the avian collection. This long-crested jay is a common resident of coniferous forests of the Southwest. It ranges into the oaks of southern New Mexico during the winter months.

*Aphelocoma coerulescens*, scrub jay, 1 feather. A year-round resident in scrub oaks, this is one of the most conspicuous birds of the lower Transition zone.

*Corvus cryptoleucus*, white-necked raven, MFC - 1, 2.08 percent of the avian collection. This small raven is found in the grassy areas of the southern part of the state.

**Wrens**

*Catherpes mexicanus*, cañon wren, 1 feather. A rather common resident in the vicinity of cliffs and banks. It occasionally ranges into the lower Transition zone.

**Bluebirds**

*Sialia mexicana*, western bluebird, 1 feather. A summer resident of the Transition and lower Canadian zones, it winters in the Upper Sonoran zone.
Sparrows

_Cf. Junco oreganus_, Oregon junco, feathered skin. This common snowbird was available only during the winter months.

Mammals

Mammal identifications were made with the aid of Olsen (1964), distributional checks with the aid of Hall and Kelson (1959), and life history information was derived from Burt and Grossenheider (1952), and Anthony, and McSpadden (1937). Marmot comparative material was donated by Sylvia Randolph Bekken. Table 15.4 shows the distribution of mammalian species within the caves at Gila Cliff Dwellings while Table 15.5 gives the accounts of edible meat from the mammals.

Hares and Rabbits

The proportion of hares, represented by black-tailed jackrabbits, to rabbits (represented by cottontails) is very low. Black-tailed jackrabbits thrive in overgrazed areas, unsuitable for cottontails. The large number of cottontails in the collection suggests that the vegetation was adequate to support the grazing animals in the area.

_Lepus californicus_, black-tailed jackrabbit, MFC - 37, 7.36 percent of the mammalian collection. The antelope jackrabbit is present in the area today, but none of the specimens examined were large enough to fall within the size range of this group. Black-tailed jackrabbits are found in areas of sparse vegetation; in modern times they are common in overgrazed rangeland.

_Sylvilagus_ ssp., rabbit, MFC - 145, 28.76 percent of the mammalian collection.

_Sylvilagus audoboni_, desert cottontail, MFC - 1, 0.20 percent of the mammalian collection. Cranial material was available for only one individual, so the remainder of the rabbit specimens has been assigned
Table 15.4

DISTRIBUTION OF MAMMALIAN SPECIES

<table>
<thead>
<tr>
<th>TAXON</th>
<th>CAVE 1</th>
<th>CAVE 2</th>
<th>CAVE 3</th>
<th>CAVES 4-5</th>
<th>CAVE 6</th>
<th>TOTAL</th>
<th>PERCENT MFC*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammalia sp. Unknown Mammal</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
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<td>Homo sapiens Man</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lepus californicus Black-Tailed Jackrabbit</td>
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<td>29</td>
<td>7</td>
<td>37</td>
<td>7.36</td>
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<td>12</td>
<td>74</td>
<td>55</td>
<td>3</td>
<td>145</td>
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</tr>
<tr>
<td>Marmota flaviventris Yellow-Bellied Marmot</td>
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<td>4</td>
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<tr>
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<tr>
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<td>1</td>
<td>11</td>
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<tr>
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<td></td>
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* MFC = Mammalian Footprint Count
Table 15.4 (continued)

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<th>TAXON</th>
<th>CAVE 1</th>
<th>CAVE 2</th>
<th>CAVE 3</th>
<th>CAVE 4-5</th>
<th>CAVE 6</th>
<th>TOTAL MFC</th>
<th>PERCENT MFC</th>
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<td>1.00</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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* MFC = Minimum Faunal Count
Table 15.5

EDIBLE MEAT PRODUCED FROM MAMMALIAN SPECIES

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<tr>
<th>TAXON</th>
<th>TOTAL MFC*</th>
<th>PERCENT MFC</th>
<th>TOTAL MEAT</th>
<th>PERCENT MEAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letrix californicus</td>
<td>37</td>
<td>7.36</td>
<td>111.00</td>
<td>0.36</td>
</tr>
<tr>
<td>Black-Tailed Jackrabbit</td>
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<td>28.96</td>
<td>253.75</td>
<td>0.83</td>
</tr>
<tr>
<td>Sylvilagus ssp. Rabbit</td>
<td>4</td>
<td>0.80</td>
<td>32.00</td>
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</tr>
<tr>
<td>Marmota flaviventris Yellow-Bellied Marmot</td>
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<td>0.20</td>
<td>1.50</td>
<td>0.01</td>
</tr>
<tr>
<td>Cynomys ludovicianus Black-Tailed Prairie Dog</td>
<td>18</td>
<td>3.58</td>
<td>18.00</td>
<td>0.06</td>
</tr>
<tr>
<td>Citellus variegatus Rock Squirrel</td>
<td>1</td>
<td>0.20</td>
<td>0.35</td>
<td>0.00</td>
</tr>
<tr>
<td>Eutamais dorsalis Cliff Chipmunk</td>
<td>29</td>
<td>5.77</td>
<td>20.30</td>
<td>0.06</td>
</tr>
<tr>
<td>Neotoma albigula White-Throated Woodrat</td>
<td>7</td>
<td>1.39</td>
<td>269.50</td>
<td>0.88</td>
</tr>
<tr>
<td>Castor canadensis Beaver</td>
<td>22</td>
<td>4.45</td>
<td>15.40</td>
<td>0.05</td>
</tr>
<tr>
<td>Neotoma albigula White-Throated Woodrat</td>
<td>6</td>
<td>1.19</td>
<td>12.00</td>
<td>0.04</td>
</tr>
<tr>
<td>Ondatra zebithecus Muskrat</td>
<td>2</td>
<td>0.40</td>
<td>25.00</td>
<td>0.08</td>
</tr>
<tr>
<td>Canis sp. Dog/Coyote</td>
<td>1</td>
<td>0.20</td>
<td>1.75</td>
<td>0.01</td>
</tr>
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</table>

257
Table 15.5 (continued)

<table>
<thead>
<tr>
<th>TAXON</th>
<th>TOTAL MFC*</th>
<th>PERCENT MFC</th>
<th>TOTAL POUNDS MEAT</th>
<th>PERCENT MEAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procyon lotor</td>
<td>4</td>
<td>0.80</td>
<td>70.00</td>
<td>0.23</td>
</tr>
<tr>
<td>Raccoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artiodactyla ssp.</td>
<td>4</td>
<td>0.80</td>
<td>300.00</td>
<td>0.98</td>
</tr>
<tr>
<td>Deer/Pronghorn</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cervus canadensis</td>
<td>5</td>
<td>1.00</td>
<td>1,750.00</td>
<td>5.70</td>
</tr>
<tr>
<td>Elk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odocoileus hemionus</td>
<td>142</td>
<td>28.36</td>
<td>14,200.00</td>
<td>46.25</td>
</tr>
<tr>
<td>Mule Deer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odocoileus virginianus</td>
<td>22</td>
<td>4.38</td>
<td>1,210.00</td>
<td>3.94</td>
</tr>
<tr>
<td>White-Tailed Deer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antilocapra americana</td>
<td>8</td>
<td>1.59</td>
<td>440.00</td>
<td>1.43</td>
</tr>
<tr>
<td>Pronghorn</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bison bison</td>
<td>26</td>
<td>5.17</td>
<td>11,900.00</td>
<td>38.76</td>
</tr>
<tr>
<td>American Bison</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>502</td>
<td>100.00</td>
<td>30,727.55</td>
<td>100.00</td>
</tr>
</tbody>
</table>

* Minimum Faunal Count
to *Sylvilagus* ssp. Desert cottontails are found in open pinyon and juniper growth in low valleys and foothills.

**Rodents**

The species of rodents identified from the Gila Cliff Dwellings are characteristic of sites in this area (during the late 1200s) except for the water-related forms. A flowing stream runs below the site to this day. Apparently this stream, or another close by, was dammed by beavers in prehistoric times. The relatively deep water provided by such a beaver dam attracted the coot and mergansers among the avifauna and the muskrats among the mammals. Trappers who entered the Southwest about 1830 totally exterminated beavers in many areas, and seriously depleted the muskrat population. Muskrats are still found inhabiting burrows in the banks of some ranch ponds in southeastern Arizona.

Although not known in southern New Mexico today, the yellow-bellied marmot was identified from the post-Pleistocene fauna of Pratt Cave in McKittrick Canyon of the Guadalupe Mountains. According to Lundelius (1983:205), A. H. Harris has determined "that the limit of the southern and lower altitudinal distribution of *Marmota flaviventris* is controlled by the availability of green fodder during the spring, which is, in turn, controlled by winter precipitation."

Several other species from Pratt Cave also require more mesic conditions than prevail in the general area today, but Lundelius suggests that McKittrick Canyon has been in the past and continues to be more moist than the surrounding area.

An early publication (Anthony and McSpadden 1937:201) gives the distribution of the yellow-bellied marmot as "western Texas, New Mexico and Arizona north to 49°." Taking this distribution into consideration, it would seem reasonable to suppose that the presence of beavers, which build dams and impound water, would provide a scattering of more moist environments, which could have supported marmots until the trappers entered the Southwest.

Other sites at which yellow-bellied marmots are listed in the Reed Faunal File (Copy Southwest Bird Lab; Globe, Arizona) include Pecos,
Burnet Cave, Tularosa Cave, Ackmen-Lowry Ruin, Woodchuck Cave, Mantle Cave, and the Durango Basketmaker.

*Marmota flaviventris*, yellow-bellied marmot, MFC - 4, 0.8 percent of the mammalian collection. Marmots are dependent upon lush vegetation for food, which in the arid Southwest severely limits their periods of activity. According to Burt and Grossenheider (1952), the yellow-bellied marmot emerges from hibernation in late February or March, goes into estivation during the dry period in June, and returns to hibernation after the lush growth of the monsoons is gone, probably in late August. Marmots can destroy a garden during a night's foraging. They would have been not only available, but necessary kills for the inhabitants of Gila Cliff Dwellings during March, April, May, July, and August.

*Cynomys ludovicianus*, black-tailed prairie dog, MFC - 1, 0.2 percent of the mammalian collection. Black-tailed prairie dogs formerly lived in colonies or "towns" in dry upland prairies.

*Citellus variegatus*, rock squirrel, MFC - 18, 3.58 percent of the mammalian collection. Rock squirrels prefer rocky canyons, and do especially well in the vicinity of human habitations.

*Eutamias dorsalis*, cliff chipmunk, MFC - 1, 0.2 percent of the mammalian collection. The cliff chipmunk makes its home on pinyon-juniper slopes up to the lower extent of the pines. One specimen was brought into the site in the form of an owl pellet.

*Sciurus aberti*, Abert's squirrel, MFC - 1, 0.2 percent of the mammalian collection. The Abert's or tassel-eared squirrel is found all along the Mogollon Rim in yellow pine forests at an altitude of 7,000 feet to 8,500 feet.

*Thomomys umbrinus*, valley pocket gopher, MFC - 29, 5.77 percent of the mammalian collection. This gopher is extremely variable throughout its range. *Thomomys baileyi* is probably a foothills variety of *Thomomys umbrinus*. Some gopher specimens occurred as owl pellets.
Castor canadensis, beaver, MFC - 7, 1.39 percent of the mammalian collection. Beaver are reported from such scattered archeological sites as Tuzigoot, Pueblo Bonito, Pecos, Frijoles Canyon, Mantle Cave in Castle Park on the Yampa, Riana on the Champa, and sites in central Utah (Reed Faunal File). Marmots are found in some of the same collections, and may be semidependent upon beaver dam environments. Beavers are helpful to man by impounding water, and by providing meadows in the form of filled-in ponds which are good agricultural sites. On the other hand, when beaver colonies expand, the dam built by the new colony may flood land already under human use. In this case, the most practical solution to the problem was probably to harvest the beavers to limit their expansion.

Neotoma albigula, white-throated woodrat, MFC - 22, 4.45 percent of the mammalian collection. Woodrats are common residents in rockshelters such as the site of the Gila Cliff Dwellings. Some specimens were introduced to the site in the form of owl pellets.

Ondatra zebithecus, muskrat, MFC - 6, 1.19 percent of the mammalian collection. The muskrat is the most common and most widely spread fur bearer in North America. Muskrats live in conical houses made of vegetation in marshes, or in burrows in the banks of ponds and streams, usually with underwater entrances.

Coyotes and Foxes

Both coyotes and gray foxes are common in the area today, and are regularly recovered from archeological sites in the Southwest.

Canis ssp., dog/coyote, MFC - 2, 0.4 percent of the mammalian collection. No dogs were positively identified from this site. If any of the very immature specimens in this category are dog, they are from a slightly built coyote-sized breed.

Canis latrans, coyote, MFC - 3, 0.6 percent of the mammalian collection. Coyotes are commonly found in small numbers at sites in the Southwest.
Urocyon cinereoargenteus, gray fox, MFC - 13, 2.59 percent of the mammalian collection. Gray fox occurs at Gila Cliff Dwellings in unusually large numbers for such a small site.

Bears

Ursus americanus, black bear, artifact only. Black bear is represented by a drilled claw core or ungual, which is similar to a drilled mountain lion ungual. Black bear still occurs in the area, and has been recovered in small numbers from many sites along the Mogollon Rim.

Ringtails and Raccoons

Both ringtails and raccoons have grizzled body fur and bushy, ringed tails. Both are nocturnal, eat insects, birds, small mammals, nuts, fruits, and about anything else available. Both are found near water. Raccoon specimens are recovered in very small numbers from archeological sites near riparian environments.

Bassariscus astutus, ringtail, MFC - 1, 0.2 percent of the mammalian collection.

Procyon lotor, raccoon, MFC - 4, 0.08 percent of the mammalian collection.

Cats

Felis concolor, mountain lion, artifact only. A pierced claw may have originally been associated with the Black Bear claw. The mountain lion is found statewide up to an altitude of 8,000 feet.

Deer, Elk, and Pronghorn

During the 1960s the opportunity arose at the Southwest Archeological Center to reassess the elk identifications which had previously been recorded. Most of these were very large bone artifacts
which had been assigned to elk on the basis of size rather than on character. When compared with the femur of a female grizzly bear, it became apparent that at least one artifact and perhaps others were actually grizzly bear. As a result, the prehistoric presence of elk along the southern Mogollon Rim was definitely in question. Since that time unmistakable elk has been identified from Gila Cliff Dwellings and the nearby sites of Wind Mountain, NM Y:7:1 (Olsen and Olsen: n.d.; McKusick 1983b) and the Rideout Site NM Y:7:3 (McKusick 1983a). Today the preferred habitat of elk is mountain meadowland.

Most of the Gila Cliff Dwellings mammalian collection consists of broken fragments of the bones of mule deer. The mule deer specimens are most numerous, and the MFC of mule deer is exceeded only by that of rabbits. Meat produced exceeded that of all other species. The subspecies represented compares well with *Odocoileus hemionus crooki*, which occupies the area today.

White-tailed deer specimens compare well with the very small subspecies *Odocoileus virginianus couisi*, which is present in the area in modern times. The contrast in size between the mule deer and white-tailed deer subspecies involved is so great that the deer artifact identifications which were based on size should be accurate.

Mule deer occupy the high deserts and open foothills, whereas white-tailed deer are more commonly found at higher altitudes. Pronghorn and bison graze on the grassy plains. Probably the best opportunity to obtain bison in this area was during the winter months when small groups of bison drifted off the plains into the foothill valleys to take refuge from the snow and wind (Green 1966).

The five artiodactyl species represented were the only species which provided as much as 1 percent of the available meat supply.
Table 15.6
MEAT FROM ARTIODACTYLS

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>TOTAL MEAT</th>
<th>PERCENT OF MEAT PRODUCED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mule Deer</td>
<td>14,200</td>
<td>46.25</td>
</tr>
<tr>
<td>Bison</td>
<td>11,900</td>
<td>38.76</td>
</tr>
<tr>
<td>Elk</td>
<td>1,750</td>
<td>5.70</td>
</tr>
<tr>
<td>White-tailed Deer</td>
<td>1,210</td>
<td>3.94</td>
</tr>
<tr>
<td>Pronghorn</td>
<td>440</td>
<td>1.43</td>
</tr>
<tr>
<td></td>
<td><strong>29,550</strong></td>
<td><strong>96.08</strong></td>
</tr>
</tbody>
</table>

Artiodactyla ssp., deer/pronghorn, MFC - 4, 0.8 percent of the mammalian collection.

*Cervus canadensis*, elk, MFC - 5, 28.36 percent of the mammalian collection.

*Odocoileus hemionus*, mule deer, MFC - 142, 28.36 percent of the mammalian collection. The distribution of age and sex of mule deer and white-tailed deer is quite different.

Table 15.7
MULE DEER AND WHITE-TAILED DEER BONE

<table>
<thead>
<tr>
<th>AGE AND SEX</th>
<th>MULE DEER</th>
<th>WHITE-TAILED DEER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Adult Male</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Adult Male</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>Young Adult Male</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Immature Male</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Old Adult Female</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Adult Female</td>
<td>52</td>
<td>3</td>
</tr>
<tr>
<td>Young Adult Female</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Immature Female</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>Very Immature</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Neonate/Foetal</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>142</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>
The pattern of mule deer usage suggests that bucks were hunted in the fall when the antlers were mature and the animals were well-fleshed before the distractions of the breeding season. The does, on the other hand, were hunted when pregnant when they were at the fattest in preparation for lactation, just before the fawns were due to be born in the month of June. This pattern of harvest provides the greatest amount of fat, a nutrient necessary to satisfy hunger in a corn-based diet. The same pattern of mule deer usage found at Gila Cliff Dwellings in the late 1200s is also characteristic of that found at Grasshopper Pueblo a hundred years later.

**Odocoileus virginianus**, white-tailed deer, MFC - 22, 4.38 percent of the mammalian collection. As can be seen from the table above, the bucks were preferred to the does, and could have been hunted during the fall in conjunction with Merriam's wild turkey which also inhabited the mountains in the area. The few does that were taken follow the general pattern of mule deer doe harvest, but the does of this subspecies of white-tailed deer are so very small that they do not provide a meat supply adequate to compensate for the bother of hunting this secretive animal.

**Antilocapra americana**, pronghorn, MFC - 8, 1.59 percent of the mammalian collection. Pronghorn remains recovered came from only two bucks to six does. They may have been harvested, when available, according to the same pattern as mule deer.

**Bison bison**, American bison, MFC - 26, 5.17 percent of the collection. Bison specimens represented two large adult males, 20 smaller adults of indeterminate sex, and four immatures. Elements represented are mostly ribs, with some parts of vertebrae, or feet, and even fewer chips of long bones. Apparently the carcasses were butchered in the field to avoid the necessity of carrying home the very heavy skeletal elements which were not particularly useful for artifacts.
Summary - Mammals

The most important information gained from the identification study of the Gila Cliff Dwellings mammalian collection is that the pattern of faunal exploitation which prevailed among the inhabitants of the western bank room block at Grasshopper Pueblo during the 1300s was already well established at this other Mogollon Rim site a hundred years earlier. Further, comparison with the mammalian identifications from the nearby Rideout Site, NM Y:7:3, indicate that mule deer were hunted as early as 215 B.C. ± 135 years, with mule deer providing 63.2 percent of the available meat. Similar to the Gila Cliff Dwelling collection, Rideout bison were the second greatest meat resource at 10.4 percent. Thus, the heavy dependence upon mule deer is basic to Mogollon Rim patterns of faunal usage for perhaps as long as 1,600 years. The fall hunting of wild turkeys characteristic of this usage pattern is present at the Rideout Site from A.D. 640-870 through A.D. 710-940 (McKusick 1983b:7, 10, 12-13).

Second, the beaver, muskrat, marmot complex found at Gila Cliff Dwellings, provides a new view of the environment enjoyed by the inhabitants of Precolumbian settlements in the Southwest, at least along the Mogollon Rim. More mesic conditions prevailed, at least in small areas, apparently due to a beaver dam at Gila Cliff Dwellings, and to manmade reservoirs at Grasshopper Pueblo and at AZ W:10:50 at Point of Pines.

Finally, it is becoming apparent that small sites have much information to contribute. Gila Cliff Dwellings and Gallo Cliff Dwellings, Bc 288 in Chaco Canyon, both indicate that only part of a cultural complex was present in each. Nevertheless, these geographically isolated settlements, although off the beaten track, were not culturally isolated, but participated in the integrative activities associated with larger sites. Further investigation of smaller sites should do much to build a picture of the complex activities which took place at the larger settlements by giving us a clearer picture of the activities of one or a few social units at a time.
Possible Special Use Areas

One of the goals of the faunal study was to determine if there is any evidence of special usage associated with room 17 and room 27. No osteological remains other than those of customary food species were found in room 17. However, a small adjacent room, room 20, contained bones from a Mearns' quail, a spotted owl, and a muskrat. It is possible that room 20 was a storage area for paraphernalia which was used in room 17.

Room 27 faunal remains include such mammals as raccoon, gray fox, and an elk hoof. Wild avifauna consist of two mourning doves, red-shafted flicker, and Steller's jay. In addition, feathers of turkey vulture, turkey, scarlet macaw, great horned owl, red-shafted flicker, and scrub jay were recovered. All eight avian species are associated with special use areas in other sites.

Although not included in the original question, rooms 10 and 10A provided faunal remains which also fit the expected pattern of occurrence of birds of ceremonial usage, particularly macaws, fur-bearing animals and/or large mammals, particularly carnivores, closely. Room 10 contained bones of beaver, muskrat, ringtail, and elk. Room 10A yielded bones of yellow-bellied marmot and coyote. Birds found within room 10 include such wild species as turkey vulture, Mearns' quail, mourning dove, and scarlet macaw. The macaw is represented by the cranium and premaxilla. A matching mandible fragment was recovered from room 10A. Scarlet macaws have been associated with special use areas from the Estrella phase at Snaketown to the present.

Room 30 contained the premaxilla of a thick-billed parrot. Thick-billed parrots are rare in the Southwest, and equally rare in southwestern archeological sites. They were, however, occasionally available in the area. There is no evidence, from earliest to historic times, of any trade in the species such as is well established for the scarlet macaw. From all available evidence, thick-billed parrots were kept as personal pets. Therefore, the faunal remains do not suggest any special use for room 30.
Summary - Birds

The species represented in the avian collection from Gila Cliff Dwellings are typical of those previously identified from sites along the Mogollon Rim dating to this general time period. Except for the deep-water species of swimming birds such as the two mergansers and the coot, the collection is conspicuously similar to that recovered during the excavation of Grasshopper Pueblo. Despite the much greater size and somewhat later date for occupation of Grasshopper Pueblo, both sites exhibit the same patterns of cultural usage of the available avifauna. Particularly conspicuous in both collections are the large Indian domestic turkey, which was kept for feathers, and Merriam's wild turkey, which was hunted apparently for feathers, meat, and (at least at Grasshopper Pueblo) for tool stock.

All species represented, except for the hairy and ladder-backed woodpeckers, have already been identified from other southwestern archaeological sites. These two tentative species identifications are based only on feathers, not bones, but the coloration of the birds in question is nearly identical to that of other woodpeckers, already identified.

As can be seen from Table 15.8, the species identified from Gila Cliff Dwellings accord not only with those from Grasshopper Pueblo, but also with those recorded for the Zuni. Fewer, but nevertheless conspicuous, common usages are recorded for the western Keresan and the Hopi (Ladd 1963).

Junco is known to the Zuni, but is not used because it is a "winter bird." The Zuni name for junco is also applied to several other species of snow bird, which are also not used. Ladd's manuscript speaks of the colorfully plumaged small birds whose feathers are used on prayer sticks as "summer birds" (1963:31).

The avifaunal collection from Grasshopper Pueblo, which is reminiscent of that from Gila Cliff Dwellings, suggests the presence of two moieties at that site. On the west bank of the wash was what appeared to be a Raven Moiety, "winter people" who were heavily involved with the hunting and gathering functions of the pueblo, including wild turkey hunting. On the east bank of the wash was what appeared to be a
Table 15.8

BIRD AND FEATHER USAGE AT GILA CLIFF DWELLINGS
COMPAoured WITH HISTORIC PERIODS

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>GILA CLIFF</th>
<th>ZUNI</th>
<th>TIWA</th>
<th>TEWA</th>
<th>TOWA</th>
<th>EASTERN KERESAN</th>
<th>WESTERN KERESAN</th>
<th>HOPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mallard (ducks)</td>
<td>x</td>
<td>x</td>
<td>?</td>
<td>?</td>
<td>x</td>
<td>?</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Turkey Vulture</td>
<td>x</td>
<td>x</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Red-Tailed Hawk</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>x</td>
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<td>x</td>
<td>x</td>
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<td>Mearns' Quail</td>
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<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>x</td>
<td>x</td>
<td>?</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>American Coot</td>
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<td>x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mourning Dove</td>
<td>x</td>
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<td></td>
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<td>x</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great Horned Owl</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Spotted Owl</td>
<td>x</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Red-Shafted Flicker</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Acorn Woodpecker</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Williamson's Sapsucker</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hairy Woodpecker</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ladder-Backed Woodpecker</td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>Stellar's Jay</td>
<td>x</td>
<td></td>
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<td></td>
<td></td>
<td>x</td>
<td></td>
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<tr>
<td>Scrub Jay</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Raven</td>
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<td>x</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Canyon Wren</td>
<td>x</td>
<td>x</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Western Bluebird</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Junco</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

* Not used because it is a winter bird.

This table is abstracted from one prepared by Edmund J. Ladd (1963).
Macaw Moiety, "summer people" who were responsible for propagation of domestic turkeys, were influential in farming and, if frequency of occurrence of the bones of ducks and geese in their room block is meaningful, also controlled the reservoir upstream from the pueblo. The western block of rooms at Grasshopper is less organized than the eastern block, and gives the impression of being the original settlement. It is representative of a more generalized, Mogollon type of life-style to which the tightly structured, rigidly organized eastern group (with its classic, large Indian domestic turkeys) attached itself, and eventually became dominant, even though it was the numerically smaller group in the pueblo.

Vorsila Bohrer affirmed, in June 1972 (personal communication), that the ethnobotanical studies of Grasshopper Pueblo substantiated this division, and also recalled that Dr. Dozier had suggested a Zuni-like moiety community organization on a basis of architecture, even before the excavation had begun. The Gila Cliff Dwellings material can be closely compared with the faunal remains of the apparently older, more generalized group living on the west side of the wash. Apparently the way of life carried on at Grasshopper during the 1300s was already well established along the Mogollon Rim during the 1200s, as exemplified by the Gila Cliff Dwellings settlement.

A Zuni-type moiety model may do much to explain why birds of various colors were chosen for special usage. If we attempt to compare directional colors for the various modern pueblos, a vast amount of confusion ensues.

Late in March of 1982, my husband and I drove to Chambers, Arizona, to pick up a displaced parrot which was being put in our care. We started early, to make our appointment at the agreed upon time, and returned after dark. Our drive, from early to late on the flat Colorado Plateau, gave a new perspective to the consideration of directional colors. The sky was white in the east at dawn and blue with the yellow sun in it at noon. By afternoon, the winds had stirred up considerable dust, and the sun set red in the west. A rain squall ended in a rainbow overhead, "all colors" for zenith. We passed a cave where no sun shown, black darkness for nadir. That left north, where the sun never shown, blue all day. Black, which is often listed as the color for north, did
not fit into this picture. Finally, the idea evolved that the directional colors involved with the travel of the sun through the day belong in one context, that of the day, whereas black as the color for the north belongs in another context, that of the night.

Indeed, this idea seemed reasonable in view of a pair of tile murals we produced in our pottery in the late 1950s for the Navajo Civic Center. The Navajo tribe flew in two sand painters who checked the drawings we had made on the tiles of the northern panel, by placing their fingers in set combinations upon the constellations of stars we had drawn in to be sure they were in the right positions. They gave their approval, and the glazing of the tiles proceeded, producing northern panels of white stars on a black background.

Luckert (1975) presents the Navajo Hunter Tradition as a remnant of an earlier, very widespread, hunting tradition that is present in the Southwest in late prehistoric times, if not even earlier, and which takes on new life and new mythology as it interacts with a farming economy. In simple terms, its most important personages are its chief, Talking God, in the east; Begochidi, in charge of domestic animals, in the south; Calling God in the west; and second in command, Raven or Black God in the north, who was also in charge of all the wild animals, "the animals who raise their own young." In his earliest function, Black God (also called Raven or Crow) was a keeper of the animals. As time went on the animals were released into the wild, but Black God hardened their hides so that hunters could only take them by prayers and singing.

The Navajo Enemy Way, the only healing ceremony which is performed without a southwestern cultural veneer, seems to be most representative of earlier practices (Luckert 1975:10). It is strongly associated with Raven as Destroyer of the Enemy (in this case disease caused by contact/conflict with cultural outsiders) even to this day (Gilpin 1968:235).

Archeological specimens of crows and ravens, where only a beak, beak with attached frontals, or beak and skull with the posterior portion cut off to remove the brains, were found in the avifauna from Mound 7, Las Humanas, at Gran Quivira. A search of other collections, archeological and ethnological, determined that three categories of
artifacts were involved, "scratchers" such as are used in the Enemy Way, fetishes, and bird skins. Earliest of these artifact types in the Southwest is a "scratcher" found at Bc 51 in Chaco Canyon which dates perhaps A.D. 1000-1100 (cf. McKusick 1981:45-46).
Chapter 16
MODERN MATERIAL CULTURE

by
George A. Teague

Introduction

Twenty-seven artifacts dating from the historic period were found during the Vivian and Morris excavations. There are 20 brass cartridge cases, one lead bullet, two inscribed wooden slats, and four pieces of paper. Descriptions follow.

Artifacts

Cartridge Cases

Brass cases were found in the following calibers: .22 Long/Long Rifle; .30-30 Winchester; .38 Smith and Wesson; .38 Long Colt; .40-82 Winchester; .41 Long Colt; .44 Colt; .44-40 (.44 Winchester Center Fire); and .45-70 Government. Identifications were made using books by Barnes (1972) and Logan (1954). All of these calibers were introduced before 1900. Cartridges in calibers .22 and .30-30 are still popular, and .44-40 and .45-70 cartridges are still available, although less common. Cartridges in the remaining calibers are no longer commercially loaded.

The cartridges were manufactured by the Peters, Remington, Union Metallic, and Winchester companies. In addition, four cartridges bear the Frankford Arsenal stamp.

The cartridges were made to fit at least nine different firearms. Six are for rifles, eight are for pistols, and six could have been fired either in rifles or pistols. The .38 Long Colt, .44 Colt, and .45-70 Government cartridges were made under government contract for military weapons.

Chronologically, the cartridge cases fit the period just before and just after the turn of the century, although some may have been fired
and deposited at the site later. Four cases have head stamps indicating year of manufacture. The stamps indicated production in 1881, 1884, 1885, and 1894.

Bullet

The one lead projectile recovered from excavation is about .45 caliber and has a recessed base and at least two grease rings. It is badly mushroomed, and further identification is not possible.

Wooden Objects

Two wooden slats had been split from logs. Both are about 20 cm long and have been written on with pencil. One has the following legend:

"C. Gerrish
June 1st 1889."

The other has this legend:

"...ware Geo. Fergus...
Jennie White July 17, 1902 Don... Wein..."

Paper Wrapping Fragments

Four fragments were recovered. One is a piece of cigarette paper, another is a scrap of tin foil, and a third is part of a cigarette paper package. The fourth item is a Wrigley's gum wrapper, which was made after 1906.

Distributions

There is no apparent pattern to distribution of historic objects except that most excavation proveniences are represented in the assemblage.
Conclusions

The historic period artifacts were useful in establishing the extent of disturbance of, and intrusion into, prehistoric levels at the site. Otherwise, they do little more than confirm the cliff dwellings as a focus of tourism over the last 100 years or so.

Datable objects center on the years around the turn of the century. This may reflect no more than 20th century government policies against disposal of litter in the ruins and the use of firearms in the monument. The high ratio of cartridge cases to other items of historic trash may indicate differential recovery practices by archeologists. That is, cartridges are durable and eye-catching and are known to be sensitive time indicators. These objects may have been unconsciously selected by excavators, while bits of paper, flash bulbs, and film cans may have been ignored as to archeological potential.
Appendix

PLANT REMAINS

by

Karen R. Adams and Lisa W. Huckell

At present ponderosa pine and juniper trees flank the slopes of Cliff Dweller Canyon in the headwater region of the Gila River in Catron County, New Mexico. At an elevation of 5,900 feet, the area has both a variety of wild plant resources and a permanent nearby water source. Wild plants sustained Archaic period visitors to the area who left only a few hints of their presence prior to A.D. 500. Nearly seven centuries later, in the period A.D. 1270-1290, the same setting provided food and household items for the Mogollon builders and occupants of the Gila Cliff Dwellings; cultural ties of this second group to other Tularosa phase Mogollon peoples in the region seem certain. These later cliff dwellers apparently also found the setting conducive for prehistoric agricultural attempts, and have left a good record of their domesticate plant use in addition to some of their wild plant choices.

The dry conditions of the Gila Cliff Dwellings caves contributed to excellent preservation of plant remains. As a result, excavators retrieved a wide range of taxa representing plant parts seldom seen in less protected sites. This appendix concentrates on plant macrofossils, excluding wood, recovered over the years from the site. Many of the items described here appear to have been modified by ancient inhabitants of the caves, while others do not. A section by Fenner in this volume compliments the present one by describing and discussing artifacts fashioned from plant parts.

Objectives of this study included: completion of an inventory of the macrofossil assemblage; basic description of the taxa present; further analysis of select taxa, if time permitted; integration of data from previous analyses and comparisons of the results with other prehistoric Mogollon plant assemblages.

The collection of the nonartifact plant remains from the Gila Cliff Dwellings consists of over 3,000 items retrieved in three separate archeological excavations carried out at the site by Charlie Steen in
1941, Gordon Vivian in 1963, and Don Morris in 1968. The sample is heavily biased toward large, readily visible macrofossils that were easily seen during excavation. All of the work done at the site predates the use of the technique known as flotation, which often recovers less conspicuous plant remains.

Methods

To facilitate inventorying the collection, an analysis form was devised that enabled each taxon from a provenience to be described in detail. The form provides entries for data on provenience, taxon, plant part, quantity, condition, dimensions where appropriate, a complete written description, and space for comments and evaluation of further identification potential. When length/width/diameter was noted for an item, the maximum dimension was taken. Among such items as nuts or seeds, only whole or nearly whole specimens were counted. In noting condition, close attention was paid to evidence of carbonization, rodent gnaw marks, or clues to human impact on an item such as cut marks, knotting or twisting of fibers. A separate inventory form was developed for those few examples of completely unidentifiable plant parts.

Taxon identification was accomplished by consulting a number of resources, including a seed manual (Martin and Barkley 1961), works on floras of Arizona and New Mexico (Wooten and Standley 1915; Gould 1951; Kearney and Peebles 1960), University of Arizona Herbarium personnel, and various modern reference collections. In the event that a specimen could not be unequivocally identified, it was placed in the most specific taxonomic category achievable, with the added designation "type." This label indicates that the specimen closely resembles the taxon named, but that additional possibilities have not been checked.

When possible, previous investigators' works were incorporated into this report. For example, in 1963 Stanley Welsh, curator of the herbarium at Brigham Young University, identified a sample of seeds recovered from the Gila Cliff Dwellings by Gordon Vivian. The identifications were rechecked during this analysis and combined with the site data. In the same year, a sample of wood specimens was sent for identification to B. Francis Kukachka of the U.S. Department of
Agriculture Forest Products Laboratory in Madison, Wisconsin. Dr. Kukachka's results have been placed in table form and included in this report.

Correspondence in the Western Archeological and Conservation Center files contained reference to an analysis of a sample of plant remains from the Gila Cliff Dwellings by personnel in the Missouri Botanical Garden. Although some of the specimens apparently sent to St. Louis for analysis seem to have been returned, efforts to locate an accompanying manuscript or notes proved unsuccessful.

All analysis forms, along with the macrofossil assemblage itself, are currently curated at the Western Archeological and Conservation Center of the National Park Service.

Results

Thirty-two taxa were identified from the Gila Cliff Dwellings assemblage (Table A.1). Of that number, eight represent cultivated domestic plants, while the remainder are wild plant species. The taxonomy employed in this study follows Kearney and Peebles (1960) and Gould (1951).

The type and quantities of plant remains from each taxon along with the proveniences from which they came are summarized in Table A.2. The detail in provenience information varied greatly among the samples; in the interest of simplicity and uniformity, only the most basic, common locations have been cited in this report. Those samples that possess more detailed provenience data such as stratigraphic level or feature designation have all been combined by cave and room only. Most of the plant parts examined are unmodified by exposure to heat. Those macrofossils that are carbonized or bear some evidence of burning are represented by a figure in a column that is placed below a diagonal slash. Those taxa for which the type concept is used are indicated by an asterisk.

The description text that follows is arranged alphabetically by taxon. The same order is observed for both Tables 1 and 2. Gymnosperms are discussed prior to angiosperms, and cultivated plant remains can be found within their appropriate families.
Table A.1
PLANT TAXA RECOVERED FROM GILA CLIFF DWELLINGS DEPOSITS

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>TAXON</th>
<th>COMMON NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cupressaceae</td>
<td>Juniperus sp.</td>
<td>juniper</td>
</tr>
<tr>
<td>Pinaceae</td>
<td>Pinus edulis Engelm.</td>
<td>pinyon</td>
</tr>
<tr>
<td></td>
<td>Pinus ponderosa Lawson.</td>
<td>yellow pine</td>
</tr>
<tr>
<td></td>
<td>Pinus sp.</td>
<td></td>
</tr>
<tr>
<td>Agavaceae</td>
<td>Agave/Yucca</td>
<td>agave/yucca</td>
</tr>
<tr>
<td></td>
<td>Yucca sp.</td>
<td>yucca</td>
</tr>
<tr>
<td>Boraginaceae</td>
<td>Lithospermum sp.</td>
<td>gromwell</td>
</tr>
<tr>
<td>Cactaceae</td>
<td>Platyopuntia</td>
<td>prickly pear</td>
</tr>
<tr>
<td></td>
<td>Opuntia sp.</td>
<td></td>
</tr>
<tr>
<td>Compositae</td>
<td>Helianthus annuus L.</td>
<td>sunflower</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td>Cucurbita mixta Pangalo</td>
<td>squash</td>
</tr>
<tr>
<td></td>
<td>C. moechata Poir.</td>
<td>squash</td>
</tr>
<tr>
<td></td>
<td>C. pepo L.</td>
<td>pumpkin</td>
</tr>
<tr>
<td></td>
<td>Cucurbita/Lagenaria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lagenaria</td>
<td>bottlegourd</td>
</tr>
<tr>
<td></td>
<td>siceraria (Mol.) Standl.</td>
<td></td>
</tr>
<tr>
<td>Fagaceae</td>
<td>Quercus sp.</td>
<td>oak</td>
</tr>
<tr>
<td>Gramineae</td>
<td>Muhlenbergia emerslevyi Vasey</td>
<td>muihy</td>
</tr>
<tr>
<td></td>
<td>M. sinuosa Swallen</td>
<td>muihy</td>
</tr>
<tr>
<td></td>
<td>Oryzopsis hymenoides</td>
<td>Indian rice</td>
</tr>
<tr>
<td></td>
<td>(Roem. &amp; Schult) Ricker</td>
<td>grass</td>
</tr>
<tr>
<td></td>
<td>Phragmites communis Trin.</td>
<td>reedgrass</td>
</tr>
<tr>
<td></td>
<td>Sporobolus cryptandrus</td>
<td>dropseed</td>
</tr>
<tr>
<td></td>
<td>(Torr.) A. Gray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zea mays L.</td>
<td>corn, maize</td>
</tr>
<tr>
<td>Leguminosae</td>
<td>Juglans major (Torr.) Heller</td>
<td>walnut</td>
</tr>
<tr>
<td></td>
<td>Type 1, Unknown</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type 2, Unknown</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phaseolus acutifolius Gray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>var. latifolius Freemon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phaseolus cf. acutifolius</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phaseolus metalaeferi Woot. &amp; Standl.</td>
<td>wild bean</td>
</tr>
<tr>
<td></td>
<td>P. vulgaris L.</td>
<td>common bean</td>
</tr>
<tr>
<td></td>
<td>Phaseolus sp.</td>
<td></td>
</tr>
<tr>
<td>Malvaceae</td>
<td>Gossypium hirsutum L.</td>
<td>cotton</td>
</tr>
<tr>
<td>Martyniaceae</td>
<td>Proboscidea</td>
<td>devil's claw</td>
</tr>
<tr>
<td>Nyctaginaceae</td>
<td>Mirabilis longiflora L.</td>
<td>four-o'clock</td>
</tr>
<tr>
<td>Rosaceae</td>
<td>Prunus serotina Ehrh. susp.</td>
<td>choke-cherry</td>
</tr>
<tr>
<td></td>
<td>virens (Woot. &amp; Standl.) McVaugh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P. virginiana L.</td>
<td>choke-cherry</td>
</tr>
<tr>
<td>Solaraceae</td>
<td>Datura meteloides DC.</td>
<td>jimson weed</td>
</tr>
</tbody>
</table>

NOTE: Not all of these taxa display evidence relating them to human activity; see text for information. Gymnosperm families precede angiosperm families.
Gymnosperms

Gymnosperms are represented at the Gila Cliff Dwellings by a number of conifer parts, including Pinus nutshells, female cones, needles, stems, bark and wood, non-Pinus wood types, Juniperus fruit, seeds and shredded bark, and conifer resin or pitch balls. Pinyon (Pinus edulis) occurs as nutshells, female cones, needle fascicles, and possibly as wood. Over 60 uncarbonized Pinus edulis-type nutshells were recovered from two locations, most from room 27 (surface to floor 1) and a few from trench 2. These nutshells range in length from 0.8 cm to 1.5 cm and in width from 0.5 cm to 1.0 cm. Many suffer from rodent damage, as evidenced by teeth marks on the surface. Four female Pinus edulis-type cones with prickly-less scales also derive from the same locations as the nutshells. These items vary in size and condition. Three are without evidence of carbonization, one of which is very immature, with scales still fused. Two others are mature, yet have had the majority of their scales gnawed off by rodents. The single nearly complete 4 cm by 4 cm cone specimen retains some whole nuts within; its slightly singed scale ends suggest that it may have been held briefly near a fire. Additional evidence of Pinus edulis from room 27 is in the form of two intact uncarbonized fascicles of needles, each bearing the typical two leaves of this particular pinyon pine. The fascicles are bound by a persistent sheath and the needles are broken. Pinus wood belonging to the pinyon pine group was noted by Kukachka (1963) as having been recovered from rooms 1, 7, and 27.

A young stem and two bark fragments of ponderosa pine (Pinus ponderosa) were found by excavators in room 27. The young stem segment appears partially carbonized and is missing most of the bark. Identification is based on the bark plate pattern which remains, appearing as irregular, puzzle-like pieces covering the surface. The two bark fragments consist of rectangular bark plates in numerous thin laminated layers, again in the typical ponderosa pine "picture puzzle" pattern. One fragment is 8.5 cm by 4.0 cm and has been burned on one end. The other, unburned, piece is of similar size.

Juniperus (juniper) seeds and at least five fruits were recovered, most from a variety of locations in room 27. An uncarbonized fruit is
complete and measures 9 mm in diameter, which falls within the 7-18 mm range of *Juniperus osteosperma* (Kearney and Peebles 1960:59). Two of the fruit have been carbonized. Of 62 juniper seeds, four are carbonized and many display rodent teeth marks. Some of these seeds are terete, while others reveal from one to two flat facets. Considerable size range exists, as does the degree of surface smoothness versus surface ridging. The prehistoric material is probably not *Juniperus Deppeana*, based on comparison with modern collections. Length and width indices of the largest and smallest Gila Cliff Dwellings specimens (32 and 14, respectively) are within the range of measurements noted by Lentz (1984:193) for *J. osteosperma* (the largest) and *J. monosperma* (the smallest).

*Juniperus* is also represented in the Gila Cliff Dwellings materials by shredded bark. A large quantity of finely shredded material came from trench 2. Layers of juniper bark, still visible, have been pulled apart and worked into a mass of fine strands generally less than 2 mm wide. The material is homogeneous and without evidence of rodent activity or encrusting soil. The soft, absorbent qualities of such an item would make it a good candidate for use as bedding or diapers, and so forth. The stiff, platey nature of the bark of *Juniperus Deppeana* make this species an unlikely candidate to provide the type of shredded bark described above. Likewise, the bark of *Juniperus scopulorum* is not easily shredded, often very compact and stiff. More likely candidates that provide easily shredded bark which is thin, loose, and moderately to extremely flexible and often extensively frayed are *Juniperus osteosperma* or old individuals of *J. monosperma* (Adams 1980).

At least eight separate samples of conifer pitch or resin are also included in the Gila Cliff Dwellings plant remains. Most are round to irregular in shape, and they average 3 cm in diameter. Room 20 produced a pine branch segment bearing a resin accumulation around the central portion. Excavators recovered at least two irregularly shaped pitch balls from room 27, both apparently in exterior storage bins.

Some of the conifer plant remains at the Gila Cliff Dwellings may relate to previous human activity, while some may not. The bulk of the pinyon pine items derive from room 27, certainly a nonrandom distribution. One of the female cones, with nuts still enclosed,
displays evidence of having been held near a fire. Historic southwestern groups (Gifford 1932:208-209; Gifford 1936:255; Palmer 1878:594-595; Stuart 1945:155) are known to have picked nearly ripe cones and employed fire to open them in order to maximize nut harvest. Alternatively, nearly empty cones could provide a ready tinder source for starting a fire. The presence of a very immature cone is probably not related to rodent food acquisition, yet the frequent occurrence of rodent teeth marks on the uncarbonized nutshell population, as well as on some of the cone scales, requires caution in assigning to humans alone the role of transport into the site.

The partially carbonized ponderosa pine stem and bark plates were probably brought into room 27 by people. Likewise, the presence of one or more species of juniper seeds, although gnawed by rodents, may be due to a human agent, as some of them had actually been burned. The mass of cleanly shredded juniper bark, with no evidence relating it to rodent activity, was likely carried in to serve any of a number of needs requiring a soft, absorbent material. The conifer pitch balls could be used to seal containers for water-proofing, and in a variety of medicinal contexts.

Agave/Yucca

A Yucca-type pod fragment, and over 40 leaves and nearly 200 seeds representing either Agave or Yucca were found in a number of locations. The Yucca-type pod consists of one locule 9 cm long (including peduncle), and a number of enclosed seeds averaging approximately 2.5 mm thick. Seed thickness is similar to that of a broad-leaved Yucca such as Yucca baccata. The pod fragment is encrusted with organic debris, such as packrat droppings.

The Agave/Yucca leaf fragments were recovered from room 1, trench 2, cave 1, room B, and in a number of locations in room 27. Although detailed comparisons were not made with modern materials, it seems likely that both Agave and Yucca are represented. For example, some fragments are of stout, thick leaves 2 cm wide and 2 mm thick; these sometimes have flared bases or boat-shaped ends. Margins have no visible prickles, but occasionally have a very sharp spine on the end or
have definite fibers peeling back from the edges. These leaves may well represent Agave. Other fragments are thin, some with smooth margins and occasionally with thickened and darkened fibers that peel back along the margin. These thin leaves average 1 cm in width and 1 mm in thickness. Some of these narrow pieces have a sharp stout end. It is likely this second type represents Yucca. Occasional evidence of rodent gnawing is present on the leaves. Many of the pieces are fragmented and frayed. None display any sign of carbonization.

Evidence of human use of these leaves comes in two forms. At least 10 of the leaves just described have one or two rather smooth and even ends, suggestive of having been cut. In contrast all other ends are frayed and erratic as if they have been broken or torn from the plant. Pieces that have definitely been modified by humans derive from at least two locations. Room 27, level 2, produced a long (12 cm) strip of Agave/Yucca leaf material with parallel vascular bundles showing at one end. The piece is narrow, consistently 3 mm wide, with epidermis present on upper and lower surfaces only. The two sides are without epidermis and parallel to one another, suggesting they have been cut with a sharp instrument along their length. This piece seems clearly to have been sliced off a larger leaf. Trench 3 produced three longitudinal split leaf sections with poorly freed fibers; two of these pieces are united in a square knot.

Nearly 200 Agave/Yucca-type seeds were recovered, mostly from room 27 and trench 3. In general the seeds are variable in size, ranging from 6 mm to 12 mm in length, and 6.5 mm to 10 mm in width. They are basically thick (2-4 mm) except for a few obvious immature specimens. Their shape is variable, with some of them tear-drop to circular, others irregular to obovate. Most have conspicuous vertical venation or wrinkles apparent; a small number have been damaged by rodents. All are black and only a single seed displays evidence of carbonization.

The general lack of rodent damage, and the presence of a single carbonized seed is suggestive that humans may have carried some of these seeds into the cliff dwellings. The ethnographic record does not generally recount the use of Agave/Yucca seeds as food by historic southwestern peoples; possibly the seeds in the Gila Cliff Dwellings
were carried in incidentally in transport of vegetative parts for use in material culture.

**Lithospermum**

Three nutlets of *Lithospermum*-type were recovered from room 27. All are uncarbonized and appear very recent in origin. Two of the nutlets are still on a pedicel and enclosed partially by bracts. A scar on one side indicates the position where additional nutlets were probably attached. The nutlets are a cream color, glossy and smooth with an ovate shape. The upper surface bears a low, longitudinally oriented ridge. The specimens compare well to modern *Lithospermum* nutlets. There is no evidence to suggest this material relates to human activity.

**Opuntia**

Cactus remains include an incomplete fruit, a small number of seeds, and a few pad and stem fragments. The uncarbonized incomplete fruit, from cave 4, is missing the interior portion and retains only sporadic glochid clusters. Identification was not attempted. The uncarbonized seeds, nearly all of which derive from room 27 in the refuse layers between floors 1 and 2, measure 4 mm by 4 mm and have a flat, subcircular shape with a distinct groove parallel to the margin. Such a seed morphology is characteristic of the platyopuntia, or flat-padded prickly pear-type of cacti (Martin and Barkley 1961:184).

Room 27 also retained some vegetative evidence of prickly pear cacti. For example, in the same refuse layer as the seeds, excavators recovered two small uncarbonized fragments of prickly pear stem or robust pad bases. Also, two prickly pear pads and a stem fragment were recovered above floor 1, none of which displayed any evidence of carbonization. One of the pads is nearly whole and rather small, measuring 4.5 cm by 2.5 cm by 0.5 cm. The small size of this whole pad suggests that the specimen was picked when quite young, in the spring of the year when cacti resume their vegetative growth. The areoles (spine-bearing areas) of this particular pad are missing their spines.
Excavators recovered three pads and a stem fragment from trench 2. The pads are larger than the small pad just described, but perhaps not fully mature. Two of the pads are joined to the stem segment, and are partially blackened (appearing burned) on one side. The spines have been removed and are basically flush with the surface of the pads, with only the blackened nubs of spine ends visible. The third pad is small (3.5 cm wide) and is missing its spines, although there is no evidence of carbonization.

Three partial pieces of prickly pear pad fragments were recovered from room 1. Two of these have attached spines, but the third retains blackened ends of spines that are flush with the surface of the pad. A stem segment, from an unknown provenience within the cliff dwellings, has a slightly carbonized exterior with areoles uniformly devoid of spines.

It is likely that the prickly pear cactus remains found in the cliff dwelling deposits represent former food items for two reasons. First, the small size of two of the pads suggest young vegetative growth was being gathered in the spring, when tender. Second, those pads with slightly charred exteriors and spines present only as blackened nubbins flush with the pad surface, reflect a common historic cactus spine-removal technique. The presence of seeds in the refuse of room 27 may indicate the fruit was also gathered as a food.

**Helianthus annuus**

Remains of two varieties of sunflowers were recovered. Half of an uncarbonized achene was found in room 27 of cave 5. Measuring 14 mm in length and 9 mm in width, its large size, thick shell, and mottled black and white exterior indicate that this is a historic domesticated, large-headed variety, probably left by an archeologist or a hiker.

The second variety of sunflower retrieved is a wild form. Six uncarbonized heads from trench 2 in cave 3 ranged in diameter from 31.5 mm to 41 mm. They appear to have been collected when the achenes had matured, for several had the ripe achenes in place among the withered disc flowers and chaff. The achenes, along with the distinctive phyllaries, indicate that the specimens are Helianthus
annuus. The seeds are a mottled brown and tan color, bear a concentration of short, straight hairs around their apices, and range in length between 4 mm and 5.2 mm, while widths vary between 2 mm and 3 mm. The phyllaries are broad and have ciliate margins.

A common "weed" throughout the Southwest, wild sunflowers are presently found growing in the Gila Cliffs area. The small but flavorful achenes have been harvested by many historic Indian groups for food. The flowers themselves have played important symbolic roles in religious rituals as well. Cutler (1952:475, 477) reported that a number of wild sunflowers representing several species had been found at the Mogollon site of Tularosa Cave. Included in the total was an unstated quantity of H. annuus seed heads. They are present in nearly every level of the cave fill, suggesting a long-term, deliberate collection and utilization of the plant by the Tularosa Cave inhabitants. Despite this strong association elsewhere, the recovery of the Gila Cliff Dwellings material from a single nonroom context in a trash deposit area, along with the small number of specimens located, make it difficult to confidently assign them a prehistoric origin. Other possibilities must be considered, such as collection by rodents (who are also fond of the achenes), and introduction into the fill by a hiker or pothunter.

Cucurbitaceae

Plant parts of several species of the squash, gourd and melon family were recovered from all six caves comprising the Gila Cliff Dwellings complex. One thousand, one hundred and ninety-six items were examined; the results are presented in Table A.2. The assemblage consists of rind fragments, fruit stems or peduncles, seeds and pulp fibers that come from one or more wild species of Cucurbita, bottle gourd (Lagenaria siceraria), and the domestic Cucurbita species C. pepo, C. moschata and C. mixta.

The largest category of cucurbit remains is that of rind fragments which accounts for 78 percent (938 pieces) of the total. The fragments range in size from a few millimeters in diameter to between 8 cm to 9 cm in their maximum dimensions. Thicknesses do not exceed 6 mm. Several
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Table A.2

PLANT PART, QUANTITY, AND PROVENIENCE INFORMATION ON TAXA RECOVERED FROM THE GILA CLIFF DWELLINGS
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* = Type (see Methods Section for explanation)
1/2 1 = Uncarbonized
2 = Carbonized or Partially Burned
species and/or cultivars appear to be represented. A majority of the pieces exhibit a smooth exterior surface that is usually some shade of brown in color. Other fragments show shallow, vertically oriented furrows and a mottled green coloration. A third group of fragments is characterized by thin, smooth walls, a spherical shape and a striped green and yellow color pattern. Other types in modest quantities are also present. Although no reliable method yet exists for distinguishing Cucurbita species based on rind morphology, it is possible to segregate Cucurbita from Lagenaria using the criteria presented by Cutler and Whitaker (1961:479). Time has not permitted the examination of all of the rind fragments recovered, but a large sample was analyzed (Table A.2) that identifies most of the smooth, thick-walled pieces as bottle gourd and the others as Cucurbita. Comparison with wild gourds in Huckell's collection indicates that the third major group of rind fragments is assignable to the wild cucurbits.

With a few exceptions, most of the rind fragments exhibit irregular, broken margins. Each of two cucurbit fragments displays a single straight cut edge; one of these pieces is a large basal fragment bearing a cleanly bisected blossom scar as though the fruit (or a large portion of it) had been longitudinally split. Sixteen bottle gourd fragments have what appear to be cut margins. Of these, four have smoothed, finished edges that indicate the gourds' use as containers or implements. Additional examples of modified bottle gourds from the site are described by Fenner (this volume).

Some of the rinds also reveal that they have been exposed to fire. Although all of the cucurbit remains are uncarbonized, six bottle gourd fragments, two Cucurbita fragments and two Lagenaria/Cucurbita fragments have been scorched or partially lightly burned.

Seeds form the next largest class of cucurbit remains with 223 individuals. Unlike the rinds, seeds of this family can be identified to species. The seeds in the Gila Cliff Dwellings sample were identified, using the criteria given by Cutler and Whitaker (1961:476-478), and by comparison with seeds in Huckell's collection and the seed collection maintained at the Arizona State Museum.

Conditions of the seeds vary considerably, ranging from pristine to poor. A majority of the seeds have been affected by mechanical damage,
abrasion, insect and rodent attacks, and other detrimental forces, all of which act to reduce the clarity of the diagnostic characters. This problem was particularly evident when seeds of *Cucurbita pepo* and *Cucurbita moschata* were being sorted. Although good examples of both are present, there is also a gray, middle area where damage to the seed margins is such that identifications could not be made with complete certainty. As a result, these two seed categories will be considered as *C. moschata*-type and *C. pepo*-type, as defined earlier.

*C. moschata*-type seeds account for 66 percent (148 pieces) of the 223 seeds in the assemblage. They are a light tan color and bear a dark red-brown marginal fringe. Maximum dimensions attained in this sample are 21 mm in length, 13 mm in width and 3 mm in thickness. All of the seeds are unburned.

The 60 *C. pepo*-type seeds are also a light tan color. However, the seed margin in this species is smooth and lacks the dark fringe. The greatest dimensions recorded from the sample for this seed type are a length of 20 mm, a width of 12 mm, and a thickness of 4 mm. Two of the seeds that were found outside room 27 in cave 5 are a dark brown color as a result of being exposed to fire or having been deliberately parched. The use of the parching method for preparing the tasty seeds has been widely documented in the archaeological and ethnographic records. It is possible that these seeds may be the discarded or lost remnants of an aboriginal meal.

Wild cucurbit seeds are also present in the assemblage (see Table A.2). The 14 small, teardrop-shaped seeds are a pale yellow-tan color. Maximum dimensions are 10 mm in length, 7 mm in width and 2 mm in thickness. The smooth seeds lack an encircling rim, which suggests that they are of the *C. foetidissima* or *C. palmata*-types.

The last species of cucurbit found is represented by a single specimen. A half of a *C. mixta* seed was found in room 1 of cave 2. The dingy white seed is 19 mm long and 10 mm wide. The exterior testa surface bears the distinctive splits or fissures that characterize many of this species' seeds (Cutler and Whitaker 1961:478).

Thirty-one fruit stems, or peduncles, were recovered. Of these, 22 can be assigned to *C. pepo*. They range from slender to robust, with the largest measuring 3.65 cm in diameter. They have sharply defined
ridges and furrows that are covered by a scattering of conspicuous, rough setae. The peduncles tend to enlarge gradually toward the attachment end, sometimes showing some thickening or buttressing at the base.

Two peduncles are present that are difficult to classify. Both are short-stemmed, having been cut from the vines about 2 cm up from the base. The shanks of both bear rounded, low ridges and shallow, broad furrows. The surfaces vary, ranging from smooth to being dotted with low-relief setae. The bases of both are somewhat flared, particularly in the specimen from cave 5, although neither has the typical broad flare or "melted wax" look characteristic of C. moschata. Outlines of the bases are smooth and rounded, with few individual rib terminations evident. Based on the shallow ribbing of the stems, the flaring of the bases and the rounded base outlines, these peduncles are considered to be of the C. moschata-type. Their somewhat intermediate character between obvious C. pepo and C. moschata examples suggests the possibility that some genetic mixing of the two species may have taken place. In his discussion of the squash/pumpkin remains from Tularosa Cave, Cutler (1952:471) classified most of the peduncles as C. pepo. However, he mentions finding some exceptions to the typical straight-sided, fluted stem morphology, noting that a few of the stems have a slight basal flare and lack prominent setae, which he feels might indicate some introgression with C. moschata. Unfortunately, Cutler does not indicate the associated time period for these anomalous peduncles. It is possible that the specimens reflect the same phenomenon.

A single peduncle of C. mixta was recovered from the area outside the north wall of room 27 in cave 5. The small, cylindrically shaped specimen measures 4.2 cm in length and 1.9 cm in diameter. Although it has been slightly damaged in several places, the five barely elevated, rounded ridges can be discerned. Setae are present, particularly in the areas between ridges. The specimen was bent at the base early in its growth, but it is clear that there is little to no expansion of the base. It is similar to some C. mixta specimens from Antelope House in Canyon de Chelly, Arizona.
Of the remaining six peduncles, one is a medial stem fragment of a wild gourd. No species determination can be made. The last five specimens all belong to the domestic cucurbits, but are either too immature or fragmentary to allow a confident species assignment. They are designated as *Cucurbita* sp. in Table A.2.

The last cucurbit remains category is that of fruit pulp. Four examples of dried, matted, fibrous-looking tissue from squash or gourd fruit interiors were found in cave 3. One specimen still has a bit of thin rind adhering to it. The small masses are unmodified, showing no evidence of use as pads, quids, wipes, and so forth. They are unburned, and it is equally likely that they are the dried remnants of wild gourds that have been introduced after the aboriginal occupation. There is no way to ascertain the species identity of the pulp masses.

The cucurbit assemblage from Gila Cliff Dwellings compares favorably with those from other Mogollon sites (Cutler and Whitaker 1961:471-3). Bottle gourd seeds, peduncles and rinds have been recovered from sites in Arizona and New Mexico, although seeds and peduncles tend to be less commonly found or are absent entirely, a situation that suggests the introduction or importation of gourds grown elsewhere. The abundance of rind fragments at the Gila Cliff Dwellings shelters, Tularosa Cave, Cordova Cave (Cutler 1952:475) and other dry caves attests to the importance of the hard-shelled fruits in the manufacture of household items.

*Cucurbita pepo* is the oldest domestic cucurbit in the Southwest, having arrived at the same time as maize (Ford 1981:14). It was widely grown throughout the region, and maintained its popularity as a food crop into historic times. It is a common constituent of the plant assemblages recovered from Mogollon sites with good preservation (Cutler and Whitaker 1961:471-472). Its cold tolerant, relatively drought resistant qualities undoubtedly contributed greatly to its continued use, particularly among farmers at higher elevations.

The presence at Gila Cliff Dwellings of *C. mixta* is not surprising. The most recent squash arrival in the Southwest, it, too, achieved a wide distribution since its debut some time around A.D. 900, and has been found at several Mogollon sites including Higgins Flat Pueblo (Cutler 1956), O Block Cave, Hinkle Park, and Cosper Cliff Cave (Cutler
and Whitaker 1961:472-473). The biased nature of the plant sample from Gila Cliff Dwellings makes it difficult to assess the role of C. mixta in the local economy; although C. pepo was undoubtedly the preferred crop, it is highly likely that more C. mixta was grown or available than the single seed and peduncle suggest.

The presence of possible C. moschata seeds and peduncles is intriguing. Arriving in the Southwest about A.D. 700, C. moschata never achieved the distribution of the two previously mentioned species (Ford 1981:17). Limiting factors probably include the species' high water requirements and intolerance of cold, traits that reflect the plant's origin in the warm lowlands of Mexico (Whitaker and Cutler 1971:127). It is not commonly encountered in archaeological sites; from the Mogollon area, it has been reported from two sites at Point of Pines, Arizona, and Cosper Cliff Cave (Cutler and Whitaker 1961:472). The Gila Cliff Dwellings C. moschata-type seeds may represent the acquisition of the squash through trade, or it may be that, along with the possible C. moschata peduncles, they indicate the presence of a C. pepo strain bearing variable amounts of introgression with C. moschata as mentioned earlier.

Wild cucurbits have enjoyed a long history of use by southwestern aboriginal peoples, having provided the raw materials for utensils, food, soap, medicine, and musical instruments (Nabhan and Thompson 1985). That this use extends back into prehistory is clear from the archeobotanical record, which shows that the fruit rind and seeds are frequently recovered (Cutler and Whitaker 1961:471). At Tularosa and Cordova Caves, Cucurbita foetidissima was the most common wild plant recovered; pulp, rind fragments and pieces of roots were found. It is difficult to evaluate the prehistoric importance of the plant and the role it played, given the myriad ways in which it has been known to be used. Cutler (1952:479) feels that the Tularosa and Cordova Caves roots and seeds may have been used for food, and that the dried pulp could have served as pads or wipes. In the case of the Gila Cliff Dwellings materials, no clues are present that suggest the intended purpose for the rinds, seeds and pulp. It is also conceivable, given the unmodified and unburned state of the items, that all or some of them may be noncultural in origin.
Quercus

Acorns (Quercus) are represented in a number of different site locations by uncarbonized whole nuts, shell fragments, and caps. The majority of the remains have evidence of rodent gnawing, in the form of teeth marks. Some of the caps appear velvety within and have retained excellent sculpture on the exterior, suggesting an identification to species might be made with an adequate comparative collection of acorns. The authors felt that the range of diversity displayed in the acorn remains could indicate that at least two species are represented. Lack of carbonization and presence of rodent damage suggests nonhuman transport of this resource into the cliff dwellings. Wood from some species of the red oak group was identified by Kukachka (1963) as present in room 4 and trenches 3 and 4.

Gramineae

In addition to the presence of cultivated corn (Zea mays), a number of members of the grass family were recovered from the excavations. Many of the grass parts are in excellent condition and have adequate intact reproductive and vegetative parts to be identified. In addition to the grasses discussed below, at least three additional grass types were recognized in the Gila Cliff Dwellings plant materials that are unidentified. For example, unidentified grass stems and leaves of at least two species came from room 4; some of the stems appear to be oriented parallel to one another, and may represent grass carried in for some cultural need.

Reedgrass (Phragmites communis) is represented by inflorescence fragments, leaves, and culms (stems) from a number of locations. Room 1 produced one partially carbonized and four uncarbonized inflorescence fragments. The spikelets match well the criteria described by Gould (1951:93). In addition, one attached leaf, approximately 1 cm wide with serrulate margins, displayed a ligule with a short lacerate fringe (Correl and Johnston 1970:114), supporting a Phragmites identification. Three inflorescence fragments were also recovered from room 27, either above floor 1 or in the refuse layer between floors 1 and 2. Both
immature florets and mature caryopses are present in these specimens. One of the inflorescence fragments appears charred at the stem end; another is darkened, as if parched, and leaves a slight charcoal smudge when pressed against soft paper.

At least 11 recognizable reedgrass leaves derive from room 1. They vary in width up to 18 mm. One specimen has two ligules and a collar intact, and compares well to published descriptive material (U.S. Department of Agriculture 1971:81). Many additional broad, long grass leaves are present in the Gila Cliff Dwellings plant remains, and some of them may likely represent reedgrass as well as corn (Zea mays).

Over 60 hollow robust Phragmites communis-type culms were recovered from at least five separate proveniences. It is unlikely these specimens represent Zea, which has a solid internode area. Diameter measurements range from 3 mm to 12 mm, and the items vary considerably in length. Most of the segments seem to have been broken off, and reveal rough jagged ends. One piece, however, may have been cut with a sharp instrument as the stem end appears quite smooth and even. Evidence of burning occurs on at least one or both ends of 20 of the specimens, and some have carbonized patches elsewhere along their length. No other unusual characteristics were noted.

Four separate species of grasses occurred at least once each, and include two species of Muhlenbergia, a Sporobolus and an Oryzopsis. These grasses were identified with the kind assistance of Dr. John Reeder and Charlotte Reeder in the facilities of the University of Arizona Herbarium.

Muhly grass (Muhlenbergia) is represented by both a perennial and an annual species. The perennial, Muhlenbergia emersleyi Vasey, occurs as three uncarbonized inflorescence fragments, one of them with mature florets. Identification is based on a comparison to features described by Gould (1951:219). Knotty, clumped grass stems with very compressed keeled sheaths accompany these specimens, and also compare well to the description of M. emersleyi. The material all derives from trench 2.

An annual muhly grass, Muhlenbergia sinuosa Swallen, was recovered from room 27, between the surface and floor 1. A small mass of uncarbonized inflorescence fragments with mature caryopses and intact culm segments permitted an identification.
Two bunches of uncarbonized Indian rice grass (*Oryzopsis hymenoides* [Roem and Schult] Ricker) culms and roots were recovered from trench 2. This material was completely without flowering parts, and identification was based on vegetative characteristics.

Seven uncarbonized robust culms of dropseed (*Sporobolus cryptandrus* [Torr.] A. Gray), more or less glabrous and polished and generally solid, came from room 1. One has the remains of an inflorescence, which, when taken with the distinctive vegetative characteristics, permitted an identification.

Grasses have been extensively employed by southwestern groups in historic times (Doebley 1984), and perhaps the Gila Cliff Dwellings occupants did likewise. The repeated presence of reedgrass culms, many with burned ends and one with a possible cut end, suggests use. The parched inflorescence hints at a method of holding a resource near the fire to loosen ripe seeds for food. The mature florets of the two species of muhly grass may represent nearby food resources. Indian rice grass is known to have been a valuable historic and prehistoric food (Bohrer 1975:202, 205), while *Sporobolus cryptandrus* was sought by at least four separate historic groups (Doebley 1984:57).

**Zea mays**

Maize remains form the largest category of plant macrofossils retrieved from the Gila Cliff Dwellings. The assemblage includes cobs, dissociated cupules, ears, caryopses, culms, leaves, roots, shanks, and tassels. Time did not permit examination of all the site inventory and analysis was limited to 1,201 items. With the exception of row number counts determined for a sample of the cobs, no systematic data were recorded beyond sorting and inventorying the materials.

**Cobs**

Of the total number of maize cobs available for analysis, 383 were examined. The actual cob total from the site is uncertain, for several boxes containing a conservative estimate of several hundred cobs from Morris' excavation in and around room 27 along with a bag of specimens from room 10, were omitted from the study. Generally speaking, the cobs
in the sample are in good to excellent condition. Many are complete or nearly so. Most are uncarbonized (only four carbonized cobs were encountered), and therefore offer more details and characters for study.

Many measurements and observations can be made on maize cobs (Wellhausen and others 1952), but the single character of row number was chosen here as offering the most information in the time available. Results of the analysis are given in Table A.3 which presents, by provenience, the total number of cobs in the sample, the number of cobs in each sample for which row number was counted, the number of cobs of each row number present, and the percentage of the sample of each row number. Those cobs not counted from the sample (55) represent those whose row numbers were not easily visible, being obscured by glumes, dirt, and so forth. The last provenience entry, rooms 16 and 27, represents counts made by an unknown individual who counted the cobs prior to sending them to Dr. Hugh Cutler for analysis. The location of these cobs is unknown. Despite their uncertain and unverified nature, the counts are included as additional data that should be used with caution.

The Table A.3 data correlate with the trend reported by Cutler at Tularosa Cave. He found a steady reduction in cob row number through time, with early corn characterized by higher percentages of 12- and 14-rowed maize while later phases showed a preponderance of 8-rowed ears (Cutler 1952:468). A change in row number takes place at the end of the Georgetown phase that appears to reflect the advent of 8-rowed maize (Maiz de Ocho) into the Southwest some time around A.D. 700. This introduction of new genetic material resulted in the tendency toward lower row number and manifestations of more tripsacoid influence as seen in cobs possessing indurated, rasp-like glumes and higher frequencies of 4- and 6-rowed cobs (Galinat and Gunnerson 1963).

The Gila Cliff Dwellings maize displays a great deal of variability. Cob shapes include slender tapered specimens and large sturdy examples with enlarged butts. Glumes range from soft and chaffy to rigid and woody. Most of the cobs are brown or yellow, but some exhibit a reddish hue in the glumes and exposed rachis surface. This color reflects the presence of soluble red, which in its most well-developed form is the rich dark coloring in the purple-red Hopi dye
<table>
<thead>
<tr>
<th>Cave 1, Room 38</th>
<th>TOTAL COBS IN SAMPLE</th>
<th>COBS COUNTED FROM SAMPLE</th>
<th>ROW NUMBERS</th>
<th>PERCENT ROW NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td>Cave 2, Room 4</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Cave 3, Room 10</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>Cave 3, Trench 2</td>
<td>83</td>
<td>46</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Cave 4, Room 40</td>
<td>119</td>
<td>109</td>
<td>16</td>
<td>54</td>
</tr>
<tr>
<td>Cave 5, Room 27, Interior</td>
<td>155</td>
<td>148</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>Cave 5, Room 27, Exterior</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td>Cave 6, General</td>
<td>8</td>
<td>7</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>Rooms 16 and 27</td>
<td>832</td>
<td>832</td>
<td>24</td>
<td>59</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,215</td>
<td>1,160</td>
<td>30</td>
<td>54</td>
</tr>
</tbody>
</table>
corn, Kokoma. The color varies greatly in its intensity and distribution in the ear, ranging from very faint to extremely dark. Most of the Gila Cliff Dwellings specimens are lightly colored, but the extent of the original coloration is impossible to ascertain, for it is subject to fading with the passage of time and exposure (Cutler 1966:10).

One of the most interesting aspects of the cob assemblage is the presence of four aberrant cobs from the interior of room 27. One is a peculiar sheet-like form that resembles a twisted ice cream cone with a wide split up one side. Other than at the very base, there is no rachis tissue. The exterior is completely covered with glumes and cupules. The other three are bifurcated or split cobs that share a common base after which two apices develop and diverge. An example of this unusual form is illustrated by Hough (1914:plate 2, 11), who noted that cobs recovered from Tularosa Cave are "generally slender, sometimes bifid or showing a tendency to pairing" (Hough 1914:7). A suggested use for such ears comes from the ethnographic record. While among the Zuni, Cushing (1974:167-168) observed that:

In each corn room or granary of Zuni are preserved carefully four objects: an ear of yellow corn full to the very tip of perfect kernels, called a ya-po-to; an ear of white corn which has resulted from the intergrowth of two or more ears within a single husk-fold, called, from its disproportionate breadth and flatness, a mi-k'iap-pan-ne; a moderately large, normal ear of corn which has been dipped by a seed-priest in the waters of the great sacred Salt Lake far south of Zuni ("Las Salinas" of New Mexico), and a bunch of unbroken cornsoot. The latter two objects are laid side by side on the floor in the middle of the corn room, and upon them, also side by side, usually connected by a bandage of cotton filaments, the ya-po-to and the mi-k'iap-pan-ne...

The significance of all this is both interesting and poetic. The cornsoot is held to symbolize the "generation of life:" the salted and sanctified ear of corn, the material given by the gods and prepared by man, as the means whereby generated life is sustained; and, finally, both of these are regarded as the "resting place" or "couch" of the "Father and Mother of Corn-crops" or seed; the ya-po-to being the "male," the mi-k'iap-pan-ne, the "female."
Among her travels in northern Mexico in search of native crop plants, Mahina Drees (personal communication) has seen such bifurcated ears hanging on the walls of Tarahumara and Pima Bajo homes where they are known as "Madre de Mais," or "Mother of Corn."

**Cupules**

Cupules, the small indurated pockets in the cob or rachis that subtend pairs of grains, are often common plant macrofossils in the fill of prehistoric sites formerly inhabited by maize agriculturalists. As discarded cobs deteriorate or are broken, the durable cupules are often separated into groups or solitary individuals.

Six cupules were recovered from the site. This low figure reflects the collection of the archeobotanical sample prior to the widespread implementation of modern recovery techniques such as flotation. All of the specimens are unburned. Dimensions of the single cupule measured are 4 mm in height and 6 mm in width. All possess abundant, conspicuous cupule hairs.

**Ears**

Two intact ears are present. One from the interior of room 27 is immature; silks are abundant and the tiny kernels are just beginning to fill. It is 4.4 cm in length and 1 cm in width. The second ear is also complete and comes from trench 2 in cave 3. It is small, measuring 6.7 cm in length and 2.55 cm in diameter. Husks still enclose the red purple caryopses. Shank diameter is 5.5 mm.

**Caryopses**

The 450 maize grains recovered display a great deal of variability. Both flint and flour forms are present, and a few of the caryopses exhibit some apical depressions suggestive of denting. Colors present include yellow, brown, purple or blue and red. Brown is by far the most common color, but this is misleading, as many grains tend to lose their colors and fade to brown with time.

Over half of the kernels are unburned. Many have unfortunately suffered extensive insect damage. Almost all of the burned grains came
from just outside room 27. A few were scorched or toasted, and may have been deliberately parched.

Tassels

Seventy staminate inflorescence or tassel fragments were recovered. Almost all of them are small fragments, the one major exception being an immature tassel still enclosed by leaves found just outside room 27. This tassel is also the exception in age, as the other specimens are all mature. This suggests the possibility that the tassels may have been collected for their pollen, an important ritual substance among contemporary Puebloan peoples.

Shanks

Twenty-eight shanks were also recovered from several rooms of the cave complex. They are generally robust and sturdy with some as long as 10 cm and as wide as 2.5 cm. Some still have the husks attached, left in place after the ear or cob was snapped off. Two shanks, one from outside room 27 and one from just outside that room's north wall, have the cob bases present, left behind when the cob was removed. Both appear to have been 10-rowed cobs, but it is risky to count row number from the cob base due to a tendency toward kernel crowding and irregular row formation.

Culms

Eighteen culm fragments were recovered from the site. Included are both nodal and internodal segments. Maximum diameter among the specimens is 1.35 cm. No evidence for use is present on these solid stems, although one large specimen from just outside room 27 has been scorched on one side.

Leaves

Several different locations produced the total of 15 corn leaves. Although most were complete or large intact fragments, one specimen from outside room 27 has been partially shredded. This may have been done by a rodent to create nesting material, or could also have been done by a village resident to produce a soft, absorbent pad for domestic purposes.
Roots

Four culm bases and their roots were recovered from room 27 in the fill between the surface and floor 1. Maximum diameters of the lower shanks range between 20.5 mm and 8.2 mm. The specimens are of variable lengths, but all have been broken off just above the first node. The longest measures 12 cm in length. All of the specimens bear evidence for well-developed permanent root systems in the form of two to three ranks of adventitious roots. The most robust specimen in the sample bears a round scar 8.5 mm in diameter at the first internode that indicates the site of a tiller. A much smaller tiller scar (3.5 mm in diameter) is present at the first internode of another culm.

Juglans

Over 2,225 whole or partial walnuts (Juglans major) are present in the Gila Cliff Dwellings plant remains. A complete fruit was also recovered. This material represents a number of separate proveniences. None of the nuts shows evidence of carbonization, and the majority have rodent teeth marks. Although walnuts could undoubtedly provide a nutritious food resource for humans, the evidence reveals it is equally likely they were carried into the site by rodents. Juglans wood was noted by Kukachka (1963) as present in room 29.

Leguminosae

Although the bean remains from Gila Cliff Dwellings form a modest part of the site's plant use record, they are most interesting. Besides two unknown wild legumes represented by two seeds, the remainder of the 61 items belong to the genus Phaseolus. Three species are represented: P. vulgaris, the common bean; P. acutifolius var. latifolius, the domestic tepary bean; and P. metcalfei, a wild native species.

Thirty-seven common beans and three common bean-type seed pods were recovered from several rooms of the cave complex (Table A.2). One additional cotyledon that is missing its seed coat is also probably P. vulgaris. The unburned seeds are in varying states of preservation; several have been badly damaged by insects, some are broken or missing.
pieces of the seed coat, while others look relatively fresh and new. The best selection of the seeds (32 individuals) was found in room 27 in cave 5, in the fill between the surface and floor 1. From this number, 27 undamaged beans were chosen for description.

Examination of the seeds revealed that several varieties were being grown by the site occupants. The beans were sorted by color, shape and size into classes that appeared to reflect these varieties, and were then measured. The means for these measurements are given in Table A.4, along with a brief description of each type following the format used by Kaplan (1956:208-211).

At least five varieties of common beans appear to be present. It is possible that PV3, PV4, PV5 and PV6 may be variants of the same bean type, for several of the characters overlap. There may also be another variety present in the beans not included in the table due to their damaged state; three are large, plump and reddish-brown in color. However, because the colors of beans fade with time, it is difficult to assess their relationship with the other beans.

Perhaps the most interesting beans in the sample are the vaquita or Jacob's cattle beans, Kaplan's type CI4 (1956:209). Striking due to their red or tan mottling on a cream field, these beans have been found archeologically in Anasazi sites in Arizona and ethnographically among the Hopi, Zuni, Navaho and Rio Grande pueblos (Kaplan 1956:216). As recently as 1984, the red and white form was found for sale in a supermarket in Cortez, Colorado, under the name "Anasazi beans" (Mahina Drees 1985:personal communication). Although the Gila Cliff Dwellings specimens have darkened, they appear to be of the red and white variant.

Three fragmentary pods of the P. vulgaris-type were also found. Two of the dingy tan to brownish-yellow papery pods are distal fragments that bear pronounced, curved terminal beaks, while the other appears to be a proximal section that is missing the pedicel. All bear well-defined "strings" along the margins. The two most complete specimens have maximum widths of 9.5 mm and 10.1 mm. All three are badly damaged, being split, cracked and crushed. The degree of damage suggests that the dried pods may have been beaten with a stick to free the beans, a widely used aboriginal threshing technique.
Table A.4
SAMPLE OF BEAN VARIETIES FROM THE INTERIOR OF ROOM 27, CAVE 5, GILA CLIFF DWELLINGS

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>SAMPLE SIZE</th>
<th>LENGTH (cm)</th>
<th>WIDTH (cm)</th>
<th>THICKNESS (cm)</th>
<th>HILUM LENGTH (cm)</th>
<th>FORM</th>
<th>ANTERIOR END</th>
<th>POSTERIOR END</th>
<th>GLOSS</th>
<th>GROUND COLOR</th>
<th>COLOR PATTERN</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV 1</td>
<td>2</td>
<td>1.38</td>
<td>0.73</td>
<td>0.60</td>
<td>0.26</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>++</td>
<td>Tan</td>
<td>Dark red/brown mottle</td>
<td>Jacob's cattle bean</td>
</tr>
<tr>
<td>PV 2</td>
<td>5</td>
<td>1.14</td>
<td>0.69</td>
<td>0.51</td>
<td>0.19</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>++</td>
<td>White</td>
<td>Self</td>
<td></td>
</tr>
<tr>
<td>PV 3</td>
<td>5</td>
<td>1.37</td>
<td>0.70</td>
<td>0.43</td>
<td>0.23</td>
<td>SR</td>
<td>R</td>
<td>R</td>
<td>++</td>
<td>Dark brown</td>
<td>Dark purple longitudinal stripes</td>
<td></td>
</tr>
<tr>
<td>PV 4</td>
<td>2</td>
<td>1.19</td>
<td>0.74</td>
<td>0.44</td>
<td>0.25</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>++</td>
<td>Dark purple brown</td>
<td>Dark purple longitudinal stripes</td>
<td></td>
</tr>
<tr>
<td>PV 5</td>
<td>3</td>
<td>1.16</td>
<td>0.73</td>
<td>0.48</td>
<td>0.23</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>+++</td>
<td>Dark red/brown</td>
<td>Dark purple flecks</td>
<td></td>
</tr>
<tr>
<td>PV 6</td>
<td>7</td>
<td>1.29</td>
<td>0.79</td>
<td>0.48</td>
<td>0.23</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>++</td>
<td>Dark red/brown</td>
<td>Self</td>
<td></td>
</tr>
<tr>
<td>PV 7</td>
<td>1</td>
<td>1.38</td>
<td>0.82</td>
<td>0.68</td>
<td>0.22</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>++</td>
<td>Yellow/brown</td>
<td>Self</td>
<td>Yellow eye ring present</td>
</tr>
<tr>
<td>PA 1</td>
<td>1</td>
<td>0.95</td>
<td>0.70</td>
<td>0.40</td>
<td>0.12</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>+</td>
<td>Yellow/brown</td>
<td>Self</td>
<td></td>
</tr>
<tr>
<td>PA 2</td>
<td>1</td>
<td>1.00</td>
<td>0.63</td>
<td>0.45</td>
<td>0.13</td>
<td>E</td>
<td>R</td>
<td>R</td>
<td>++</td>
<td>Red/brown</td>
<td>Self</td>
<td></td>
</tr>
</tbody>
</table>

KEY:
PV = Phaseolus vulgaris  
PA = Phaseolus acutifolius var. latifolius  
E = Entire  
R = Round  
SR = Sub-reniform  
+ = Dull seed coat  
++ = Moderately glossy seed coat  
+++ = Highly glossy seed coat

All measurements are averages.
Included in the bean sample from room 27 are two beans that are considered to be domesticated tepary beans, although one is not a typical form and is therefore placed in the species with some uncertainty. Both are small and possess very small hila, but PA2 has an uncharacteristically glossy seed coat and an unusual dark red-brown color that is not usually included among the shades of brown, tan and white commonly seen. It does compare favorably with some of the Sonoran white teparies in terms of shape and dimensions.

The history of domesticated beans appears to begin in Mexico, where domesticated species begin to show up in the archeological record at least 8,000 years ago. Tepary beans found in the Tehuacan Valley date to 5000 years B.P. (Nabhan and Feiger 1978:8). However, there appears to have been a lag time between these early appearances and the arrival of beans in the Southwest. Common beans first appear in the Mogollon area, where beans from the pre-Pottery levels at Tularosa Cave indicate that they were being cultivated by 300 B.C. (Kaplan 1956:218). Data from Snaketown suggest that common beans may have been grown by the Hohokam by the Estrella phase (A.D. 1-200) (Bohrer 1970:425). Teparies appear by A.D. 500 (Ford 1981:18). These beans achieved a wide southwestern distribution (Ford 1981:16) among both prehistoric and historic peoples (Kaplan 1956:216; Nabhan and Feiger 1978:13; Ford 1981:18), becoming major dietary staples.

An unexpected surprise was the discovery of 11 seeds of the wild bean, P. metcalfii, in the assemblage. All of the seeds were found in room 27, in the level between the surface and floor. The large, dark brown seeds are circular to obovate in outline and have a plump, biconvex cross section. Surfaces range from smooth to lightly wrinkled and display a slight gloss. The hilum rests in a depression or notch in the edge. A caruncle is present. Average dimensions for the sample are 9.6 mm in length, 9.0 mm in width, and 6.0 mm in thickness. These seeds compare well with specimens in the University of Arizona herbarium and samples in the collections of the Tucson-based Native Seeds/SEARCH, an organization dedicated to the preservation of native crop plants and their wild relatives.

Four leguminous pods from the same provenience are considered to be P. metcalfii-type. The rigid pods range in color from brown to straw
yellow and have thickened, fibrous rims along both margins. The two pods that are complete bear short, well-developed sharp beaks. Three of the specimens are twisted from dehiscence, while the last indehiscent specimen has had its two seeds removed through the side walls. The other complete pod appears to have contained a single seed. Dimensions of the largest intact pod are 5.3 cm in length and 1.75 cm in width. The identification of the pods was made by Dr. Gary Nabhan, an ethnobotanist at the University of Arizona who is a specialist in native crops and useful wild plants. Comparison with vouchered pod specimens should confirm this.

Both the roots and seeds of *P. metcalfei* have been used ethnographically. Known as cocoimeca, the red roots are used in northern Mexico for medicine, as a fermenting agent and for the manufacture of glue. The beans and pods, or frijoles, have been gathered for food by both Mexican Indians and by Apache groups in Arizona and New Mexico (Nabhan, Berry, and Weber 1980:76-80). The archeological record sheds surprisingly little light on the plant's use among prehistoric populations, for the beans have been reported from just one site in the Southwest. Excavations at the Tanque Verde phase Hohokam Fortified Hill site near Gila Bend, Arizona, produced three cremations that contained "less than a handful each" of possible *P. metcalfei* beans (Cutler and Blake 1975:269). The seeds cannot be located presently to absolutely verify their identities.

It is interesting that the only other known archeological specimens of the bean come from a site that is located at some distance (as much as 125 km or 78 miles) from the nearest known modern population (Nabhan and others 1980:78). Such is not the case with the sample. The site is located in the midst of the preferred environment for the plant, which includes steep, rocky slopes among juniper, pine and oak or chaparral (Nabhan and others 1980:73). The vicinity around the site has been a productive collecting locale (Nabhan and others 1980:70), with recent collections made at Gila Hot Springs approximately 18 miles to the southeast, and at the very entrance to the monument itself (Nabhan and others 1980:70-82; Nabhan 1985:personal communication). The beans were probably readily available to the prehistoric residents of the shelters in late summer and early fall. However, despite the good
archaeological context in which the seeds were found, it is wise to be cautious in assuming that these beans are the products of cultural activity. It is possible that they could have been introduced and cached by rodents, who are eager gatherers of the seeds (Nabhan and others 1980:76). It will take the verdict of a radiocarbon date to resolve whether the Gila Cliff Dwellings can securely claim to be the second archaeological site to yield P. metcalfei.

Time did not permit the identification of the last two legumes from the site. One is a small seed with diagonally parallel truncated ends and a rounded square cross section. Measuring 3 mm in length and 4 mm in width, it is a deep brown color with black flecks. The second seed is larger, measuring 5.5 mm in length and 8.5 mm in width. It is a reddish-brown color. One end is diagonally truncated while the other is round. It bears some resemblance to a tepary in overall morphology, but lacks a caruncle in the hilum area and is encircled by a conspicuous rim. Both seeds are in excellent condition and could probably be identified with adequate time and a good comparative seed collection.

Gossypium hirsutum

One small mass of unmodified cotton fibers was found in room 27 of cave 5. Intermixed with the fibers are pine needle fragments and two small bits of cordage made of other unknown fibers. The fine, soft single seed hairs range in color from gray to brown. Under microscopic examination they possess the twisted, collapsed conformation characteristic of mature cotton. Staple length consistently measures around 2.5 cm.

Two species of Precolombian North American cotton have been identified: Gossypium hirsutum, or upland cotton, and G. barbadense, also known as Sea Island cotton. The latter species, probably of tropical South American origin, was grown in the southeastern United States after having been introduced into South Carolina and Georgia. It is characterized by seed hairs or lint that can reach 5 cm in length. Gossypium hirsutum, the cotton species grown in the prehistoric Southwest, is felt to have a Central American origin. The lint of this species tends to be about 2.5 cm in length (Baker 1970:59). Comparison
of the fibers with modern specimens of both species in Huckell's collection suggests that the fibers belong to *G. hirsutum* var. *punctatum* (Schumacher) J. B. Hutch.

Cotton fibers were found at Tularosa Cave, where Cutler (1952:495) observed that the amount of fibers found was modest compared to the quantities of products manufactured from several other wild plant fibers. However, at Gila Cliff Dwellings, cotton appears to be a more commonly available commodity (see Anderson, this volume).

The absence of seeds and plant parts from both sites may indicate that the cotton was either grown elsewhere or was a trade commodity. Several seeds mixed in with corn grains were discovered at Higgins Flat Pueblo, another Mogollon site in New Mexico (Cutler 1956:181).

Cotton was initially produced by the Hohokam, possibly as early as A.D. 500. It appears to have been widely traded for centuries to the Mogollon and Anasazi until cultivation of the crop was finally undertaken in those areas. It was grown in the Mimbres area after A.D. 1100 (Ford 1981:18).

**Proboscidea sp.**

Devil's claw derives its colorful name from the morphology of its fruit capsule after dehiscence. The cylindrical woody capsule terminates in a long, slender hooked beak that splits and curls apart as it dries, creating a unique and distinctive appearance. A single uncarbonized fragment of one of these capsules was found in room 4 of cave 2. It consists of one of the two "claws" or split beak members that has been broken away at its point of attachment to the capsule. It is 16 cm long and 8 mm wide at the base.

The ethnographic literature contains many references to the use of the capsule during various stages of maturity. The very young fruit may be eaten, while the exterior portion of the hooked beak on the mature pod is peeled and used to produce a black basketry element by the Pima (Curtin 1984:107-108). Among the Tewa and Zuni, the mature pods are used as frameworks for the construction of flower models that are incorporated into ceremonial costumes (Robbins, Harrington, and Freire-Marreco 1916:57; Stevenson 1915:46).
The archeological record substantiates the use of devil's claw capsules as a food or masticatory. Cutler (1952:471) mentions that among the fiber quids and wads found at Cordova Cave, the chewed fibrous remains of devil's claw were found. Familiarity with the plant suggests that young pods were suitable for chewing, which, if true, precludes the mature Gila Cliff Dwellings pod fragment from consideration for this purpose. However, the absence of the capsule proper and Cutler's mention of the fibrous wads remaining may indicate that capsules were chosen when older and tougher to chew, but also when the contained seeds were tender and sweet. The single specimen may also have been saved for basketry or reflect ceremonial preparations. However, there is no evidence to indicate that this specimen is conclusively linked to the aboriginal occupation, and the possibility of the plant's introduction after abandonment must be considered as equally viable.

**Mirabilis**

Tuberculate, 5-ribbed fruits of *Mirabilis longiflora*-type were recovered from room 27 and room 31. A total of three specimens is represented, and none is complete. All are uncarbonized. They are more or less oval in shape, with a small triangular apex, and a base that is truncated and flat with a slightly enlarged collar encircling it. The vertical ribs are interspersed with small transverse ridges and bumps in between. A comparison to modern specimens of *M. longiflora* reveals a very close match. There is no evidence suggesting this material derives from human activity.

**Prunus**

Two species of choke-cherry (*Prunus*) drupes were found by excavators in room 27 deposits above floor 1, and in two other locations. None of the items is carbonized. Nearly all the specimens are smooth-coated drupes with a lateral crease that begins at the hilum and extends the full length on one side suggesting the species *Prunus virginiana*. Rodent teeth marks are present on some specimens. A single globose drupe with a distinctly rugulose coat, a beaked hilum area, and
without an obvious lateral crease has been labeled *Prunus serotina*-type. The evidence of rodent gnawing may reflect nonhuman carriers for all the choke-cherry remains.

**Datura meteloides**

Cave 5 produced the only representatives of this genus. Six seeds were found in the fill of room 31, all of which are uncarbonized and in excellent condition. The flat, C-shaped seeds are brown in color, have a finely reticulate surface, and bear a well-defined rim around the edge. The largest of the seeds measures 5.3 mm in length and 4.5 mm in width. Comparison with *D. meteloides* seeds in Huckell's collection produced an identical match. However, because seeds from all species potentially occurring in the Gila Cliff Dwellings area were not available for examination, these seeds will be considered *D. meteloides*-type.

*Datura meteloides* (jimson weed) grows in the vicinity of the ruins today and, as a plant that prefers disturbed soil, may well have been readily available around the shelters during their occupation. The use of the alkaloid-rich jimson weed as a ritual hallucinogenic and medicine among many historic aboriginal groups is well-known. In the case of *D. meteloides*, the roots, leaves, and seeds have all been employed medicinally (Whiting 1966:89; Kearney and Peebles 1960:760).

Archeological evidence suggesting the possibility of similar uses by the Mogollon comes from Higgins Flat Pueblo, a Tularosa phase settlement located along the upper San Francisco River (Martin and others 1956). Roughly 900 seeds of *D. meteloides* were found on floor 2 of room E, a room Cutler (1956:182-183) notes contained ceremonial objects. Unfortunately, the context of the seeds at Gila Cliff Dwellings is less secure. The small number of seeds and the possibilities for disturbance and deposition by postoccupational human and animal visitors make it difficult to interpret the seeds' true significance.
Unknown Seeds

Two unknown seed taxa were found among the Gila Cliff Dwellings plant remains. The first is represented by two uncarbonized seeds from different proveniences within cave 5. One comes from the fill of room 31, while the second comes from a refuse layer between floors 1 and 2 of room 27. The smooth, tan-colored seeds are irregularly obovate in outline with a biconvex cross section. A thin ridge forms on both edges about halfway down and continues on to the hilum. The dimensions range from 5 mm to 6.5 mm in length, 4 mm to 5 mm in width, and 2 mm to 3.5 mm in thickness.

The second unknown seed came from cave 5, room 27, interior. It is a single globose seed 5 mm in diameter that has no distinguishing characteristics on its surface. The seed coat is approximately 1 mm thick.

Epidermis

Nine pieces of plant epidermis were found in the assemblage, all of which were recovered from cave 4. Only one of the specimens has a more specific provenience, having been found in level 2 of room 40. The specimens consist of paper thin, smooth sheets of epidermis that exhibit in-rolled margins. No ribs, furrows, or areoles are evident. Colors range from pale yellow to a dirty yellow-brown. The pieces are irregularly square to rectangular in shape, reaching a maximum length of 9.5 cm and width of 3.1 cm.

Five of the fragments were selected for comparison with epidermis from modern plant species in an attempt to identify the genera present. Temporary water mounts were made from small cuttings of the archeological specimens, and examined under a compound microscope for diagnostic stomate and cell patterns. Comparisons were then made with Scanning Electron Microscope photographs of modern epidermis (Platyopuntia, Carnegeia, Yucca, Nolina, Dasylirion, Agave) taken by Adams and permanent prepared slides of epidermal peels (Yucca, Nolina, Dasylirion, Agave) made by Huckell.
All of the Gila Cliff Dwellings specimens exhibit the same basic morphology. In all but one case, the stomates are large and conspicuous, often occurring in somewhat irregular rows where they are aligned side by side, separated by one to a few cells. The exception is a specimen that is difficult to examine because of the dirt and stains adhering to the surface. It appears to have smaller stomates that are present in lower numbers than in the other specimens. All of the stomates seen in the specimens appear to be paracytic; each of the two bean-shaped guard cells is enclosed by a single subsidiary cell shaped roughly like an elongated hexagon. The stomatal aperture appears to be protected by a pair of opposed flattened papillae that arch over the opening.

Of the modern comparative materials examined, the closest matches are found in Agave and Yucca. Slides of A. parryi and A. schotti show the presence of an opposed pair of papillae and large five- to six-sided elongated subsidiary cells. Slides of Y. brevifolia, Y. schidigera, Y. baccata, and Y. schotti also show papillae to be present, although the last two are the only ones to have an opposed pair rather than multiple papillae. All of them have distinctive elongate hexagonal subsidiary cells as well. Time constraints precluded a literature search and gathering of measurements needed to achieve a more specific identification; in light of these comparisons, the prehistoric specimens are considered to be Agave/Yucca.

The intended function of such pieces of epidermis is unknown. Ethnohistorically, when the leaves of both genera are used in the production of fibers, soap, brushes, and textiles, they are generally cut, pounded, or split without the removal of the epidermis.

Quids

Room 40, level 1, produced a number of uncarbonized vegetal fiber quids. These items range in diameter from 1 cm to 3 cm and are generally flat in cross section. While none of them reveals evidence of teeth marks, generally considered distinctive of quids, they are similar in size, shape, and modified appearance to quids described by other
researchers (Zauderer 1975; Reed 1978). Actual identification of the fibers was not attempted.

These quids from the Gila Cliff Dwellings are basically of two types. Thirteen quids have cleaned fibers that are loosely arranged with their fibers in parallel fashion. They appear folded and/or twisted and compare well in morphology to the Type 1 yucca quid of Reed (1978:12). The parallel nature of the fibers suggests these derive from some monocot such as Yucca or Agave. Six additional quids are unlike those just described in that they appear to be of wadded up fibers of varying size, not arranged in parallel fashion. Extensive chewing could account for a quid whose fibers are not aligned in any way, as could the use of dicotyledonous plants that have nonparallel venation. In addition to the material described above, quids are also represented in room 27, and a Tularosa fillet rim bowl from room 1 held over 100 well-preserved quids that appear to represent a variety of styles and materials.

Quids are formed when people chew the leaves of a plant for food value, or in preparation of fibers for weaving or cord-making (Reed 1978:1). Possibly both objectives are responsible for the quids described above.

Miscellaneous

Included in the materials submitted for study were various items that were not analyzed due to project time constraints. For example, unworked wood fragments and fibers, primarily in the form of short cordage segments, were not dealt with. They were given general inventory numbers so that their quantity and location could be readily ascertained by interested future students of the assemblage.

Several masses of plant materials that bore suspicious resemblances to rodent nests remain unsorted. A quick visual inspection indicated that most of the taxa involved had already been identified elsewhere, with the exception of a Bouteloua gracilis (H.B.K.) Lag.-type inflorescence in one bag. Various leaves and twigs with no demonstrable cultural affiliation were also left for future study.
A single remnant of a nonflowering plant was found in room 27 of cave 5. It is the pileus or cap of a mushroom belonging to the division Basidiomycophyta. Intact gills are present on the interior surface. No attempt was made to determine the genus and species.

Various insect cocoons were also present, and may offer some potential for identification by entomologists interested in the local insect fauna.

The last inclusion in this miscellaneous category is coprolites. Specimens of fecal material were recovered from the area outside of room 27 in cave 5, while several were removed from room 1 in cave 2. They appear to have a good chance of being human in origin; if so, they represent a potentially valuable source of information on diet, nutrition, and disease among the cave inhabitants, if indeed they are prehistoric.

Wood

Worked and unmodified wood items constitute an important component of the plant assemblage recovered from the Gila Cliff Dwellings. Unfortunately, time constraints have necessitated the exclusion of wood identification from this study. However, an analysis of some woods from the site was carried out in 1963 by Dr. B. Francis Kukachka of the U.S. Department of Agriculture Forest Products Laboratory in Madison, Wisconsin, at the request of Gordon Vivian. Correspondence suggests that these specimens were unmodified wood samples. Efforts to confirm this were unsuccessful, as the present location of this material is unknown. In the interests of making existing data available, Dr. Kukachka's wood identifications are presented below as Table A.5.

Summary

Many of the plant remains in the Gila Cliff Dwellings represent human activity, although not all do. It is likely that humans carried in many of the items recovered by excavators; rodents either carried in some or perhaps took advantage of resources brought in by people and stored in rodent-accessible places. Evidence to sort the likelihood of
### Table A.5

Wood samples from Vivian's excavations at Gila Cliff Dwellings identified by Dr. B. Francis Eiriachna, U.S. Department of Agriculture Forest Products Laboratory, Madison, Wisconsin.

| SCIENTIFIC NAMES | CAVE 2 ROOM 1 | CAVE 2 ROOM 2 | CAVE 2 ROOM 3 | CAVE 2 ROOM 4 | CAVE 2 ROOM 5 | CAVE 2 ROOM 6 | CAVE 3 ROOM 3 | CAVE 3 ROOM 4 | CAVE 3 ROOM 5 | CAVE 3 ROOM 6 | CAVE 3 ROOM 7 | CAVE 3 ROOM 8 | CAVE 3 ROOM 9 | CAVE 3 TRENCH 1 | CAVE 3 TRENCH 2 | CAVE 3 TRENCH 3 | CAVE 3 TRENCH 4 | CAVE 4 ROOM 3 | CAVE 4 ROOM 4 | CAVE 4 ROOM 5 | CAVE 4 ROOM 6 | CAVE 4 ROOM 7 | CAVE 4 ROOM 8 | CAVE 4 TRENCH 1 | CAVE 4 TRENCH 2 | CAVE 4 TRENCH 3 | CAVE 5 ROOM 3 | CAVE 5 ROOM 4 | CAVE 5 ROOM 5 | CAVE 5 TRENCH 1 | CAVE 5 TRENCH 2 | CAVE 5 TRENCH 3 | TOTAL | TRAIL |
|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Stips sp.        |               |               |               |               |               |               | 1             |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 1              | 9              |
| Corokia sp.      |               |               |               |               |               |               | 1             |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 2              |
| Populus sp.      |               |               |               |               |               |               | 1             |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 1              |
| Sphacelaria sp.  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 0              |
| Salix sp.        |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | 2              |
| Total            | 5             | 1             | 2             | 4             | 2             | 1             | 1             | 1             | 2             | 1             | 1             | 3             | 4             | 6             | 1             | 1             | 1             | 4             | 4             | 4             | 2             | 2             | 1             | 1             | 1             | 1             | 1             | 1             | 1             | 1             | 1             | 1             | 1             | 1             | 1             | 17             |

* - Trail between rooms 22, 23, 24, 25, and 27.
human transport from animal transport comes in more than one form. Direct evidence for human use occurs as cut ends of grasses or leaves, charred parts, and twisted fibers. Indirect evidence for human use may be reflected in an immature pinyon cone or a ball of pine pitch unlikely to hold appeal for an animal, or in a section of prickly pear stem with two pads attached that might be unwieldy for all but larger carriers.

Wild plant remains that likely represent human use or interaction include a number of taxa. Various Agave/Yucca leaf segments displayed cut ends, a square knot, and a single strip 12 cm long that had been sliced off a larger leaf in a 3 mm wide strip. A number of quids seem to be of plants with parallel fibers, perhaps either Agave or Yucca. None of the Agave/Yucca-type seeds had rodent teeth marks, and at least one revealed evidence of charring. In sum, it seems the sturdy leaves of these plants served material culture needs; it is difficult to say if the seeds provided a food resource.

The many reedgrass (Phragmites) stems were probably carried into the dwellings from some nearby riparian location; a spring-fed stream is present just below the site. Many burned stem ends, and at least one likely cut end on these sturdy stems suggests they were being fashioned to certain lengths. Some reedgrass was harvested in the summer during the time when both unripe and ripe seeds were available on the plant. The single inflorescence displaying evidence of parching hints of the historic practice of holding a grass near a fire to loosen tightly enclosed seeds for food. The presence of other grasses such as muhly (Muhlenbergia) and dropseed (Sporobolus) with inflorescence parts may represent food resources. The Indian rice grass (Oryzopsis) stems without flowering parts imply a nearby stand; many historic groups are known to have used this grass for food.

The conifer (Gymnosperm) evidence is varied in both taxa and parts represented. Eight specimens of conifer pitch, one still attached to a stem segment, could have served various household or medicinal needs. A pinyon (Pinus edulis) cone with seeds still inside and singed scales is suggestive of a nearly mature cone harvest, or use of cones as fire tinder. Pinyon wood seems to have been carried into the site. Rodent gnaw marks on many seeds and lack of carbonization or parching evidence may mean rodents were responsible for some of the nut remains. The
partially charred bark of a ponderosa pine tree (Pinus ponderosa) could have provided hearth tinder.

The juniper (Juniperus) remains are also varied. The faceted seeds fall within the size range of J. osteosperma, as does an uncarbonized fruit. Two additional fruits may have been burned. Many of the seeds have rodent teeth marks, requiring that caution be used in assigning only human transport as an explanation for these parts. The presence of a mass of shredded juniper bark implies a rather nearby resource. If that were the case one might expect some examples of juniper wood to also have shown up in the dwellings (see Table A.5), yet none did. Collecting and sampling bias may be acting in this case.

Cactus, especially prickly pear, may well have been a prehistoric food source. The presence of pad/stem fragments, some partially charred with spines only present as nubbins, may reflect spine removal in preparation of a food. The small size of two pads implies a spring harvest of a vegetable resource. The ripe fruit may also have been carried in, as a number of mature seeds were found, which were free of rodent gnaw marks.

A large number of quids represents variety in plants being chewed. Some appear to have been of parallel-fibered species such as Agave or Yucca, while others were from reticulate-veined plants. The fibers in some quids were aligned carefully, and could perhaps be used in preparation of household items, while other quids were masses of unaligned fibers possibly representing plant materials chewed for their food content and then discarded.

A number of wild plant remains in the Gila Cliff Dwellings could represent rodent activity as likely as human use. Even though walnuts (Juglans), acorns (Quercus), sunflower seeds (Helianthus), and choke-cherries (Prunus) could easily serve as human foods, the evidence that they did so is not present. Pervasive rodent gnaw marks and lack of any signs of carbonization give no support for human use of these plants. A Yucca-type pod fragment with encrusted soil may have been incorporated into a packrat nest. A packrat may also be responsible for introducing the devil's claw pod fragment into the site, although it could just as easily have been brought in by larger animals or hikers. Likewise, other natural mechanisms such as wind or simply nearby live
plants might account for such parts as the rare broken anthocarp fragments of *Mirabilis longiflora* and the nutlets of *Lithospermum*-type.

Fruits or items that cling to a plant during a long maturing period, or for a time after the part is ripe, are of little help in determining the season of harvest. Such items from the Gila Cliff Dwellings include an *Agave/Yucca* pod, *Opuntia* fruit/seeds and *Juniperus* fruit/seeds which can cling for months after maturing, and the extremely immature *Pinus edulis* cone which could represent any period within a number of months of maturation. On the other hand, fruit that remains on a plant only for a rather short period of time, or vegetative parts that rapidly mature, can sometimes assist in establishing a period of harvest. The young *Opuntia* pads suggest a late spring or early summer period of availability, while the immature florets and mature caryopses of *Phragmites* are likely only available in summer months before dispersing from the plant. The *Pinus edulis* cone with mature seeds still inside may represent a nearly ripe cone picked in the fall just prior to the period of cone maturity.

Unlike the case of wild plants, there is no doubt regarding the cultural association of domesticated plants in the Gila Cliff Dwellings, for few of these species can survive apart from human care. The great importance of domesticated plants to the ancient cliff dwelling occupants is evident from both the diversity of crop plants found in the archeobotanical record and the sheer volume of plant remains left behind. Their highly developed agricultural tradition is reflected in the inventory of plants present that includes three squash species (*Cucurbita pepo*, *C. mixta*, and *C. moschata*), bottle gourd, several types of common beans, tepary beans, several varieties of maize, and cotton.

It is difficult to assess whether or not all of these crops were grown locally. In the case of maize, the presence of leaves, culms, roots, and tassels strongly suggest local production. The quantity of cucurbit seeds, rind fragments, and peduncles also suggest that squashes were grown in the area, although the single peduncle and seed fragment of *C. mixta*-type could indicate that this squash may have been transported in from elsewhere. The characteristic absence of peduncles and seeds of the bottle gourd also implies the gourds were being grown and/or processed elsewhere and carried to the shelter as finished
containers. The discovery of pods along with the common bean seeds hints at a local origin. Although unspun cotton fibers were recovered, the absence of seeds, bolls, and other vegetative parts would indicate that the cotton was probably grown elsewhere, and that the fibers or completed textiles were traded or carried into the area.

A complication that arises in evaluating the Gila Cliff Dwellings plant assemblage is that ceramic period Mogollon farmers were not the only occupants of the shelter complex. An Archaic component has been identified at the site, which indicates that these nomadic hunters and gatherers were drawn to the area by the rich diversity of resources it offered. In addition to shelter, water, game, and fish, the types and quantities of wild plant foods and materials available undoubtedly acted as strong inducements to keep the people in the area. However, these same nuts, seeds, fruits, berries, and leaves were also employed by the subsequent site inhabitants hundreds of years later.

The excellent preservation conditions at the site are responsible for the survival of perishable Archaic artifacts such as a wooden atlatl fragment. It is possible that some of the wild plant food remains could date back to the Archaic occupation as well. However, none of the materials were recovered from recognized Archaic contexts; such contexts may have been very nearly or completely destroyed by the later large-scale ceramic period occupation. In the absence of good cultural associations, there is no efficient method short of radiocarbon dating that could determine temporal distinctions. The same is true for the cultigens maize and pumpkin (C. pepo) that were known to have been grown by Late Archaic inhabitants of the Southwest (Ford 1981).

What the Gila Cliff Dwellings site plant assemblage reveals is a well-developed agricultural system maintained by competent farmers. In all likelihood, the site residents capitalized on the diverse array of wild plant food available to supplement their dietary staples, although clear evidence for this is sparse. The cultivated plant assemblage compares well with those from other Mogollon sites (Cutler 1952, 1956), particularly in the later San Francisco and Tularosa phases, which supports the assignment, through other lines of evidence, of the ceramic occupation of the site to the Tularosa phase.
Acknowledgements

This project has benefitted substantially from the aid and expertise graciously given by several people. Dr. John R. Reeder and Charlotte G. Reeder assisted with the identification of some of the grass specimens. Dr. Willard Van Asdall, Curator of Ethnobotany at the Arizona State Museum, made available the cultivated plant comparative collection under his care. Dr. Paul Bartels, Department of Plant Sciences at the University of Arizona, provided microscopes, laboratory space and supplies for the work with the unknown epidermal material. Dr. Gary Nabhan, University of Arizona Department of Arid Lands, aided in the identification of some of the bean remains. Mahina Drees (1985), Meals for Millions Foundation and Native Seeds/SEARCH of Tucson, shared her knowledge of northern Mexican cultures and provided access to the seed stocks she maintains, which yielded much comparative data on beans. Leonard Blake, Department of Anthropology at Washington University in St. Louis, took the time to search through files and records with the hope of finding a report or other documents relating to an analysis of Gila Cliff Dwellings plant remains by Missouri Botanical Garden personnel. Our thanks to you all.
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