Supplement B:
Recommended Field Documentation of Communications System Material Culture and Notes on Interpretation

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WIRES

Attribute	Notes on Interpretation	Recommended Field Documentation
Material	• All lines were iron before the invention of Hard Drawn Copper Wire in 1877 (CDA 2020) • Use of copper wire in Colorado increased in the 1890s (Rhodes 1929:91) • Copper was better, but iron was cheaper, and may have been used as a cost cutting measure.	Take detailed photographs of any wire associated with a communication system. Copper wire will be reddish gold with green tarnish, whereas iron wire will be gray with rust-colored oxidation.
Wire Organization	• Equidistant pairs with larger spaces between pairs may indicate the presence of a metallic circuit telephone line. • Both early telephone and telegraph lines used a grounded circuit, which required one wire (CDA 2020) • 1879: Alexander Graham Bell patented the metallic (2 wire) circuit, which eliminated interference and crosstalk for telephones. (Bell 1979). • 1893: Metallic circuit usage begins in Colorado (Vaille 1916:63). • Two-wire telephone lines were more expensive to produce and did not replace single wire lines. • Many rural/farmer telephone lines continued to use single wire lines (DCL, BC 1902:6)	Measure the distance between neighboring wires if the line remains intact, or the distance between insulators or pins.

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Cables	• It is likely that telephone cables contained more individual conductors (wires) than telegraph lines. • Telephone cables may contain up to 75 conductors (wires) (WEC 1882:15) • Telegraph cables may contain between 1 and 20 conductors (wires) (WEC 1882:15). • Telephone cables may also contain wires arranged in twisted pairs, another way of implementing Bell's metallic telephone circuit (Bell 1881:2).	Interpretation with this method requires a cross sectional view of a cable. Unless a cross section is already visible, this method should be avoided, as it inherently destructive. If no other interpretation methods prove viable, and differentiation is crucial, a cable may be cut. Before cutting, ensure that the line is not actively conducting electricity. Once a cross-section is visible, photograph it extensively and count the number of conductors. Note whether the wires are individually packaged or organized into twisted pairs.
Wire Gauge	• Wire Gauge can be used to interpret a line's intended length • Short telephone lines used No.12 American Wire Gauge (DCL, BC 1902:41). • Long distance toll lines used No. 6 or No. 8 American Wire Gauge (DCL, BC 1902:41).	If wire is available, measure its gauge (thickness) using a high accuracy set of digital calipers. Measure in multiple locations along the same wire. If variations occur, take the mean of all measurements. Compare the collected measurements to Table 1.

INSULATORS

Attribute	Notes on Interpretation	Recommended Field Documentation
Threading	• Insulator threads were first patented in 1865 (Cauvet 1865; Milholland and Milholland 1973:1; Miller et al. 2005:15). • 1870s insulator threads further popularized by the invention of insulator presses (Brooks 1870; Brookfield 1871; Hemingray 1871) • Non-threaded insulators more likely associated with telegraph systems (threading was invented several) years before Colorado's first telephone (Vaille 1916:2).	As insulators are translucent, internal threading should be visible without removal from the pin. If no wire is attached, an insulator can be photographed and measured. If the insulator is difficult to remove, it should be left in place to prevent damage, and photographs and measurements should be taken in situ.

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Drip Points	• Drip points, or teats, are ridges or points located around the circumference of the bottom of the insulator's skirt. These were first patented in 1893 (Hemingray 1893) and can provide a *terminus post quem*.	Photos should be taken of representative insulators containing drip points.
Embossing Patterns	Hemingray (Willis 2019) • "Pat Dec. 1871" – produced between 1878 and 1877 • "H.G.CO." – produced between 1887 and 1898 • "Hemingray" – produced 1895 -1900s Valverde, Colorado Insulators (McDougald and McDougald 2013:95-100) • "R. Good Jr." on front skirt and "Petticoat" on rear skirt –produced 1887 - 1899 • "Denver COLO." Below "R. Good Jr." – Later end of the 1887-1899 period • "W.F.G.CO." over "Denver CO." – Produced 1899 – 1900 • "W.G.M. CO." – Produced between 1900 and 1910	As insulator embossing patterns can often provide an earliest possible production date, insulator photographs should document embossing patterns. Embossed patterns should also be recorded on forms and in field notebooks.
Size	• A size cutoff that differentiates telegraph and telephone insulators has yet to be observed. As size is relative to other insulators, judgements can only be made by individuals familiar with this artifact class. • Telegraph insulators may be larger than telephone insulators (Bunker, personal communication 2019; Gay, personal communication 2019; Davenport 2019, personal communication. • Lighter insulators would have been less expensive to transport into rural areas (McDougald and McDougald 2013:6). • Insulator size is directly correlated with line voltage (Johnson 2020; Bunker, personal communication 2020).	Record the dimensions on a representative insulator on a line. Weigh the insulator if not attached to the line. Unfortunately,

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Shape	• An insulator's shape can be matched with a consolidated design using an online database (NIA 2020) • Electrical insulators frequently contain a saddle groove at the top (Bunker, personal communication 2020; Gay, personal communication 2019) • Electrical insulators often contain an umbrella disk (Johnson 2020).	All insulators representative of a line should be photographed.
Material and Color	• Electrical insulators could be made of glass or porcelain (Kelley 1884:111; Keane 2008). • Telephone and telegraph insulators were typically made of glass (Kelley 1884:111; Keane 2008). • If communication lines occupied the same pole as a power line, power insulators were differently colored. Telephone and telegraph insulators were generally light blue or aqua, whereas electrical insulators were colored cobalt blue or brown (Bob Bunker, personal communication 2020).	Representative insulators encountered should be photographed. Colors and material should also be recorded on forms and in field notebooks.

POLES

Attribute	Notes on Interpretation	Recommended Field Documentation
Location	• Poles that followed railroad rights-of-way are strong indicators for the presence of a telegraph line (King 2006:138; Mahan 1975:6; DCL BC 1902:104; Bunker personal communication 2019; Gay personal communication, 2019) • Poles constructed over uneven terrain can be indicators of a telephone line (Mike Gay, personal communication 2020)	GPS points should be taken on all poles within the extent of the project for inclusion in archaeological databases. Photos may be taken of all poles for deterioration comparisons, though this action is not necessary.

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Specifications	• Poles with uniform heights, width, and levels of deterioration may be more associated with a large telephone or telegraph company. • Poles that lack uniformity and are significantly deteriorated may be associated with a rural/farmer or mutual telephone line. Significant deterioration may indicate that poles were improperly seasoned.	All poles uncovered at a site should be photographed. Pole circumferences should be obtained at breast level, or approximately 140cm from the base. Height measurements should be obtained when possible, but a high degree of accuracy is not required.

Note: See the references cited section of the main text for full bibliographic information.