OF RUPTURES AND RAPTURES: LOCATING IDEOLOGY WITH LIDAR IMAGERY

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OF RUPTURES AND RAPTURES:

LOCATING IDEOLOGY WITH LIDAR IMAGERY

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Without deviation from the norm progress is not possible.

--Frank Zappa

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ABSTRACT

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Anthropology

Of Ruptures and Raptures: Locating Ideology with LiDAR Imagery

Chairperson: Dr. Kelly Dixon

Key words: ideology, technology, landscape archaeology, LiDAR

Archaeological praxis necessarily requires at least one object (a piece of technology or something that functions as an object) to articulate and explain ideologies from the past. This is problematic because ideology is abstract and difficult to locate in the archaeological record in reified form. Archaeology’s preoccupation for over 100 years has been the systematic location, identification, and excavation of discrete artifacts; features, and sites; interpreting meanings from comparative studies and data sets; and putting the past in order all while documenting change over time. Historical archaeologist Mark P. Leone identified fences, the Plat of the ideal City of Zion, Mormon temple architecture, plan, and program, and dams on the Little Colorado River in Arizona as the technologies and objects that facilitated Mormon settlement, survival, and adaptation in the Intermontane West of North America in the 19th and early 20th centuries. In 2010, Leone revisited his life-work including a critical re-examination of his original research on Mormon fences, the Plat of the ideal City of Zion, and Mormon temples. In the interim, Leone read Philosopher Slavoj Žižek’s The Sublime Object of Ideology. Žižek defined three types of ideological objects: voids (or absences); large, unattractive objects left over or resultant from the past of which we are all aware; and an index or circulating object, one that is known to exist or have existed and requires an ideological structure to understand it, e.g. Mormonism. Žižek’s definitions and rubric have a potential to answer a research question that emerges out of Leone’s life-work: What was or is the object of Mormon ideological desire in the archaeological record (OMIDAR)? The ultimate ideological desire of 19th and early 20th century Mormonism was the creation of a New Zion. A test revealed that none of the four technologies Leone previously identified completely meets Žižek’s criteria. This dissertation undertook a critical examination of LiDAR imagery of the Mormon Row Historic District (MRHD) (48TE1444) in Grand Teton National Park (GTNP) in which a provisional Mormon irrigation pattern (MIP) was identified. Leone considered irrigation associated with dams as an important factor, but did not consider it as an ideal technological object perhaps because, unlike fences, settlements, temples, and dams, irrigation was not seen as a unary object. The MIP was searched for along the Little Colorado River in Arizona. In each of the settlements in Leone’s original study area at least one relict field containing the MIP was located. As a technology and unary object, the MIP was tested against Žižek’s criteria and it passes. It is averred that the MIP is the metaphysical and material ‘footprint’ of New Zion—an ideological void. The authorizing heritage discourse (AHD) concerning irrigation features is also challenged and a recommended revision concerning their significance and eligibility for listing on the National Register of Historic Places is offered*.

* A précis of this dissertation is included as Appendix C; it does not, however, include a full discussion of the AHD.
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Chapter I

Introduction to the Research Problem

Archaeological praxis necessarily requires at least one object (a whole or fragmentary piece of technology or something that functions as an object) to articulate and explain ideologies from the past. This is problematic because ideology is an abstract notion and difficult to locate in the archaeological record in reified form, especially without written records (Silva 2013).

Archaeology’s preoccupation for over one hundred years has been the systematic location, identification, and excavation of discrete artifacts (objects; pieces of technology); features, and sites; deciphering and interpreting meanings from comparative studies and data sets; and putting the past in order all while documenting change over time. Thus the research problem is methodological. Given the limitations, historical archaeologist and Professor of Anthropology Mark P. Leone asked, “Can archaeology adduce the origins or early stages of any ideology?” (Leone 2010:53). Neither Dr. Leone nor the author of this dissertation is a member of the Church of Jesus Christ of Latter-day Saints (LDS); as Gentiles, both know about Mormonism only from the outside and through the eyes of inter-item Mormons. All observations and interpretations by this author are subjective and are open to critique. I have done my level best to stay faithful to Leone’s understanding and interpretation of Mormonism and ecological ritual while giving Mormon ideology justice through some of the religion’s most respected historians.

An archaeological investigation seeking to locate an object of ideological desire must begin with a working definition of ideology. According to Leone by way of Louis Althusser (1971),
Ideology is a set of masks of illusions, which disguise the operations of daily, exploitative life in capitalism that serve to reproduce society intact. Such masking is achieved by using notions, or assumption, that appear to be the taken-for-granteds, or givens, of our daily lives. Such obviousnesses act through material things, like spaces, measures of time, and manifestations of individual personhood. The two key points are (1) that the givens of daily life (2) act through things. [Leone 2010:65]

Given the premises above, Leone answers his own question affirmatively:

… because … ideology’s actual history can be discovered in its tie to material variables, and because those variables are the subject matter of historical archaeology, then there exists the possibility for an important extension of materialist archaeology into historical archaeology. [Leone 2010:55]

It is equally important to remember that the ‘givens of daily life’ occur or occurred and ‘things’ are or were in places where humans interact or interacted with natural and constructed environments (Tuan 1977) or scapes (sensu Appadurai 1991). It is and was in places that material objects that have and had some role or roles in a single or multiple ideologies in the past are known or are potentially (re-)discoverable in the present. Known places can be and often are mapped using various means, methods, and symbolic representations. Professional geographer, environmental designer, and Professor Emeritus of History, Geography, and Religious Studies Richard V. Francaviglia posits that if fiction, fantasy, and film places can be cognitively mapped, then, following Thomas A. Tweed (2006), “religions themselves are maps” (Francaviglia 2015:3). Landscape archaeology using Geographic Information Systems (GIS) has the potential to map religion and or ideology if Althusser’s (1971) premises are accepted.
Gordon Willey, the purported Dean of New World Archaeology in the mid-twentieth century, grounded Americanist landscape archaeology when he defined landscape as:

The way in which man disposed himself over the landscape in which he lived. It refers to the dwelling, to their arrangement, and to the nature and disposition of other buildings pertaining to community life. These settlements reflect the natural environment, the level of technology on which the builders operated, and various institutions of social interaction and control which the culture maintained. [Willey 1953:1]

According to American archaeologist Tom Patterson,

Willey’s definition of settlement patterns was sufficiently broad that it gave archaeologists the opportunity to pursue studies concerned with both the relationships of people to their ecological settings and their social relationships with one another. It was also not wed to a particular social-theoretical standpoint (although Willey had one), but rather to the collection and analysis of empirical evidence. [Patterson 2008:78]

UK landscape archaeologist Henry Chapman (2006) found that maps tend to become more subjective as more inputs and factors are included and increasingly less scientific as a result while simultaneously providing previously unconsidered perspectives and intersections of data sets. Moreover,

A disadvantage of past and current approaches to interpretive landscape archaeology is that there is a general desire to produce testable models and theories … [and] [a]lthough repeatable and testable experiments are useful in terms of positivist theory … the fundamental reasoning of post-processual interpretation lies beyond the need for them, this criticism levelled towards such processes. [Chapman 2006:23]
Experimental anthropologist Marcos Llobera (1996, 2001, 2012) advocated for the acknowledgement that GIS is a heuristic tool for the exploration of competing interpretations in or of social theory including landscape archaeology. Landscape archaeologists can utilize aerial and satellite imagery including Light Detection and Ranging (LiDAR) imagery of landforms and landscape as units of analysis. GIS applications of other relevant data distributed across a landscape increase the scale and or number of associations available for present-day historical analysis and interpretation, i.e. landscape analysis. GIS is testable, repeatable, and positivistic if one is deliberate in how one’s research agenda and dataset (layers) are constructed.

Landscape analysis methods facilitate present-day interpretations of patterns that connect human behavior with particular times, places, and ideologies such as capitalism (Anschutz, Wilshusen, and Scheick 2001). Margaret Purser promoted the idea that, “[t]hese patterns can only be identified by archaeologists working back and forth across the range of scales at which capitalism was, and is, relevant” (Purser 1999:117) and “the sheer breadth and complexity of the topic demands a methodological creativity and interpretive flexibility we have yet to give ourselves the permission or authority to pursue” (Purser 1999:137). As with any research agenda, we must be “mindful that method is practice informed by theory, and encapsulated within the debates” (Beaudry 2011:22). Like historical ecologist James O’Connor’s (1998) Natural Causes, Carole Crumley’s (1994) Historical Ecology: A Multidimensional Ecological Orientation, (2001) New Directions in Anthropology and Environment, and Crumley and Marquardt’s (1990) “Landscape: A Unifying Concept in Regional Analysis” each have paid strict attention to expressions of capitalism writ large on landscapes, an excursive interest of Leone (1974, 1977, 1979, 1999). A metapattern (sensu Bateson 1978) is sought that helps explain the relationship between land-use practices over time and ideologies such as Capitalism or Mormonism.
The Americas were seen by European colonizers as terra nullius upon arrival as well as a Garden of Eden (Tuveson 1968). There was little understanding that the Americas had been occupied and had already undergone several successive social organizational transformations from hunter-gatherers to empires for upwards of 12,000 years. Because it was a Christian duty to subdue Nature and make it work, Euro-Americans who followed a Manifest Destiny course of action sought to capitalize on nature by extracting anything and everything of value from the environment (Tuveson 1968).

In 2006, James Harmon, Mark P. Leone, Stephen Prince, and Marcia Snyder utilized LiDAR and GIS to qualitatively and orthographically visualize two 18th century Maryland gardens at a landscape scale thus enabling the entire site at each location to become the focus of analysis because “the spatial relationships that comprise the whole often cannot be elucidated through application of standard field methods” (Harmon et al. 2006:649) alone and “to test whether maps and images derived from LiDAR data could be used to accomplish these goals, and thus support interpretations of garden landscapes” (Harmon et al. 2006:652). Their paper in American Antiquity presented a cogent example of the utility of LiDAR and GIS to accomplish such goals and has positive implications for studies of Mormon ideology in the present.

Research Problem

In 2010, Mark P. Leone redressed his life-work in Critical Historical Archaeology. Leone redressed two of his earlier publications on Mormon uses of technology. In “Archaeology
as the Science of Technology: Mormon Town Plans and Fences” (1973, 1978, 2010), Leone intimated that¹:

We might consider asking how the system of artifacts, the primary and undestroyed system of technology, caused or determined the social and ideological systems to take shape. What is there about the system of technology that either facilitated or determined parts of the social or belief systems? [Leone 1978:194]

Leone provisionally answered his own question thus:

Archaeology could profitably study both the manipulation of material culture (why and how we do what we do with technology) and the manipulating that technology does on the rest of culture. … Cause works both ways, and by considering plural contexts, one can assign cause a locus, albeit a shifting one. [Leone 1978:195] (Figure 1).

In pursuit of objects of Mormon ideological desire in the archaeological record², Leone averred:

… despite overwhelming changes in Mormon culture, there is an unchanged relationship between a key set of artifacts and a set of religious symbols. Fences still keep the same things in and keep the same things out. … The fences enable them to redeem the earth and manipulate and act out the categories used to deal with the world. Despite changes in form, there have been few changes in function. … Nothing has been said here about town plans and fences that is necessarily true outside of Mormonism. A comparative generalizing study has not been done. [Leone 1978:199]

¹ This dissertation will treat Archaeology as the Science of Technology as if in chronological order with Leone’s Contemporary Archaeology (1972b) preceding the first publication of Archaeology as the Science of Technology (1973) and The Economic Basis for the Evolution of Mormon Religion (1974) next in the queue. The slightly revised Archaeology as the Science of Technology (Leone 1978) will be quoted from and not the 1973 version because it is the version read first; note however that the passages cited in this dissertation can be found in all three versions.

² Leone never used the phrase, ‘object of Mormon ideological desire in the archaeological record,’ or OMIDAR for short. The OMIDAR is a conceptual combination of technologies investigated by Leone (1973, 1974, 1977, 1978, 1979, 2010) and Philosopher Slavoj Žižek’s definition of an object of ideological desire (Žižek 2008). The technological object sought by Leone is heretofore referred as an or the object of Mormon ideological desire in the archaeological record or as the acronym OMIDAR. The first use of this hybrid concept is in this dissertation.
This passage is interpreted to mean that Mormon fences and the ideal Plat of the City of Zion are technologies truly unique to Mormons and Mormon ideology. The latter part of that technologically determinative supposition can be accepted; no other religious or faith-based community has attempted to create a City of Zion in the same manner as the Mormons. Leone’s fence hypothesis has not been comparatively tested since 1978; other technologies were proposed by Leone in the interim. Throughout Leone’s published career, four technologies were extensively investigated and written about: 1.) Mormon fences; 2.) Mormon settlement patterns based on Joseph Smith, Jr.’s ideal Plat of the City of Zion; 3.) Mormon temple architecture, plan, and program; and 4.) dam re\construction orchestrated by Mormon High Councils along the Little Colorado River in Arizona ritual (Figure 2). Each technology or object had or has the potential to be the technology that “either facilitated or determined parts of the social or belief systems” (Leone 1978:194) and their ecological adaptive strategy (Leone 1972a, 1972b, 1973, 1974, 1977, 1978, 1979, 2010).
FIGURE 2. Leone’s study area along the Little Colorado River in Arizona (Leone 1979:xvi).

Leone began with praise:

I have come to like the answer I have gotten from Slovaj Zizek³ (1989:182–185). Zizek is one of the very few social theorists who actually deals with objects. … Zizek is concerned with objectification the way Freud was. … It is a psychological process and does not necessarily concern concrete things, although Zizek does include things. [Leone 2010:208]

Žižek, by way of German philosopher Georg Friedrich Hegel and French psychoanalyst Jacques Lacan, found that:

The dialectical approach is usually perceived as trying to locate the phenomenon-to-be-analysed in the totality to which it belongs, to bring to light the wealth of its links to other things, and thus to break the spell of fetishizing abstraction: from a dialectical perspective, one should see not just the thing in front of oneself, but this thing as it is embedded in all the wealth of its concrete historical context. This, however, is the most dangerous trap to be avoided; for Hegel, the true problem is èely the opposite one: The fact that, when we observe a thing, we see *too much* in it, we fall under the spell of the wealth of empirical detail which prevents us from clearly perceiving the notional

³ The first time Leone mentioned Slavoj Žižek his name was spelled “Slovaj Zizek” (Leone 2010:208). This can be explained as a misprint. However, there is an error in at least three books by Leone that concern Mormon ideology. This curious pattern has not been searched for in the other books or papers written by Leone on other topics. It is simply noted here for posterity in the event that a hunch turns out to have some meaning in the future. The second point I wish to make here is that Leone cited the 1989 edition of Žižek’s *The Sublime Object of Ideology* and this dissertation cites from the revised second edition published in 2008 because it has a preface that is useful in understanding the rest of the text. The third point I wish to make here is that in *Critical Historical Archaeology* (2010), the font used does not retain the diacritical marks in Žižek’s name as I do here. To avoid confusion, when I directly or block quote from Leone’s *Critical Historical Archaeology* (2010), I will retain the way Žižek’s name is printed, but elsewhere, I will present Žižek’s name the way it should be spelled, with a caron over each zee.
determination which forms the core of the thing. The problem is thus not that of how to grasp the multiplicity of determinations, but rather of how to abstract from them, how to constrain our gaze and teach it to grasp only the notional determination. [Žižek 2008:x–xi; emphasis in original],

Moreover,

The Real is *nothing but* this impossibility of its inscription: The Real is not a transcendent positive entity, persisting somewhere beyond the symbolic order like a hard kernel inaccessible to it, some kind of Kantian “Thing-in-itself” – in itself it is nothing at all, just a void, an emptiness in a symbolic structure marking some central impossibility. It is in this sense that the enigmatic Lacanian phrase defining the subject as an ‘answer of the Real’ is to be understood: we can inscribe, encircle the void place of the subject through the failure of his symbolization …. [Žižek 2008:195; emphasis in original]

Žižek outlined three types of objects “and objectifications” (Leone 2010:208) that are ideological and amenable to social scientific inquiry from a materialist perspective. Leone interpreted Žižek’s objects thus:

The first is a void, or an absence, that creates a sense of mystery which then requires it to be filled. The void will be filled with an object or something that seems real.

The second kind of object is some large, unattractive object: a big leftover from another time, another world. This huge, often vile, object is unavoidable, by which Zizek means everyone has heard about it.

The third kind of object is an index or circulating object. It is something that people know exists but which requires that a structure be created to understand it. It is a leftover that requires an explanation. It demands a story. [Žižek 2010:208–209]
Paradoxically, “Lacan’s Real is impossible, it is precisely the impossibility which is to be grasped through its effects, its texture, its notional qualities and abstractions” (Žižek 2008:184; emphasis in original) and “[t]hat is why the material real object is a sublime object in a strict Lacanian sense, an object which is the embodiment of the lack of the Other” (Žižek 2008:192). Leone claimed that, “Zizek couldn’t see” because “his combination of Marx and Freud didn’t allow him to see” (Leone 2010:213). In the final analysis, Žižek’s ontology of voids (or absences) may hold more proverbial water than Leone thought.

According to Mormon Doctrine, the ultimate Mormon desire in the 19th and early 20th centuries was the creation of a New Zion, the abode of Jesus Christ and the righteous and endowed Latter-day Saints, the Chosen Ones, who will reside in the City of God on Earth during the Future Tribulation or The Rapture (Smith 1835). This leaves open the questions: are fences and Mormon settlement plans the ideal expressions of technology employed by Mormons in the creation of a New Zion?; and are there any other technologies identified by Leone that hypothetically facilitated the creation of a New Zion, i.e. something within the boundaries of fences that was or is the ideal technological expression of Mormon ideology?

A pertinent compound research question emerges out of this line of interrogation: Can we in the present identify and locate New Zion—the Real object of Mormon ideological desire in the 19th and early 20th centuries—reified in the archaeological record, and if so, what was the technology responsible for its material evidence? Thus the collective central research problem, purpose, and significance of this dissertation is to identify such a technology and locate material evidence of New Zion reified in the archaeological record.

Purpose
In 2010, Leone also re-examined what bothered him about historical re-enactments and displays of class, gender, and perceived race at Colonial Williamsburg. Leone discovered that it was the perpetuation of false information that was most unsettling, especially when there was ample archaeological evidence available to tell the truth. According to Leone (1973, 1978, 2010), the purpose of archaeology is to link archaeological contributions to current anthropological theory, especially materialist evolutionary theory, in an effort to garner a better understanding of the comparative meanings and uses of technology (artifacts) in past human societies. Leone by way of Lewis Binford (1962) had four principle goals for archaeology: (1) to add a formal and scientific approach to the profession; (2) to increase the temporal depth of the field; (3) to study technology within the framework of culture while (4) arresting the perpetuation of false information (Leone 1973, 1978).

Philosopher of the social and historical sciences Alison Wylie brought focused attention to the problem of Western American myth in the pursuit of the corrected archaeological record: "archaeology has an absolutely critical role to play in these revisionist exercises, committed, as they are, to rigorous empirical reassessment of extant myths and presuppositions" (Wylie 1993:10; emphasis in original). Wylie cautiously reminded us, however, that any “adequate account of archaeological practice must [recognize] that the past as we know it will always have mythic dimensions” (Wylie 1993:15). There is a second presupposition: if one deconstructs a legend through a ‘failure of its symbolization,’ (sensu Žižek 2008), the truth can be discovered

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4 Wylie’s used of the word myth is almost pejorative. Myths serve a purpose: to embody the ideals and institutions of a society or societal group or explain cultural practice, beliefs, and or phenomena. Myths are integral components of worldviews and ideologies because they convey morals, ethics, and other culturally sanctioned behaviors in allegorical form; there are lessons, mores or taboos to be learned by young and old and stories are efficient at delivering effective teaching to many at once and over time. Legends typically have an historical antecedent based on facts that over time become or have become distorted such that they begin to or now contain misinformation. Legends should be distinguished from myths and misinformation. Where the word myth is used by an author, the word myth is retained; where legend is more appropriate or more accurate, I have taken the liberty to paraphrase so that misinformation is not perpetuated unnecessarily, i.e. by referring to historical legend as myth when it is not.
and by critically re-examining our methods and field practices following Matthew Johnson’s (2012a, 2012b) advice, phenomena may be accepted ‘as is’ rather than dismissed because they do not conform to the rules of pure positivist scientific method and rigor. New worlds open up.

An opportunity to apply these ideas was presented to me when I undertook a Summer Resources Internship with the National Park Service at Grand Teton National Park (NPS-GTNP) in Moose, Wyoming. The original purpose of the internship was the fulfillment of the Cultural Resources Division’s (CRD) need for a National Historic Preservation Act (NHPA) Section 110 survey and inventory of the Mormon Row Historic District (MRHD) (48TE1444) (Figure 3). The internship included the following objectives:

- Assist GTNP in NHPA Section 110 compliance for the MRHD settlement;
- Research settlement history and water rights in and around the MRHD settlement to understand the context of the irrigation networks;
- Perform GIS analysis of LiDAR imagery as it relates to the location of previously unmapped and un-inventoried cultural resources;
- Survey locations of non-extant structures to assess, photograph, and map surviving features and artifacts such as foundations and debris scatters;
- Locate structural foundations of additional Mormon Row community homesteads or remains thereof;
- Evaluate the integrity of the irrigation network and newly recorded cultural resources;
- Re-evaluate the sufficiency of the existing historic district boundary taking into account the cultural and historical landscape, and provide recommendations on how to reconcile conflicting district boundaries or augment existing site boundaries;
Develop management recommendations and graphically represent the extent of the original compared to the re-visited homestead community and its irrigation network for future land management purposes.
It was quickly discovered on a pre-field visit that, without LiDAR imagery, one person performing standard 10–20m interval parallel linear transects walking back and forth in waist-high sagebrush and hay fields searching for evidence of possibly 27 additional historic-era homesteads across a cultural landscape encompassing large portions of 25 Sections in 10 weeks was impossible and impracticable (Figure 3). A secondary objective emerged out of the internship: to deconstruct the local legend of “Miracle” Spring because, following Leone’s (1978) and Wylie’s (1993) advice, the local legend offers an opportunity to arrest the perpetuation of false information and discover the truth; the MRHD is also an apt comparative study area and data set against which one may test Leone’s technologies and hypotheses. During the internship and the writing of “A Modified NHPA Section 110 Class II Inventory Using LiDAR Imagery to Locate Historic-era Homesteads and Irrigation Features of the Lower Gros Ventre River Floodplain Terrace and Ditch Creek Alluvial Fan within Grand Teton National Park, Teton County, Wyoming, Volumes I and II” (Schroeder 2017), the author located five published versions of the Mormon Row local legend of the origin of “Miracle” Spring (also known as Mud Spring(s) and Kelly Warm Springs) and 11 site records for the associated prehistoric archaeological site 48TE449-450. Each of the local legends of the origin of “Miracle Spring” and the site records for 48TE449-450 contains similarities and differences. There are kernels within the various legends, maps, and site records that potentially point to the truth of the ‘miracle.’ It is promoted here in this dissertation that landscape archaeology landscape analysis of historic maps plus environmental and remote sensing data such as LiDAR imagery in GIS has the potential to read a landscape and discover where people in the past performed daily life activities within the parameters of ideologies, i.e. find the metapattern (sensu Bateson 1978).
Landscape archaeology landscape analysis also has the potential to discover kernels of truth ‘hidden’ in a variety of primary and secondary sources, especially historic maps and oral histories and assist in the arrest of perpetuation of false information. Hence, there are four secondary objectives to this dissertation following the three unofficial dicta of historical archaeology: to confirm the facts; to contradict when necessary; and to contribute to the discipline:

1.) to re-examine Mark P. Leone’s oeuvre, argument, and method starting with technologies Leone previously identified (1973, 1974, 1977, 1978, 1979, 2010) that have a potential to answer a pertinent research question: Can we in the present identify and locate New Zion—the Real object of Mormon ideological desire in the 19th and early 20th centuries—reified in the archaeological record?;

2.) to search a comparative study area and data set at MRHD for the same technologies;

3.) to test Leone’s technological objects against Žižek’s (2008) criteria; and,

4.) to deconstruct archaeologically the Mormon Row local legend of “Miracle” Spring to discover the kernels of truth behind and within it; the kernels of truth have the potential to reveal the identity of the object of Mormon ideological desire in the archaeological record (OMIDAR).

Significance

As an extension of Binford’s dicta, early postprocessual archaeology theory promoted that,
… it is not so much the mechanisms of human adaptation to changing natural circumstances that deserve attention, as the different ways in which people in the past perceived and ordered their environments according to space, time and culture. New diachronic approaches were developed that highlight the continuous reuse of [features] and the constant reordering of landscapes within subsequent societies with different social, ritual and mnemonic systems. [Kluiving and Guttmann-Bond 2012:9]

Materializations of worldviews in landscape archaeology incorporate cosmology, genesis stories, theology, spirituality, and celestial events among other pertinent cultural aspects, features, and functions of a social group. “Extending landscape to the celestial sphere … afford[s] new insights into the timing and significance of practices … and their meanings in terms of particular belief systems” (Patterson 2008:79). Not only have more research projects incorporated phenomenology in recent years, more controversy and frustration has emerged as a result in part due to the sometimes uneasy antagonism between positivist ‘hard’ sciences and the ‘soft’ social sciences. In order to ascertain meanings and their relationships to ideologies in the past, material evidence is necessary because the immaterial is mediated by the material (Quinn 1987).

The Mormon Row legends of the origin of “Miracle” Spring collectively constitute an apt case study. Archaeological deconstruction, landscape archaeology landscape analysis, and examination of archival records confirmed the facts, contradicted misinformation, and contributed meaningfully to what is known about the history of the Grovont, Wyoming-Mormon Row community, i.e. kernels of truth were extracted. The legends and their deconstruction are the topics of Chapter VII.
American philosopher and psychologist William James advocated for a methodology of “radical empiricism” that requires that (1) all of the ideas and theories in science be grounded in direct experience, and (2) no experience be excluded from scientific purview” (Laughlin and McManus 1995:34). This is quite impossible, because there are so many competing ideological ontologies in the world, yet it may be possible to isolate a single ideological ontology such as Mormonism. The 2016 internship and fieldwork I undertook served and serve as ‘direct experience.’

UK Professor of Archaeological Science Martin Bell encouraged social scientists not “to xerox,” as in rely solely on the hypothetico-deductive-plus-testing method, but rather “we need to utilise the full toolkit of available approaches, social and scientific, including experiments, and to devise effective combinations that enable an interpretation derived from one source to be critically examined against evidence from other sources” (Bell 2015:42). Bell encouraged archaeologists, “to devise effective combinations that enable an interpretation derived from one source to be critically examined against evidence from other sources,” because “the gathering of data is not independent of the theory to be tested” (supra) and “in the historical sciences we are seldom in a position to prove anything” (Bell 2015:45; emphasis in original). Consequently, we must be mindful that, “[t]his assumes that a degree of objectivity can be achieved, and that the observations are not totally obscured by underlying assumptions based on pre-understandings” (supra; emphasis in original). American ethnoarchaeologist David Killik is likewise concerned with the manner in which archaeologists and historians arrive at conclusions:

Most archaeologists are pragmatists, and thus evaluate the adequacy of interpretation/explanations by examining how well they account for the archaeological
evidence, without resorting to formal methods. But archaeological evidence is woefully incomplete…. [Killik 2015:161]

The fact that archaeologists will never have the entire data set they seek to explicate presents gaps that archaeologists and historians too often fill with repetitions of presumptions (Bell’s ‘xeroxing’) which results in the perpetuation of false information, a central concern of Leone (1973, 1978). This dissertation re-examines Leone’s oeuvre for theory and method and repeats parts of both, yet also takes the opportunity to test hypotheses that Leone did not in his time using theory and methods that were unavailable at the time of his past publications but are available to him presently in order to correct for and arrest the perpetuation of false information.

After deconstructing ‘modern’ conceptions in landscape archaeology from a postmodern paradigm, UK landscape archaeologist Matthew Johnson proffered three ways forward for the discipline: “abandon the highly rhetorical use of theoretical bogeymen and the invitation of false choices … ; maintain and extend the critical examination of field practices … ; [and] open the practice of landscape archaeology up to different groups and stakeholders” (Johnson 2012a:522).

Johnson softly concluded that landscape archaeology and its practitioners have a choice:

… we can cling to a myth of academic detachment that has long since been comprehensively discredited, … [or we can] think carefully and self-critically about how it moves from evidence to inference. The amassing of evidence in itself, however carefully and arduously done, is not the single defining or primary feature of science; theoretical reflection on the means of inference is at least equally important. [Johnson 2012a:523]

At some point, “[w]e are all phenomenologists,” and even though an understanding of the human experience is necessary, it is not a commonsense undertaking (Johnson 2012b:279).
LiDAR imagery and Digital Elevation Models (DEM$s$) assist in interpretation of space and place because they are viewed top-down. This elevated, Apollonian perspective cuts through the more experiential qualities that one would have in person on the ground. GIS manipulation of LiDAR imagery such as hillshading or color ramping and the projection of simulated height or elevation on a 2.5-dimensional (2.5D) map image can assist landscape archaeological survey data collection, groundtruthing, management, and interpretation (Chapman 2006:20–21). The Apollonian and Cartesian perspective that GIS and LiDAR affords landscape archaeology studies is not only illuminative it is phenomenal (all connotations intended). Distinguished American Professor Emerita in the History of Consciousness and Feminist Studies Donna Haraway has called this phenomenon a “God-trick” (Haraway 1991:189).

In 2010, Leone introduced Žižek’s definition and rubric of an object of ideological desire to his own research agenda, but did not test his objects against Žižek’s schema. Throughout his career Leone hypothesized that fences, settlement plans based on the ideal Plat of the City of Zion, Mormon temple architecture, plan, and program, and ritual dam re\construction orchestrated by Mormon High Councils facilitated Mormon settlement, social cohesion, and ecological adaptation to marginal environments in the 19th and early 20th centuries in the Intermontane West (Leone 1973, 1974, 1977, 1978, 1979, 2010), yet never tested his hypotheses in a comparative study area (Leone 1978:199). If cause can be assigned a locus and “religions themselves are maps” (Francaviglia 2015:3; Tweed 2006), then distribution maps of Mormon settlements and cultural resource loci projected in LiDAR imagery in GIS can potentially reveal Mormon ideology expressed, metaphorically speaking, like a landscape-scale ‘fingerprint’ or metapattern (sensu Bateson 1978) on landforms and landscapes. Location of Mormon ideology reified in the archaeological record anywhere and everywhere would be highly significant.
In order to proceed, one must suspend disbelief and accept Mormon religion as it was and as it is: a phenomenon. Through the function of fetishistic disavowal wherein “I know very well that things are the way I see them … [yet] I believe in Another Space (the domain of pure symbolic authority) which matters more than the reality of its spokesmen,” (Žižek 2012) one can break the ‘spell of fetishizing abstraction’ (Žižek 2008:x). Simply put, “if one limits oneself to what one sees, one simply misses the point. This paradox is what Lacan aim[ed] at with his les non-dupes errent: those who do not let themselves be caught in the symbolic deception/fiction and continue to believe their eyes are the ones who err most” (Žižek 2012).5

Hypotheses

I acknowledge that the hypotheses presented here are seductive and false, but in this disclosure, the proverbial door is opened to the phenomenal (sensu Johnson 2012a, 2012b) while respecting Žižek’s ontology and Leone’s research problem. It is acknowledged here, too, that rather than construct a new scientific paradigm without hypotheses, I will proceed with false hypotheses.

H₁ There is a real, material, mediating object of Mormon ideological desire that is a void (or deficiency), a large and unattractive leftover from the past about which all are aware, and something that is identifiable in the archaeological record which circulates or circulated within capitalism (Leone 2010:209; sensu Žižek 2008).

5 The best example of this is delivered by Chicolini Marx impersonating Groucho Marx as Rufus T. Firefly in Duck Soup when Chicolini-Rufus says: “Ma’am, who you gonna’ believe, me or your own eyes?” (Marx Brothers 1933). Žižek published this quote as, “In one of the Marx brothers’ films, Groucho Marx, when caught in a lie, answers angrily: ‘Whom do you believe, your eyes or my words?’” (Žižek 2012). If asked why there is this glaring discrepancy, Žižek would likely answer with the exact same quoted question: “Whom do you believe, your eyes or my words?” This ambiguity, this failure of symbolization between the ‘Real’ and ‘the real,’ is, in a nutshell, ideology. You have to see the movie and the scene in order to believe me. Trust me, you won’t be disappointed.
Alternatively:

H2 The object of Mormon ideological desire is not identifiable or locatable in reified form in the archaeological record; it is an immaterial, abstract notion and byproduct of human consciousness; it is a deliciously anticipated wish intended to fill an ideological void or gap (sensu Žižek 2008) in the daily lives of righteous Mormon believers.

Test Expectations

If an OMIDAR is not identified among Leone’s previously identified technologies, one that meets Leone’s and Žižek’s criteria and resolves the research problem, there are at least two possible outcomes. One outcome is that there is yet another object that exists in Leone’s original study area that was overlooked or discounted in the past; an object that has not been fully identified or tested for its potential to resolve the research problem and, most importantly, is a manifestation of ideological desire in reified form. Another outcome is that there is not an OMIDAR that resolves the research problem; the argument returns to the premise that ideology is purely abstract and cannot be located in reified form archaeologically or otherwise. If the problem is not resolved by the identification and location of a material object, the real object of Mormon ideological desire must remain an abstract notion, a deliciously anticipated wish.

The first phase of the test checked Leone’s previously identified technologies for presence or absence at Mormon Row. If Leone’s 1973 and 1978 hypotheses are true, then the evidence and proof should be evident elsewhere; everywhere. Landscape archaeology landscape analysis of archival maps, records, and Mormon land-use patterns in two historic landscapes—Leone’s original study area along the Little Colorado River in Arizona (Figure 2) and Grovont,
Wyoming-Mormon Row Historic District (48TE1444) (Figure 3)–increased the probability of there being a metapattern (*sensu* Bateson 1978). The second phase of the first test sought to check Leone’s previously identified technologies against Žižek’s definition and rubric to determine if there is a match. A match among Leone’s previously identified technologies would support the hypothesis that there is an OMIDAR. Because there was not a perfect match, an alternative was sought from among other technologies discussed by Leone in his back catalogue. An alternate technology was identified. If “Hegelian cognition is simultaneously both active and passive … [and] radically displaces the Kantian notion of cognition as the unity of activity and passivity” Žižek (2008: xv), then the process of searching itself produces the object which caused the search (Žižek 2008:180).

It is demonstrated herein that landscape archaeology landscape analysis of LiDAR imagery and textual deconstruction of the Mormon Row local legend of the origin of “Miracle” Spring revealed a technology associated with water that potentially satisfies Žižek’s criteria and resolves Leone’s research problem—irrigation. A thorough re-examination of Leone’s back catalogue revealed a flaw in Leone’s logic. Leone did consider irrigation’s importance in the Mormon adaptive strategy (Leone 1974, 1979), but only as an ancillary adjunct to dams. Leone did not consider irrigation as an object perhaps because, unlike fences, settlements, temples, and dams, the whole of an irrigation network could not be seen as a ‘single’ feature; GIS makes it possible to see the whole of an irrigation network at a landscape scale and thus as a unary object.

Two tests were necessary to determine whether or not irrigation technology satisfies the criteria set forth above. Presence or absence of irrigation technology and patterning was searched for in both study areas using LiDAR and aerial imagery in GIS. The conclusion is: there is an
OMIDAR. The OMIDAR is a Mormon irrigation pattern or MIP\textsuperscript{6}, a concentration of parallel-spaced irrigation sublaterals and irrigation ditches that supplied and or continue to supply water to Mormon settlements in the Intermontane West in the 19th, 20th, and 21st centuries. I aver that the MIP is the material and metaphysical ‘footprint’ of New Zion, i.e. a metapattern (\textit{sensu} Bateson 1978). If the MIP is New Zion reified, then the MIP is the OMIDAR.

Dissertation Outline

The organization of this dissertation is critical to understanding the arguments involved. Despite the experimental nature of the methods used, certain principles of the scientific method are employed in order to maintain the structure of a dissertation and not a mystery novel. In place of statistical data, block quotes are used throughout this dissertation to serve as data, provide context for concepts and ideas, and avoid reductionism and paraphrasing which too often distorts the original meaning of a word or a passage. Case in point, the dictum: ‘Those who do not know their history are condemned to repeat it’ is attributed to George Santayana. This dictum is a reduction of what was actually printed, which is:

\begin{quote}
Science, then, is the attentive consideration of common experience; it is common knowledge extended and refined. Its validity is of the same order as that of ordinary perception; memory, and understanding. Its test is found, like theirs, in actual intuition, which sometimes consists in perception and sometimes in intent. The flight of science is
\end{quote}

\textsuperscript{6} The concept of a Mormon Irrigation Pattern (MIP) is introduced here for the first time in this dissertation. It is a provisional label applied to a phenomenon observed first at Grovont, Wyoming-Mormon Row and then later searched for and located in so-called Mormon Arizona. The question whether other cultural groups, other Christian millenialists, or Native American cultures employed flood irrigation technology in a similar manner is a research question and hypothesis that deserves testing by other researchers interested in historical uses of irrigation. Until that research is done, it is not proper to call all concentrations of parallel-spaced irrigation sublaterals the MIP; for now, this term only applies to the patterns observed and associated with the Mormon settlements in this dissertation.
merely longer from perception to perception, and its deduction more accurate of meaning from meaning and purpose from purpose. It generates in the mind, for each vulgar observation, a whole brood of suggestions, hypotheses, and inferences. The sciences bestow, as is right and fitting, infinite pains upon that experience which in their absence would drift by unchallenged or misunderstood. They take note, infer, and prophesy. They compare prophesy with event, and altogether they supply—so intent are they on reality—every imaginable background and extension for the present dream. [Santayana 1954:393]

The common denominator between both quotes is that it is important to be able to distinguish facts from fiction. Mark P. Leone and Slavoj Žižek both employ block quotes in their books and papers; I will also employ the convention of block quotes to convey their ideas and the ideas of other authors and researchers as they pertain to the overall structure and logic presented in this dissertation. Block quotes also assist in the arrest of false interpretations or information.

This dissertation begins with the research problem, research question, and rationale needed to test technological objects previously and hypothetically identified by Mark P. Leone that have a potential to resolve a research problem concerning the identification and location of the object of Mormon ideological desire in the archaeological record (OMIDAR) if a rubric and schema from philosopher Slavoj Žižek are considered. Leone hypothesized that fences, Mormon settlement patterns based on the ideal Plat of the City of Zion, Mormon temple architecture, plan, and program, and ritual dam re\construction on the Little Colorado River in Arizona each facilitated Mormon settlement and social cohesion in the 19th and early 20th centuries in the Intermontane West, yet never comparatively tested these hypothetical technological objects against his own argument (Leone 1978:199) or at a comparative study area. Leone also did not test his objects against Žižek’s rubric and definition of what an object of ideological desire is.
This dissertation aims to test the hypothesis that an object of Mormon ideological desire does exist in reified form in the archaeological record, one that satisfies all of Leone’s and Žižek’s criteria (Chapter I).

Chapter II revisits Leone’s back catalogue as it relates to Mormonism. Through this literature review a context for the four previously identified technological objects is established. Occasional excursions are taken when ideas and concepts from authors other than Leone are necessary in order to establish a context. A context for Žižek’s rubric is presented.

Chapter III situates European and American landscape archaeology paradigms historically. Ways in which landscape archaeology theory is applicable at the Grovont, Wyoming-Mormon Row study area and relate to the internship as well as this dissertation are discussed. The chapter ends with a look at Americanist landscape archaeology and recent developments or sub-disciplines within landscape archaeology in recent years including phenomenological landscape archaeology (Johnson 2012a, 2012b).

Chapter IV presents the methodological means of analyzing the Mormon Row study area: landscape analysis of LiDAR imagery and archival maps in GIS. This chapter historically situates European and American landscape archaeology landscape analysis methods. This chapter closes with a brief discussion of the advantages of a multidisciplinary, multiscalar hybrid methodology. James O’Connor’s historical ecology allows one to bridge theory and method through the effects of capitalism on natural environments at the hand of humans over time. Historical ecology’s apt applicability to the study of Mormon settlement patterns in the Intermontane West in the 19th and early 20th centuries is highlighted throughout the dissertation.

Chapter V presents the environmental and historical background of the Grovont, Wyoming-Mormon Row Historic District (MRHD; 48TE1444) study area. Much of the chapter
contains information and data collected in the production of “A Modified NHPA Section 110 Class II Inventory Using LiDAR Imagery to Locate Historic-era Homesteads and Irrigation Features of the Lower Gros Ventre River Floodplain Terrace and Ditch Creek Alluvial Fan within Grand Teton National Park, Teton County, Wyoming, Volumes I and II,” a draft report, submitted to the NPS-GTNP and the Wyoming State Historic Preservation Office (WYSHPO) for review (Schroeder 2017). The MRHD (48TE1444) and the internship study area serve as the comparative study area against which Leone’s technologies are tested.

Recommendations for the future treatment and disposition of the extensive and extant Grovont, Wyoming-Mormon Row community’s historic irrigation network are based on data collected during the internship including landscape archaeology landscape analysis of 2014 LiDAR imagery of the MRHD and historic archival maps and site records held by the NPS-GTNP and the WYSHPO. The results of the survey and inventory of the irrigation network prompt a re-examination of the definitions of non-sites in Wyoming (Chapter IX).

Chapter VI presents a discussion of the four technological objects before the objects are tested for presence or absence within a comparative study area—the Grovont, Wyoming-Mormon Row Historic District (MRHD; 48TE1444). After the comparative test, each potential technology is tested against Žižek’s schema. A Yes-No table is presented and discussed.

Chapter VII presents a textual and archaeological deconstruction of the Grovont, Wyoming-Mormon Row local legend of the origin of “Miracle” Spring. It is believed that through the deconstruction of legends truth is ascertained. In addition to the truth behind the origin of “Miracle” Spring, a potential new technology emerges, one that hypothetically resolves the research problem presented in Chapter I. Preliminary results suggest that there is a Mormon
irrigation pattern or MIP that meets Leone’s and Žižek’s criteria. A revisit to materializations of worldviews rounds out the chapter.

Chapter VIII presents all known mentions of irrigation technology found in Leone’s back catalogue as well as mentions of the importance of irrigation found in the research performed by others on historical Mormonism. Irrigation technology is searched for within Leone’s original study area along the Little Colorado River in Arizona.

Chapter IX presents the authorizing heritage discourses (AHDs) from the states of Washington and Wyoming in an effort to situate irrigation technology and its features within local, regional, state, and national historical contexts of significance before irrigation networks can be adequately evaluated and assessed for significance and eligibility for listing on the NRHP. Recommendations and suggestions for future evaluation and assessment are presented.

Chapter X presents the results and conclusion of this dissertation research project. Irrigation technology and its features are tested against Žižek’s criteria. A Yes-No table is presented and discussed. Significance and implications for future research are also presented.
Chapter II

Leone’s Theories and Methods

A processual research agenda allows for multidisciplinary flexibility, an issue Leone (1972b) addressed in his Preface to Contemporary Archaeology. Leone advises archaeologists, that, “[w]hile archaeology has been conscious of the need for technical accuracy, it has not so often been aware of the need for rigor of the same quality in linking its data to its conclusions” (Leone 1972b:xii). Leone found that there are certainly areas within anthropology where ecological, demographic, geographic, technological, and a host of biological and environmental variables are crucial in the process of describing and explaining cultural behavior as it changed over time in particular places. Natural variables are commonly considered in some aspect by most archaeologists; whether or not natural variables are the central focus is determined by the theoretical paradigm or research agenda. Processual archaeology demands a precision from its practitioners, yet “the unalloyed use of [inductive inference] is debilitating to archaeology,” and this imbalance contributes to the debate “over the validity of types of taxonomies and the proper places of induction and deduction in research” (Leone 1972b:xiii).

The authors in Leone’s edited volume contributed papers that range from the inductive to the deductive and several points in between. Indeed, “[t]here are certainly areas within anthropology where ecological, demographic, geographic, and a host of other biological and environmental factors can be considered as critical variables in describing and explaining cultural behavior” (Leone 1972b:xiii), yet, more than any other factor of analysis in processual archaeology, the role of technology, how it reflects the culture that distributed it across the
surface of the Earth over vast swaths of time (for archaeologists to locate and interpret in the present for the future), was highlighted by Leone as editor. Leone predicted that, “[t]he full range of reflective abilities of objects, or material culture in general, or technology in specific, will undoubtedly be in hand one day” (Leone 1972b:xiv). As editor, Leone asked of his audience going forward, “what role do items [objects; historic or prehistoric artifacts] play in economics, social organization, and religion [or ideologies] … [and] what are the properties of specific artifacts that allow them to behave as they do?” (supra). How objects and pieces of technology reflect culture is one result, how cultures reflect technologies recursively is the real crux of Leone’s biscuit and a research agenda that he undertook throughout the 1970s when he investigated historical Mormonism. The ‘full range of reflective abilities’ may be at hand in the 21st century with GIS technologies and remote sensing or retrieved data such as LiDAR.

Leone credited Walter W. Taylor (1948) with much needed attention to Americanist archaeology up to 1945. Taylor’s “alternative theoretical approach brings attention to goals and methods in archaeology as they relate to anthropology, history, and science” (Leone 1972b:1). Indeed,

The fallacy of using the word reconstruction was dealt with at some length in A Study of Archaeology (Taylor 1948:35), and to use it today is to set up a straw man, to saddle other archaeologists with an admittedly impossible goal and then deny its possibility. In addition to perpetrating this dubious circularity, they have fallen into the very trap against which they were warned. [Leone 1972b:31]

Taylor’s approach opened floodgates for processualism yet was sharply criticized by Miller and Tilley (1984) and others because it “tended to award material evidence a status that is more ‘real’ than the society that produced it” (Thomas 1993:26).
Paul S. Martin (1972:6) recommended that there is at least a possibility of a better way to develop research strategies that will actually help anthropologists and archaeologists reach their goals and advocated for a “cultural-materialist research strategy that can deal with the questions of causality and origins and laws” (Martin 1972:7).

Martin’s approach represents a nomothetic archaeology for a lack of a better term. Martin (1972:9) found as a result of extensive re-examination from this ‘new’ perspective that, even in 1972, most of the theories and practices of the past were already obsolete. Martin encourages that archaeologists and anthropologists collectively reach a position in which deduction and induction interplay with one another. Moreover, “[a]rchaeology can be structured, not haphazard or vague,” and “tentative hypotheses may be deductively formulated to give direction to scientific investigation” (Martin 1972:12).

Even this early in processual archaeology, the limitations of the hypothetico-deductive method were apparent. Meanwhile hypothesis generation was and still is seen as an essential structural component of research; a better alternative had yet to be presented. Archaeology may proceed if the discipline also focuses on culture, “not as an aggregation of traits but as an extrasomatic adaptive mechanism that permitted man to cope with the daily problems of living,” a conceptual dimension (Martin 1972:13). Methodologically speaking, Martin advocated for the study of “patterned covariation of groups of traits,” e.g. ecological, sociological, technological, economic, and ideological traits, through “sophisticated statistical techniques, sampling, statistical models, and computer aid at all levels of research” (supra). Lastly, Martin (1972) made sure to point out that there never was nor never will be such a thing as ‘computer archaeology,’ since humans (scientists; social scientists) make the choices and have constructed the logic and paradigm in which the research questions are proposed and addressed.
Returning to Chapman’s view, landscape features can and often do blur and merge with ideologies. The use of GIS analysis to answer positivist research questions and hypotheses has expanded yet is profoundly limited by cultural factors and meanings people have about certain places that are the subject of archaeological investigation. In other words, culture tends to muddy the waters of an otherwise scientific methodological process (Chapman 2006:23). Given such seemingly antagonistic inputs and factors, anthropological theory is nonetheless necessary in order to make sense of empirical, experiential, and cultural data.

Whereas there may be no ‘computer archaeology’ (pace Martin 1972:13), there is computer-aided archaeology, a methodology Leone used later in his career (Leone 1984; Harmon et al. 2006). Leone predicted that archaeology will be “best seen through the law of evolutionary potential” while also adding the caveat:

… just as no evolutionist can predict the future of the specific case, we can not be sure what is going to happen to archaeology. It may become extinct. But it more surely is going to be radically transformed. [Leone 1972b:27]

Leone continued to pursue an evolutionary archaeology of Mormonism by way of ethnography in an obscure paper in Utah Historical Quarterly. “The Evolution of Mormon Culture in Eastern Arizona” (Leone 1972a) outlined the utopian agrarian ideals of the United Order of Enoch (United Order; Arrington 1958:324) that began in the 1870s in northeastern Arizona along the Little Colorado River. The United Order “was founded as an attempt to create completely autonomous communities throughout the Great Basin” (Leone 1972a:123). Lowry Nelson also mentioned the United Order and referred to it as an “expression of Christian communism” (Nelson 1952:35). Nelson pointed out that the United Order “was given by
revelation through Joseph Smith about the same time that the plan of the City of Zion was announced and doubtless was a contributing factor in determining the particular design” (*supra*).

Leone made a curious word choice in the first paragraph of “The Evolution of Mormon Culture in Eastern Arizona” (1972a). Leone claimed that Shakers, Mennonites, Hutterites and other faith-based Christian communities including the Mormons, “all sought to set up an environment where the group could lead an independent, autonomous, self-sustaining existence” (Leone 1972a:122). Mennonites, Hutterites and other faith-based Christian communities have persisted and subsisted unto the present; an exception being the United Society of Believers in Christ’s Second Appearing, also known as the Shakers, who have all but desisted due in part to their practice of celibacy. What is so curious about the line from Leone is the connotation ‘to set up an environment.’ There is a distinction between landscape and environment, with scholars such as John Brinkerhoff Jackson specifically noting that landscapes are not synonymous with natural environments but instead are synthetic and contain cultural systems that structure and organize peoples’ interactions with their environments or the landscape they ‘create’ (Jackson 1984:156). Jackson’s advice and distinction was published over a decade after Leone’s curious remark in 1972, so Leone cannot be held accountable for the confusion this phrase may cause in interpretation. Leone appears to have used environment in the general sense.

The Mormon settlements along the Little Colorado River were established starting in 1876 and began disarticulating around 1885. Some of the larger communities are still municipalities today including Brigham City, St. Joseph, Holbrook, Woodruff, Snowflake, Shumway, and St. Johns, Arizona. Even the hamlet of Hay Hollow still has a few residents. What characterized these communities from other Euro-American settlements was “the communal holding of property” (Leone 1972a:124). Indeed, “[t]he individualistic, profit-making
ethos that characterized much of the settlement of the American West was not as efficient and adaptive strategy as the communal one, when applied to the Great Basin” (supra). Additionally, “[i]t is important to see that such a strategy can emphasize local autonomy as well as cooperative efforts at survival. These are two tendencies that are more likely to be contradictory and conflicting than complementary” (Leone 1972a:125).

How, then, did the Mormons mediate this seeming paradox? Presaging his later work (Leone 1979), Leone presented an introduction to the Mormon adaptive strategy as well as a brief discussion of Mormon endogamy in “The Evolution of Mormon Culture in Eastern Arizona” (1972a). Leone suggested yet another seeming paradox: “In addition to the isolation of towns through an inbred kinship network, the economic pattern whereby all towns raised the same crops fostered separation” (Leone 1972a:126). That ‘all towns raised the same crops’ should not, on the surface, foster separation; this economic and agrarian pattern should foster cooperation. Why, then, did it foster separation? Production of the same commodities in every settlement or city resulted in “little economic basis to foster trade between the towns” (supra).

In Marxian terms, “under primitive cooperative and market conditions,” ecological variation always has and always will influence the availability of commodities (Leone 1972a:130). In materialist terms, each Mormon community produced or produces comparatively more or fewer commodities resulting in surpluses and deficits (inequalities); inequalities were and are mediated through tithing and distribution by local High Councils. Indeed, under the knowing and watchful eyes of High Councils, “surpluses could be traded for or shipped to any crisis point” (Leone 1972a:132). Thus the central research problem in Leone’s paper was whether, how, and “to what extent the economic autonomy of the [Little Colorado] towns produced community endogamy” and vice versa (supra).
To answer his question, Leone investigated and interrogated patterns of marriage exchange between 1879 and 1965 along the Little Colorado River in Arizona. One factor in the disarticulation of Mormon settlements over time was clearly the in-marrying “between the most powerful families in the area in the nineteenth century” (Leone 1972a:129). To counteract the isolating effect of hierarchical endogamy and meet community needs, then-recent converts were incorporated into the fold and trade with exogenous communities increased gradually over time as necessary. The Arizona Cooperative Mercantile Institution (ADMI), a local variation on the Zion’s Cooperative Mercantile Institution (ZCMI), also provided communities with commodities that were not possible for individual communities to produce themselves for their immediate consumption and use. Thus,

The church served as an efficient vehicle for economic redistribution and for creating the social organization that staffed and reinforced the economic system. The church leadership was wise enough to see that adaptation in a marginal ecological zone involved almost continual crisis. Its success was built on mediating the crises. [Leone 1972a:136]

Therefore, the cooperative institutions of the Church of Jesus Christ of Latter-day Saints were a “key factor in survival, if not to ideological determinism” (supra). In this view, ‘ideological determinism’ should not be confused or conflated with ‘technological determinism.’ Neither endogamy nor High Council hierarchy can be considered technologies; each can be considered forms of social organization and structure: “The individual not only supplies the answer for himself, but, in fact, he has been taught to do so all along by his revolving, role-fulfilling activities within the church” (Leone 1972a:139)\(^7\).

\(^7\) This passage presages Leone’s 1974 ethnographic inquiry into the atomizing experiences Mormons undergo within temples during endowment ceremonies, an individualistic duty.
Leone posited that the intrasomatic experience and exosomatic expression of Mormon faith emerged out of “the rapid flux the local economic base is subject to, and it is a means of coping with the potential clash of traditional community values and those imposed by surrounding modern American culture” (Leone 1972a:140). More, “[i]t is almost as though someone took Thomas Jefferson seriously when he proclaimed, ‘I am a sect myself.’ The only real difference is he knew it, and the church’s faithful do not” (*supra*). Indeed, nowadays as opposed to the 19th century, “the church prepares an individual for economic adaptability and ideological independence within American culture” (Leone 1972a:141).

In 1973 and again in 1978, Leone took up the mantle of technological determinism with the publication of “Archaeology as the Science of Technology: Mormon Town Plans and Fences.” Leone begins “Archaeology as the Science of Technology” by advocating that archaeological goals and archaeological results should “link archaeological contributions to anthropological theory, especially materialist evolutionary theory” (1978:191). Leone was weary and wondered “whether archaeologists will ever discover what questions cultural anthropologists think are significant” and whether “archaeology [will be] permanently condemned to subordinate status in anthropology” because of “the muteness of its data” (*supra*). To address this weakness, early processual and postprocessual archaeological theory sought to discover “the systematic ways in which cultures fit their subsystems together and how such articulated variables shift or change over time,” and presciently, “[t]hrough … cultural ecology … archaeology [has access to] the principles of cultural evolution” (*supra*).

While discussing the theoretical applicability of a materialist archaeology that follows a cultural ecological perspective to its cultural anthropological ends, Leone asked whether archaeologists who borrow other models “borrow the processes that link together a set of
factors,” too (Leone 1978:192). They do and, regrettably, there has yet to be a one-size-fits-all theory to explain everything. So it goes.

Leone briefly outlined his frustrations with historical archaeological investigations, past reconstructions, and historical re-enactments at Colonial Williamsburg; what he called “the empirical substantiation of national mythology” (Leone 1978:192). Leone’s concerns about the accuracy and authenticity of reconstructed Colonial Williamsburg were also present in his critique of the reconstructed Mormon settlement of Nauvoo, Illinois. Leone was frustrated mostly by the seeming paradox: there is ample archaeological evidence by and through which to tell the truth about Colonial Williamsburg and Nauvoo, yet the legends of both places are perpetuated for public consumption. Why? What is the purpose of archaeology at both sites then? Leone’s critique is that “[m]eanings are notoriously difficult to recreate and recapture and, as a result, a new set of meanings—more accurately, a reinterpreted set of meanings—is readily imposed on the artifacts themselves” (Leone 1978:193). Leone reminded us:

As Voltaire has pointed out, “History is the lie commonly agreed on.” Agreeing with the interpretation—his meaning of a lie—is implied by visiting the site. But the site (the environment) is especially effective because it is up to you, the visitor, to reach the message yourself by wandering through the setting, picking out in empirical detail how something you are looking at strikes you. History may be the commonly agreed-on lie but, for that common agreement to be sustained and realized in individuals, they must see it for themselves. [Leone 1978:193]

As an aside, Leone’s critique was that the past has been sanitized and essentialized (though he never uses these terms). The net effect has been that official interpreters have “molded and distorted (or simply fleshed out)” the archaeological or historical record for public
consumption resulting in perpetuation of less than ‘the truth, the whole truth, and nothing but the truth.’ What concerned Leone most was the borderline offensive unawareness of archaeologists of their potential to correct the archaeological record and not further the perpetuation of false information. Just because “substantiation is an end to which archaeology is put does not mean we, as archaeologists, must participate in it” (Leone 1978:193). Indeed, a postmodern critique of Leone’s critique is: because everything that is cultural is subjective and open to multiple interpretations, we cannot understand ‘others’ unless the ‘others’ speak for themselves in the same manner as those asking the questions. From this perspective, a question emerges Can we say with confidence that we are or will ever be capable of knowing what really happened in the past? From a materialist-realist perspective, we cannot go back in time and the archaeological record is “woefully incomplete” (Killik 2015:161). The short answer is, no. This is the problem of the presentist paradigm. Still, if archaeologists do not ask the hard(er) questions, they are neither tasked with seeking answers that potentially fly in the face of popular belief (which they would then have to defend) nor are they required to accept that which falls outside of paradigms that provide little or no explanation for phenomena. Social scientists and archaeologists have a choice as to whether or not to invite information and perspectives that challenge the status quo or turn the proverbial ‘blind eye.’ Binford and Leone encouraged deconstruction of legends as an ethical response to the problem of the perpetuation false information; there are more responsible, responsive, and recent methods available in the 21st century. Suffice it to say, ‘turning a blind eye’ was not then nor is it now an ethical option.

Returning to *Archaeology as the Science of Technology*, Leone advocated an imbrication of Lewis Binford’s dicta within processual archaeology, and reminded his readers that:
The farther artifacts are removed from the present or from historical sources, the harder it is to figure out the function of the artifacts and, consequently, anything about the culture that produced them. Recently, archaeologists have started with the reverse assumption: since an artifact is the product of a total cultural system, it is likely to present evidence about the perishable parts of the system that created it (Binford 1962). The logic of that assumption cannot be denied. The positive effect it has had on the higher quality of archaeological analyses is there for the whole discipline to see. [Leone 1978:194]

This position logically leads to a perspective in which,

The artifacts are regarded as indices to the systems of primary subsistence and exchange, of social relations, and of beliefs that brought them into existence. However, the artifacts and pieces of technology are, in some sense, determined in form and distribution by other systems including the social and ideological structures. [Leone 1978:194]

This assumption seeks to resolve the problem by analyzing subsystems of factors responsible in a positivist cause and effect relationship in the present via intense examination of the artifacts (technologies) recovered from the past. In other words, artifacts are indices of the system that produced them and if we can decipher their code and imbrications we can elucidate social relationships, technologies, and meanings. As a presupposition and a way to move forward, Leone proffered that certain technologies (artifacts locatable in the archaeological record) caused or determined social systems to take shape, which prompted an important processualist question: “What is there about the system of technology that either facilitated or determined parts of the social or belief systems?” (Leone 1978:194). By following Leone’s trajectory, we can arrive at a position as archaeological practitioners in our praxis where “[w]e would add a comparative and, hence, a more formally scientific approach; we would vastly increase the temporal depth of the field and; most important, we would be studying technology
within the matrix of culture” (Leone 1978:195). Leone addressed this pertinent research question by devoting the bulk of *Archaeology as the Science of Technology* to Mormon town plans based on the ideal Plat of the City of Zion and Mormon uses of fences, their articulation with Mormon ideology, and Mormon social organization.

According to Leone, fences are also a causative agent. Leone is however cautious to draw an analytical distinction between reconstructing a historical context and doing an analysis of the determinative characteristics of technology. In a reflexive archaeology there is an opportunity to learn about Mormons from their fences at the same time we may investigate ways fences influenced Mormonism. Hedgerows, windrow trees, white picket fences, and corrals are “a nonrandom pattern of fence use. The kind of fence used was decided by what was kept in, or as the case will show, what was kept out” (Leone 1978:197). Leone’s analysis concludes that wind, sand, predators, Gentiles, and neighbors were kept out by fences, and “… their primary role as a piece of enabling technology is established” (Leone 1978:198). Not only does the fence serve an engineering purpose, it also has social and ideological functions, namely “fences provided the visible distinction between individual property holdings” (*supra*). More than just providing visual distinction between individual property owners, a Mormon fence separates the private from the public. Later, after establishing themselves and subduing the landscape, some Mormons were more financially successful or had more capital than others, thus status and wealth differences were contained within the boundaries of a fence, too. Thus Leone found that the technology of the fence enabled certain social tasks to occur while co-facilitating egalitarianism and social hierarchy. If we take technological determinism seriously, we can expect to see “the effect of artifacts on culture” (Leone 1978:199). If this premise is true, then:
… despite overwhelming changes in Mormon culture, there is an unchanged relationship between a key set of artifacts and a set of religious symbols. Fences still keep the same things in and keep the same things out. … The fences enable them to redeem the earth and manipulate and act out the categories used to deal with the world. Despite changes in form, there have been few changes in function. [supra]

Then Leone wrote the most curious admission in the penultimate paragraph: “Nothing has been said here about town plans and fences that is necessarily true outside of Mormonism. A comparative generalizing study has not been done” (supra).

There is only one reasonable, logical response to this: Why not? Whereas it is accepted that only Mormons sought to create a New Zion in the Intermontane West of North America, is it so obvious that town plans and fences are the ideal technology employed by Mormons in their project to create the abode of Jesus Christ and the righteous and endowed Latter-day Saints who will reside in the City of God on Earth during the Future Tribulation or The Rapture? Or is there something within the boundaries of fences and Mormon settlements that is the ideal expression of ideology? These questions form the basis and need for this dissertation. If there is any doubt that town plans and fences are the ideal technologies, then further inquiry is so that the truth can be ascertained. Perhaps also it is time to test Leone’s hypotheses against his own schema and Žižek’s rubric to determine if Leone was correct in his assumptions. It deserves reiterating that neither Dr. Leone nor the author is a member of the Church of Jesus Christ of Latter-day Saints (LDS). All observations and interpretations by this author are subjective and are open to critique. I have done my level best to stay faithful to Leone’s understanding and interpretation of Mormon ecological ritual while giving Mormon ideology justice. At this juncture, an excursus and brief examination of recent scholarship on the Plat of the City of Zion is warranted.
In 1833, with the help of farmer and scribe Frederick G. Williams, Joseph Smith, Jr. drew a schematic map of the Ideal Plat of the City of Zion (Smith 1833) (Figure 4). Smith’s map was based on the biblical mention that “New Jerusalem, ‘lieth four square’” (Francaviglia 2015:28).

In fact, it was Williams’s drafting skills that first helped Smith’s vision of how a temple should look take actual form on paper. Now with an entire city to describe, Smith and Williams collaborated cartographically. This type of team effort is common for most maps, because mapmakers are, strictly speaking people who draft the lines by putting (in this case) pen to paper. They may or may not be the people with the vision to
conceptualize the place that will be represented. In that sense, Smith is the visionary behind the map while Williams is the hands-on cartographer. This distinction, of course, is arbitrary because both individuals are needed to actually make the map. As seen on the Smith/Williams map, the City of Zion is not only the blueprint for a real place but also an abstract idea for many places. It depicts, in a word, something utopian. [Francaviglia 2015:31; emphasis in original; see also Bushman 2005:6]

LDS Historian Richard Bushman predicted in a lecture presented at Utah State University, the City of Zion is, was, and always will be “a place of refuge in the apocalyptic destructions that were to precede the coming of Christ” and the one constant iss the belief that the “City of Zion will be the place where the Second Coming will occur, and that may happen at any time” (Bushman 1996:10; emphasis in original). The use of a future subjunctive case in the quote from Bushman alludes to Mormon salvation time (Leone 1979:vi, 29). The Rapture is ever-anticipated in Christian time; in Mormon salvation time it will have been; it is inevitable; it is a matter of when in a future perfect grammatical tense and chronological sense. In Leone’s conception of Mormon salvation time, “there was no creation, for God and a part of everyone’s personal being always existed and will continue to exist into the infinite future” (Leone 1979:29). In Leone’s context, “Zion is not solely in Utah but wherever there are Mormons” (Leone 1979:28). It must be noted that the plan for the City of Zion was “never canonized, or characterized, as a revelation” in Joseph Smith’s time or thereafter (Francaviglia 2015:30). If the City of Zion is a utopia, and utopia literally means ‘no-place,’ then can a City of Zion ever actually exist or have existed? Because only variations on the Plat were constructed and those that were constructed were never fully realized as a City of Zion, doubt is raised as to the temerity and validity of Leone’s results.
Leone continued to investigate and publish on his study area along the Little Colorado River in Arizona throughout the 1970s. The remainder of this literature review will focus on the other technology Leone identified as being a significant adjunct to Mormon settlement of the Intermontane West in the 19th and early 20th centuries: dams and their periodic reconstruction.

In Issues in Anthropological Archaeology, Leone cautioned against the practice of “‘flamboyant symbol mongering’ (Geertz 1964:68)” (Leone 1974:14). This is profound and more than a little odd in light of Leone’s admission of untested hypotheses originally in 1973 (and again in 1978). The original meaning of American anthropologist Clifford Geertz’s ‘flamboyant symbol mongering’ refers to the application of present-day meanings onto objects from the past, in this case when archaeologists are wont to apply ethnographic analogies to ancient archaeological site interpretations. This type of grafting or hybridizing may not be appropriate (Leone 1974:14).

William Whewell’s 1832 concept of uniformitarianism in the philosophy of the geologic sciences (later attributed to Charles Lyell and applied to archaeological site formation processes) says that the same processes that act upon the Earth presently acted upon the Earth in the past (Cameron 1993:42). American paleontologist, evolutionary biologist, and historian of science Stephen J. Gould is credited with having provided working definitions of both substantive and methodological uniformitarianism such that, “[b]oth postulate uniformity, but according to whether this be a uniformity of rates of the material processes themselves or of the abstract laws by which they operate, two distinct concepts arise” (Gould 1965:226). When considering methodological uniformitarianism in a materialist evolutionary archaeology that also investigates ideology (‘abstract laws’ by which societies operate), it is inappropriate to assume that principles
that guided decisions in the modern era are apt or directly correlative in prehistory, though there may be areas of overlap, e.g. Marxian versus Marxist interpretations. Thus,

Without a single paradigm to guide, unity of ultimate ends and proximate goals can not be achieved. This exists either because the paradigm for anthropology is as yet incomplete—as it probably is—or because there are several competing paradigms within the field at the moment. This latter is also true, and it is to be observed that none of those used now is complete. [Leone 1974:15]

This passage is understood to mean that archaeology was, is, and will always be woefully incomplete yet archaeologists have persisted and continue to pursue explanations of the past based on observations made in the present from multiple perspectives, paradigms, and disciplines—as they should until a more unary paradigm is constructed that meets the needs of the present and future. It also behooves archaeologists to expand the scope of the discipline because we are only “dimly aware” of the complex interactions between material culture, objects, and technology (Leone 1974:27). It would appear, then, that Leone took his own admonition seriously when, based on the work of Robin George Collingwood in philosophy, history, and archaeology, and anthropologist Roy Rappaport’s inquiry into ritual and ecology, he re-investigated his study area along the Little Colorado River in Arizona from an historical ecology perspective (Leone 1977, 1979).

In 1974, Leone published “The Economic Basis for the Evolution of Mormon Religion” in an edited volume entitled Religious Movements in Contemporary America (Zaretsky and Leone 1974). Leone’s purpose was stated immediately:

This paper is a case study of specific evolution (Sahlins and Service 1961:12–44). It is an examination of the changes one culture has undergone over the course of a century. It is
not overtly comparative and as such does not aim at an explicit contribution to general evolution. I am interested in the adaptive modification of Mormon culture in a part of the Great Basin. Such an examination has as its explicit aim the elucidation of the means one culture used to meet the threats induced by a changing environment, both natural and super-organic … and as such nineteenth-century Mormonism would not be efficient today and vice versa. [Leone 1974:722]

The remainder of the paper is a test of American sociologist Robert Bellah’s “scheme of general religious evolution” (Bellah 1970:20–50). Bellah and Professor of the History of Religions J. Stillson Judah “suggest that there is a class of modern religions which is oriented to change and as such is to in tune with the varying demands placed on adherents that the religious system changes as the rest of the culture changes” and as such the “rituals of Modern Religion have systematic empirical effect on the natural world by making the content of the rituals the practical problems of the day-to-day world of adherents” (Leone 1974:723). Until Leone, “[s]uch an examination of the empirical effects of ritual [had] not been subjected to testing in a complex culture nor in one where a population had to depend on many natural zones for survival and where no one zone could support a population by itself” (supra). Leone’s examination resulted in the soft conclusion that, “ritual is embedded in ecology and facilitates the distribution of resources critical to survival” (Leone 1974:726).

In ecological theory, Mormon inhabitants of ‘new’ environments participated in “adaptive radiation” (Leone 1974:730). Indeed, “Mormonism’s unique survival value resides in its ability to impose the religious system on, to sacralize, all day-to-day activities and, by doing this, to so key itself to those activities that it sacralizes whatever its people touch” (supra). Thus, “[r]itual activity usually has an immediately sacred end, and for Mormons all pragmatic matters
aimed at redeeming and building up the earth were sacred by definition” (Leone 1974:732). This will be important to remember in the analysis of an OMIDAR that resolves the research problem outlined in Chapter I.

Once again, based on his observations and insights, Leone hypothesized yet did not comparatively test his model, rather Leone purported his conclusion as fact such that,

… the process of defining Mormonism which was centralized in the hands of a very few in the nineteenth century, has been decentralized so that it resides in the hands of the vast bulk of the faithful in the twentieth century. This process is latent and not recognized or labelled as such by the Church or the faithful. [Leone 1974:761]

Due to its decentralized adaptive strategy, Mormons were able to settle marginal ecological niches throughout the Intermontane West and subsist even if only for a short while. In the Little Colorado River basin, Mormons were able to survive and subsist unto the present in part due to their employment of dams. Dams provided water unless the dams washed out, which they did periodically. Periodically then, Mormon High Councils were convened and reconstruction of the dams was orchestrated. Leone would have liked his research on the Little Colorado River Mormons to “stand in microcosmic fashion for what went on contemporaneously in Great Basin Mormonism as a whole,” but “[t]hat is a more general level of inference and as such must be subject to further testing than is provided for here” (Leone 1974:726). The Great Basin and the Wasatch Valley provided protection, constrained where people could settle and attempt agricultural projects, fostered social intercourse, and fairly necessitated that farmers separate from their fields but not too distant (Nelson 1930:29). These factors presented themselves in different landscapes and climes as the Mormons began to expand and migrate outside of Utah, the subject of Leone’s *Roots of Modern Mormonism* (Leone 1979).
Landscape archaeology studies in America began at about the same time as the historic preservation movement following the National Historic Preservation Act of 1966 (NHPA; Public Law 89-665; 54 U.S.C. 300101 et seq.). Landscape archaeologists and historic preservationists were interested in re-discovering and documenting domestic structures and gardens (properties) of early American historical and political figures such as George Washington’s Mount Vernon, Thomas Jefferson’s Monticello, and William Paca’s garden (Leone 1984; Harmon et al. 2006).

Leone modified again his methods and adapted to the changing landscape of archaeology in a manner akin to his subject. In 1977, Leone published “The New Mormon Temple in Washington, D.C.” in a special publication series volume produced by the Society for Historical Archaeology entitled Historical Archaeology and the Importance of Material Things (Ferguson 1977). Leone employed structural analysis “to show how the pieces of the temple fit together and thus make sense” (Leone 1977:43). This paper is dense in a Deetzian sense, as well it should be, as the argument includes a Lévi-Straussian-Freudian reference in the conclusion. Leone then employs structural analysis because he would also like to

… call this effort a piece of historical archaeology: historical because the Mormons are literate, and archaeology because it attempts to treat a piece of material culture in its whole social context. Insofar as the essay is these things it could also be called art history or architectural analysis or plain ethnography, but [he is] interested in calling it archaeology because it allow [him] to highlight the role of form—built three dimensional form—in human behavior. [supra]

It is important to note here that three-dimensional objects are easier to recognize as artifacts in archaeological praxis; two-dimensional objects such as maps, texts, or photographs (images) are recognizable as archaeological, too, but are more commonly referred to as archival materials not
as archaeological artifacts unless located and recovered at or below the surface of the Earth. It is further curious to note that LiDAR imagery is capable of being projected in GIS in 2.5-D—a technological compromise between the real and a facsimile or projection of a real two-dimensional map or image. A 2.5-D image is capable of representing change in elevation because it is based on a DEM. It is a false image because it is ultimately two-dimensional yet appears almost three-dimensional (Chapman 2006). Nonetheless, DEMs and LiDAR imagery are useful in structural analysis and landscape archaeology landscape analysis because, as Chapman explains, “…GIS only simulates the physical world and, in the case of archaeology, it can demonstrate how sometimes this simulation is the closest way of approaching the unknown, past realities being studied” (Chapman 2006:37).

GIS and LiDAR imagery were not available to Leone in 1977, so his study of the Washington Temple had to rely on his in-person experiences and the experiences of informants Leone interviewed. As for the experiential aspects of Leone’s structural analysis of the Washington Temple, one could say that his work verges or merges with the phenomenological landscape archaeology of Matthew Johnson (2012a, 2012b).

A final note on “The New Mormon Temple in Washington, D.C.”: Leone presents a bird’s eye view line drawing perspective of the main façade on the first page of his 1977 essay. This black and white line drawing does not adequately convey the massing, cladding, height, or dimensions of the actual Washington Temple; the line drawing of the front elevation does not have a scale or even a North arrow to orient the viewer. In Leone’s 2010 retrospective, Critical Historical Archaeology, Leone includes a black and white half-tone photographic image of the Washington Temple which gives the reader a more accurate and realistic reference for the remainder of the paper excerpt than the original 1977 paper provided (Figure 5). The half-tone
photographic image reveals some of the three-dimensional qualities of the Washington Temple in two dimensions similar to the capabilities of projecting DEM-based LiDAR imagery in 2.5-D in GIS minus the half-dimension (if the half-dimension can be said to ever actually exist).
First, though, Leone (1977) returned to a central concern in processual archaeology: muteness. The muteness of the conversation between Mormons and non-Mormons over the then newly constructed Washington Temple built by the Church of Jesus Christ of Latter-day Saints in Montgomery County, Maryland near the District of Columbia was an appropriate place to start (supra). By gathering what was known about Mormon temples and analyzing how the technology facilitated the religion and the religion influences the sacred program of use, Leone was able to interrogate

… what Deetz and Glassie in this volume [Deetz 1977; Glassie 1977] call cognitive patterns; what Erwin Panofsky refers to as symbolical values (1955:31); and it involves what most of us know directly from Lévi-Strauss as structure. Further this is what is meant by archaeologists as style. In addition to using structure or style to understand this building, I also want to use the actual patterns of the material the temple is built of to see how it guides people's behavior and, more effectively than words, communicates the essence of Mormonism. That neither visitor nor Mormon may articulate the temple's messages is beside the point; they are there just as is …. [Leone 1977:44]

This passage is significant because of the last three words: ‘just as is.’ This qualifying phrase is fundamental when interrogating Mormonism: one ought to accept Mormonism “as is” and not attempt to analyze or explain it in contexts other than Mormon. One may compare and contrast Mormonism with other Protestant religions (as Leone does), but there is no real efficacy in doing so. Leone explains throughout “The New Mormon Temple in Washington, D.C.” that Mormonism exists only because it is in an antagonistic relationship with the U.S. federal government; the U.S. federal government provides the structure to which Mormonism, a structure in its own right, is set in distinct contrast. Out of this antagonistic relationship emerges
a “political millennialism” (Leone 1977:56) that is unlike any other religious sect or movement in U.S. or world history.

Profound, too, is the relationship between Mormon adherents and their temples, “[f]or a temple is as close to the other-worldly as he can come on earth” (Leone 1977:46). A temple is of this world, material, real, yet the experiences an inter-item Mormon has in a temple while performing rites and ceremonies is said to be impressionistic and transcendent. In a Mormon temple, time stands still, or more precisely “it is compressed. Time is overcome” (supra). In a Mormon temple, an adherent “secures one’s past and future” in the “highly fragmenting and atomizing nature of the building itself” which lends itself well to adherents having “deeply personal, spiritual and moving experiences in the temple” (supra).

Concerning the inner and outer experiences of adherents, Gentiles, and the temple structure itself, “Mormons like all believers must juggle discrepancies and contradictions, but, unlike most other Christians, they must do it individual by individual without professional thinkers to invent syntheses from them” (Leone 1977:50). This is taken to mean that this is the condition of late 20th century Mormons, Modern Mormons, not Early Mormons or late 19th and early 20th century Mormonism. Early Mormonism was based on communalism and anti-capitalism, Jeffersonian agrarian ethics, a Manifest Destiny ethos, and a firm belief in the Second Coming of Jesus Christ to North America at any moment among other beliefs. Indeed,

The second paradox which every Mormon faces just because he is a Mormon and incidentally because he is a Christian as well, is the non-event of the promised millennium. The prophet Joseph unambiguously promised the Second Coming before the generation to whom he was speaking passed away. … Nonetheless Christ has not come and Joseph’s generation has passed away. That problem is doubly poignant because the
Second Coming would establish a bliss that would show both the triumph of the church and an end to its persecution. [Leone 1977:52]

When the Apocalypse, the Great Awakening or Great Uncovering, did not happen as predicted, certain adjustments were required to enable the Mormon project to continue its program of earthly redemption while expecting Christ’s eventual return. This disjointed timeline provides a context in which the desire to unite with Christ is an eagerly anticipated delicious wish (sensu Žižek 2008).

Leone referenced John Gager’s 1975 “illuminating analysis of that rather obscure text, the Book of Revelation, St. John’s Apocalypse” (Leone 1977:52). Leone could have also referenced Ernest Lee Tuveson’s Redeemer Nation: The Idea of America’s Millennial Role (Tuveson 1968). Placed within the context of Manifest Destiny borne of a westward expansion of Europe already in progress, i.e. colonization, America was to be either a New Rome (a Capitalist republic) or the New Promised Land, Zion, New Jerusalem of “a chosen people” (Tuveson 1968:96). Leone made no reference to Manifest Destiny in his 1977 essay, but he did remark on Divine Providence: “Mormons feel their religion is worthy and true and credit the building of their community and specifically of its temple to Divine Providence” (1977:58). This passage is in reference to the Washington Temple built between 1971 and 1974 not any 19th or early 20th century Mormon temples, so the analogy is not exactly analogous. It should be noted, however, that Divine Providence and Manifest Destiny are intimately related.

Manifest Destiny was a quasi-religious, quasi-political belief that God had ordained the United States to stretch from sea to shining sea (Francaviglia 2015:49). According to Tuveson, Manifest Destiny was Christian capitalism plus historical ecology. Tuveson also frames Manifest Destiny as “a kind of national Protestantism” (Tuveson 1968:85). Manifest Destiny is an
American belief inherited from Europe, Great Britain especially (Tuveson 1968:91–92).

Although the terms Manifest Destiny and Divine Providence are not perfectly analogous, they are historically related as evidenced by American columnist and editor John L. O'Sullivan’s use of the proper noun ‘Providence’ in the July–August 1845 issue of the United States Magazine and Democratic Review when referring to the annexation of the Territory of Texas such that:

… in a spirit of hostile interference against us, for the avowed object of thwarting our policy and hampering our power, limiting our greatness and checking the fulfillment of our manifest destiny to overspread the continent allotted by Providence for the free development of our yearly multiplying millions. [O'Sullivan 1845a:5]

O’Sullivan paraphrased himself on 27 December 1845 in the New York Morning News to justify “… the right of our manifest destiny to overspread and to possess the whole of the continent which Providence has given us for the development of the great experiment of liberty and federated self-government entrusted to us” (O’Sullivan 1845b) regarding the dispute with Great Britain over the Oregon Territory. The word providence is derived from Latin and Old French and has as its root the verb providere—to attend to; to provide, thus the proper noun version of providence connotes the protective care of God over man and nature for the future. In both examples, O’Sullivan presents providence as a proper noun and this convention thus alludes to ‘Divine Providence.’ By the turn of the 20th century in America, though,

The idea that any one state is to “redeem” history [was] wholly inconsistent with the Augustinian and medieval idea of the City of God, which denies that this world’s community and history can ever be transformed. … But when the Protestant millennialist theory was formed, logically there came with it a need to find a new chosen nation, or nations. If history is theodicy, if redemption is historical as well as individual, if evil is to
be finally and decisively bound through great conflicts, God must operate through cohesive bodies of men; there must be children of light and children of darkness geographically, and the City of God and the City of the World should be susceptible of being designated on maps. [Tuveson 1968:139]

Thus, whether under the aegis of Divine Providence and or Manifest Destiny, Mormon New Zion is just such an ideal City of God on Earth. The question remains: Can New Zion be located materially or was it, is it, and forever will it be only a notion? This question enjoins Lévi-Strauss’ structural symbolism as well as concepts derived from Freudian psychoanalysis.

Because psychology was included in Leone’s structural analysis, it is appropriate to delve into the psychological aspects of Leone’s argument. Hence,

This is the kind of analysis that some art historians, some architectural historians and some cultural historians have been doing for some time. It is not psychologising, but it is rather impressionistic. It is quite empirical, although as with structuralism as a whole, difficult to disprove and consequently difficult to test. Its popularity demonstrates its utility insofar as popularity demonstrates strength. I personally think that neither Glassie nor Deetz have done much more than an impressionistic job at this type of analysis and, in not consulting the sources they might have, have missed reaching a level of generality. [Leone 1977:44–45]

The difficulty to test or disprove any conclusions found in structuralism is not insurmountable in postprocessual or postmodern archaeology; one may forego the need for hypotheses and positivistic proofs and proceed anyway with an investigation and propose reasonable explanations of cause and effect for phenomena empirically observed (Johnson 2012a, 2012b).
Indeed, Leone remotely posits the experiential qualities of a Mormon undergoing ceremonies in a Mormon temple by describing impressionistic outsider observations and summations thus:

Consider then what is going on for the Mormon in the temple. He brings expectations of profound experience and sometimes specific problems to be solved. Narrated before him by supernatural personages is the whole of human history comprising the creation, fall and redemption of man. At one point there is actually verbal and physical contact with God himself and then God actually invites the purified to enter and experience heaven. … If he believes what he is hearing, the Mormon is hearing a level of reality not present even in *Revelations*. The contradictions in the past and the future are overcome, and so consequently is time. Time is held still and all the paradoxes arising as a result of the way time does indeed pass are faced and resolved in the temple experience which is along, fully participatory, emotionally profound recitation and enactment of the answers to life’s basic questions. [Leone 1977:52]

This profound experience is facilitated by the technology of the temple, its architecture, plan, and program, even if Leone and non-Mormons cannot know about it personally. The temple as a technology

… is so large and contains so many rooms it merely absorbs people. It was quite possible to be alone, removed and peacefully at east without seeing or being seen by another person. These are useful, if personal observations, because they reflect the highly individual, and private nature of the experience Mormons have in this building. It is very much tailored to the self and the idiosyncratic. [Leone 1977:47]

Again, this atomization of the Mormon self is not characteristic of 19th and early 20th century Mormonism; it is a Modern Mormon texture. Early Mormonism had an all-for-one-and-one-for-
all ethos. The relationship of the individual to the group can best be symbolized by the bee and
the beehive in Mormon iconography, an aspect of Mormonism Leone interrogates in passing.

The symbolism is very old in this church, is conscious and recognized by all members,
and has been elaborated at one time or another before all Mormons. Consequently it is
neither an accident nor a particularly unconscious action that the new Washington
Temple is hexagonal, the basic geometric pattern inside a beehive. Temples, like
beehives, build and demonstrate order, and the individual who goes through one is shown
order and is empowered to create the very order he witnesses. [Leone 1977:47]

What is significant about the last sentence of this passage is the evocation of the power to
create at the hands of humans, Mormons to be more exact. The hexagonal plan of the
Washington Temple, its Divine Providence, and all that the temple is qualifies the temple as a
technological object that is potentially the OMIDAR. Only a comparative test of Leone’s
hypothesis can tell us for certain (Leone 1978:199).

In 1979 Leone continued to investigate 19th and early 20th century Mormon agricultural,
economic, and religious ritual in Mormondom by examining High Council meeting minutes,
church records, archival materials, and oral histories in Mormon Arizona. Leone begins with a
revised perspective on the Mormon microcosm such that, “Mormonism is a way of thinking used
by increasingly powerless people in modern society. This it is not a microcosm of the present or
a vision of the future; it is a religion for subordinates which serves to maintain their condition
intact” (Leone 1979:vi). Maintenance of an intact condition is a different notion than the one
Leone proffered in 1977; that Mormons were successful principally because they employed
‘adaptive radiation’ whereby they modified themselves and their culture to various and complex
existing natural circumstances and pre-existing cultural variations (Leone 1977:730). Mormons
maintained their condition intact while also making compromises due to complex and often marginal landscapes. In other words, in a reflexive almost postprocessual perspective, “Mormonism assumed change and changed accordingly” (Leone 1979:vi).

Leone investigated dam construction, periodic destruction due to flood, their eventual reconstruction and the social structure needed to orchestrate this chain of events on the Little Colorado River in Arizona. The process can be symbolized by a left hash line connoting a return and written as re\construction. Dam re\construction is seen by Leone as a demonstration of self-reliance while also exhibiting discipline, self-consciousness, and perhaps most importantly flexibility and adaptability to changing circumstances. From this Leone was able to distill a Mormon adaptive strategy (Leone 1979:25) that also has calendrical and worldview aspects at the regional scale. Curiously, Leone remarks that the Mormon adaptive strategy had not been noticed by students or even the faithful (Leone 1979:vi), a semi-self-righteous perspective in this author’s opinion that will be re-examined in the concluding chapter of this dissertation.

It can be said then that Mormonism engaged with the celestial sphere while being grounded in the terrestrial, the material, and the empirical as well as a form of social organization and or stratification that had implications for the way Mormons approached ecology. Leone took the position as a non-Mormon and non-historian that:

Both God and man are subject to the natural processes of the universe, and both cooperate, under these constraints, to improve man’s estate. This cooperative process is called the Plan of Salvation. According to the plan, God gave mankind life with rules to live by (the gospel), a redeemer to atone for their sins (Christ), and an opportunity to achieve God’s glory. The ultimate goal of salvation is not to unite with God in the usual Christian sense but to become godlike. [Leone 1979:31]
Leone’s summation of Mormonism was “one in which conceptual looseness works with authoritarianism to create subordination” (Leone 1979:vii). In a teleological twist, the subordinate role of adherents is critical to the continued survival of Mormonism: “It kept people persevering at difficult tasks which were thought to be essential to building up the kingdom in general, and eventually it produced a world view of permanent subordination” (Leone 1979:98). Thus ritual reconstruction of dams, “based on this kind of philosophy can be used to present arbitrary, even fallacious logic as acceptable truth” (supra). Here, ‘fallacious logic’ appears to refer to a belief that human engineering could conquer Nature, subdue it, control it, and make it work for humans in the ways humans wanted Nature to behave (Tuveson 1968).

The condition was, is, and always will be that while Nature does adhere to certain rules of physics it does not behave according to any plan or design of humans no matter how much hubris is applied. Humans have travelled to the moon and back not by breaking the law of gravity but by working with gravity, by thinking about the nature of gravity in different ways while still being subordinate to it. We must be mindful that early Mormonism was as much about sanctuary and the soul as it was about dollars and cents. Dean Depew McBrien (1929) found that within the Mormon text *Doctrine and Covenant*, of the 112 revelations of Joseph Smith, 88 concern economic matters in some way, shape, or form. Therefore, Mormons persisted not by adhering strictly to Doctrine, but by working with Doctrine to find workable solutions to local problems. Whereas Mormonism began as a utopian anti-capitalist agrarian ethos, it was and always has been enmeshed in an antagonistic relationship with Capitalism. Rather than create a completely new economic system, Mormon leaders found through compromises in praxis they could arrive at pragmatic solutions to local problems, participate in Manifest Destiny (Tuveson
1968), and continue to practice their faith without having to cease and desist or die in another territorial war with the U.S. federal government.

Leone found that, “Mormonism is almost always characterized as hierarchical, authoritarian, and literalistic,” yet “continuous revision of meaning by the individual believer, a process facilitated by the immediacy and availability of revelation and the freedom to discuss all religious topics in the conviction that all can be equally well understood”(Leone 1979:171). This led to a situation in the present in which:

Mormons have a set of autonomous and disarticulated concepts which, while strong enough to mask economic, political, and psychological reality, have nevertheless lost the ability to comment on them, an ability that they conspicuously possessed in the nineteenth century. [Leone 1979:191]

Through subordination to God, Nature, and the U.S. federal government, Mormons developed an adaptive strategy (Leone 1979:vi, 25) before and after the turn of the 20th century (Leone 1977:60) that has served them well. Mormonism adapts to its current condition(s) because it always has, always does, and always will have because God is all in salvation time, and dams participated in this dynamic to some extent. In the chapter entitled “Water Control,” Leone deconstructed the dynamics of dam re\construction thus:

Dam disasters fill the plates of the Little Colorado histories …. Until the 1920s, when permanent dams using modern engineering and reinforced concrete were built, the disasters and the spiritual “testing” they represented continued unabated. Until then all Mormon dams were built in essentially one of two equally unstable ways. One type involved mud, sand, and stone piled in and around a maze of logs and brush; the other was a solid earthwork. [Leone 1979:90]
Leone prefaced this passage with an allusion to the joy of earthly redemption tempered by the disappointment of natural disaster when he points out that:

The Mormons were not aware of the cyclical dynamism of conditions around them, but their records show that the worsening environmental conditions kept pace with and may even have outrun their own growing competence in water control. This is part of the reason that the Little Colorado towns built and rebuilt so many dams and yet disasters remained so unremitting. In their desperation, the Mormons were forced to accept a particularly hard-driven deity behind these conditions, one continually testing his Saints. [supra]

For the reasons given above,

All the early diversion dams leaked as a result of the way they were constructed. Later leak-proof dams were made of earth, as in the Snowflake-Taylor area, or of stone and cement, as at Woodruff and St. Joseph. All had spillways, which were supposed to keep floods from pilin up behind a dam and spilling over the top in an unselective fashion. But the spillways were never adequate, and when a flood came, the dams were too limited for the volume they were forced to handle. Moreover, dams often were not provided with adequate foundations. This factor, coupled with inadequate spillways, meant that dams frequently gave way in a flood. [supra]

Dam breaches were without a doubt frustrating, but their re\construction enjoined multiple aspects of Mormon society and engaged adherents in doing God’s work on Earth. Indeed, Contemporary documents show that daily labor was an act of worship and that, in the case of critical projects, worship was filled with an unusual immediacy because one had to search for God’s will in current events. Was the washout a sign to leave the town? Was
periodic disaster a message to abandon the spot as a place to settle? Should they or should they not seek an alternative to the whole effort? These questions occurred to every family about its relation to the town, the dam, and settlement in Arizona, and it occurred to the whole people as a people about is common effort. [Leone 1979:103]

Thus,

When a decision to rebuild a dam had been made and a plan of action set up, doubts were alleviated at the communal level. Doubts could never be entirely eliminated, however, despite the taken-for-granted stance enunciated by the hierarchy. Since the resolution of doubts and the forming of decisions took place in the various types of worship service, those services themselves took on the character of forums for confronting the pragmatic in the context of the sacred. [supra]

This last passage almost suggests that High Councils are a form of technology. Whereas a group of humans could theoretically be regarded as an object, a High Council is not a technology in the strictest materialist sense of the word; a High Council is a function of social stratification, hierarchy, and authority within Mormon society and ideology.

Mark P. Leone and Parker B. Potter, Jr.’s edited volume, *Historical Archaeologies of Capitalism* (1999), cannot go unaddressed in a literature review of Leone’s oeuvre. Leone and Potter set some terms early, terms which are useful when referring to objects, labor, and human interactions within natural environments and landscapes.

To begin, if we accept that ‘things’ or objects are made by humans, then objects or ‘things’ are artifacts. Objects, ‘things,’ or artifacts can be and commonly are (or were) exchanged for ‘things,’ objects, or artifacts, labor, or money. ‘Things’ are objects but not extensions of social relations; social relations are seen and function as or like objects
however. Commodities and commodified relations are not the same as artifacts or material culture. But our task as archaeologists is to tie the two together so that archaeological circumstances can be better understood in the context of capitalist relations. The vast majority of archaeologists do not see a connection to be made between the things they uncover in context from the ground and written records, and the production and market forces that gave them birth. The position we take defines artifacts as mirrors of culture, as well as building blocks of culture. Things are symbols of meaning, as well as personalized expressions of meaning. Artifacts are fetishized forms of exploitation, as well as avenues to personal fulfillment. [Leone and Potter 1999:17–18]

Whereas technology refers to tools and machines in a materialist sense, it also refers to the ontological aspects of engineering or applied sciences. In the gap between the two meanings one could theoretically situate Mormon High Councils because they applied and continue to apply pragmatism and ideological principles to real-world problems and situations in an effort to resolve them much like the application of theory and method to a scientific research problem. Because there is a grey area with regard to Mormon High Councils as a form of technology, it is not considered an ideal technological object that facilitated Mormon settlement of the Intermontane West. Moreover, Mormon High Councils are not physically material and recoverable as an artifact in an archaeological context which further disqualifies them for consideration as an OMIDAR. Whereas Leone researched and published trenchant examinations of evidence supporting the roles and functions of Mormon High Councils in the Mormon adaptive ecological strategy (Leone 1979), Leone sought a reified, material archaeological object that is also the ideal technology that facilitated Mormon settlement of the Intermontane West, a technology that is a product of Mormonism and which produced Mormonism.
As of 1999, Leone had still not located the ideal technological object that resolves the problem he posed in 1973 and 1978:

Our definition of what counts as material culture is as inclusive as possible. One feature of inclusion is a shift to defining material patterns based on consumption and use, rather than on production. As we draft an archaeology of capitalism, this shift provides a powerful means of returning some sense of individual motivation and action, and, therefore of creating ways of analyzing objects whose meanings are ambiguous [Leone and Potter 1999:18]

The passage, ‘this shift provides a powerful means of returning some sense of individual motivation and action’ contains a nod towards agency. This is important to remember going forward and when considering Leone and Potter’s ‘objects’ within Žižek’s conception and examination of objects of ideological desire. When it worked, dam technology made it possible for Mormons to subordinate Nature and make water work towards earthly redemption and the creation of a New Zion. High Councils are rituals and as such are performances acted out by agents of earthly redemption unlike dams which are material objects that serve a technological function and purpose in the process of earthly redemption. If anything, dam technology mediated Divine Providence, human labor, and Nature and is therefore a strong OMIDAR candidate.

On the topic of labor, labor is a commodity when it is bought and sold, yet subsistence farming may be an exception. If communal groups of laborers produce commodities only for the consumption and benefit of the in-group, commodities in this scenario are not bought and sold. They have no exchange value, but they still have value and worth. Indeed, “[w]hen work is compensated for with money, the tie effectively severs object from market value, on the one hand, and producer from owner, on the other. Such severed ties are the basis for profit
accumulations, as well as exploitation, which produces poverty” (Leone and Potter 1999:5). In this sense, Mormon utopian communalism is anti-capitalist (Leone 1979). More,

This assumption necessitates both the deconstruction of the given product—a particular history—and the construction of a new product—a revised history that does not wholly undermine the value of what has come before, but which bears the marks of the explicit reasons for its creation. Of course, we also see that those who study capitalism participate in it. We assume that our disciplines are products of a capitalist society and that using them requires a reflexive or critical perspective, [Leone and Potter 1999:7]

Leone began his investigation of Mormondom with a quest to discover the relationships between ideology and technology by interrogating the ideal Plat of the City of Zion and Mormon fence technology through their social and ideological uses, Mormon temple architecture, plan, and program, and Mormon ritual as it related to dam reconstruction on the Little Colorado River in the late 19th and early 20th centuries, as well as the historical ecological and economic bases for all of the above (Leone 1973, 1974, 1977, 1978, 1979). The role technological objects played in social and economic contexts is a fruitful pursuit of historical archaeologists working in a capitalist context. Case in point, historical archaeologist Margaret Purser’s focus on the detritus of Basque settlers in the American West entitled, “Et Occidente Lux? An Archaeology of Later Capitalism in the Nineteenth-Century West” (Purser 1999), was showcased in Historical Archaeologies of Capitalism (Leone and Potter 1999). Purser re-examined the complex web of social and economic interdependencies that historian Robert Blair St. George dubbed “maintenance relations” (St. George 1983; Purser 1992). Purser observed how

… locally focused structures linking producers, consumers, and mediating specialists were highly sensitive to shifts in technology that originated well outside local contexts.
What the archaeological and documentary records of Paradise Valley actually track is the gradual replacement of locally assembled, processed, and maintained consumer goods with goods either more fully processed at distant production centers (like the increasingly processed brand-name foodstuffs of the early twentieth century), or composed of replaceable parts not intended to be either assembled or mended locally (like the vehicles and farm equipment made increasingly of cast- or stamped-metal components following the 1890s). [Purser 1999:129]

Hence, Purser’s example of putting the past in order revealed previously unknown intersections of ideology, natural resources, and commodity consumption with change over time. Leone’s aim was to discover if there was or is a positivist cause and effect relationship that changed over time evident among artifacts and objects or pieces of technology in shaping ideologies and the role ideologies have had in shaping technology is a noble pursuit that too often, however, results in mute data (Leone 1977, 1978). Leone found that fences (a technology) really do make better neighbors, Mormon temples and the ideal Plat of the City of Zion are desirable places and by extension objects, and dams facilitate the distribution of water needed to grow crops (Leone 1973, 1974, 1977, 1978, 1979). But this does not address or answer the research question: Can the OMIDAR ever be identified and located?

Leone’s approach or praxis was neither purely positivist nor purely scientific; Leone wanted historical archaeology “to work so that it [is] generalizing or scientific” (Leone 2010:14). Leone’s generalizing approach is as significant as a specified scientific approach. In order to know for certain if Leone’s hypotheses were or are correct, a test against Žižek’s rubric and schema is needed.
In 2010, Leone critically revisited his back catalogue in *Critical Historical Archaeology* which includes among other topics a re-examination of his original research on Mormon historical ecological ritual, the plat of the ideal City of Zion and fences, as well as Mormon temple architecture, plan, and program. Leone did not discuss dam reconstruction again in his 2010 retrospective. In the interim, however, Leone read Slavoj Žižek’s *The Sublime Object of Ideology* (2008). Leone’s discussion of Žižek occupies only a few pages and deserves wider examination. Žižek’s rubric and schema for the identification of the object of ideological desire have a potential to answer the research problem posed in Chapter I. Certain key passages are cited here so that Leone’s interpretation of Žižek can be better understood as well as situated within Leone’s oeuvre and evolving argument.

According to French Marxist philosopher Louis Althusser (1971), Leone (1973, 1978, 2010), and Žižek (2008), ideology is a fantastical Other that structures and directs social realities both internal and external to empirical experiences of the Subject. Indeed,

> The dialectical approach is usually perceived as trying to locate the phenomenon-to-be-analysed in the totality to which it belongs, to bring to light the wealth of its links to other things, and thus to break the spell of fetishizing abstraction: from a dialectical perspective, one should see not just the thing in front of oneself, but this thing as it is embedded in all the wealth of its concrete historical context. … The problem is thus not that of how to grasp the multiplicity of determinations, but rather of how to abstract from them, how to constrain our gaze and teach it to grasp only the notional determination.

[Žižek 2008:x–xi; emphasis in original]

Given the parameters outlined above, Leone argued that “[a]rchaeology could profitably study both the manipulation of material culture (why and how we do what we do with technology) and
the manipulating that technology does on the rest of culture” (Leone 1978:195). This can be accomplished if Žižek’s definitions are taken into full account.

Leone finds that,

Žižek’s objects achieve two things. First, they reveal an ideological—that is fantasy—quest for the perfect, the ideal, the stable; and then, second, the object helps find the ideal in some other time. There is nothing new there, although he is doing better than Althusser did with ideology. This makes ideology a wish, and a deliciously anticipated one, he says. Then, Žižek notices that the object is real. It has to be or would not be convincing. [Leone 2010:209]

In Žižek’s terms,

… it is an object produced by the signifying texture itself. It is a kind of object that came to exist as a result of all the fuss about it. … The paradox, then, is that the process of searching itself produces the object which causes it: and exact parallel to Lacanian desire which produces its own object-cause. [Žižek 2008:180].

Ultimately, it is the process of searching for the Other and the Real which produces the object(s) which caused or continues to cause both, to wit:

First we have the paradox of a signifier which is a part of the representation of reality (filling out a void, a hole in it). Then we have the inverse paradox of an object which must be included in the signifying texture. Perhaps this double paradox offers us the final clue to the Lacanian proposition: ‘There is no metalanguage.’ [Žižek 2008:181; emphasis in original]

Why is this the condition? This is the condition because, “Lacan’s Real is impossible, it is precisely the impossibility which is to be grasped through its effects, its texture, its notional
qualities and abstractions” (Žižek 2008:184). “That is why the real object is a sublime object in a strict Lacanian sense - an object which is the embodiment of the lack of the Other, in the symbolic order” (Žižek 2008:192) of an ideology such as Mormonism. Moreover,

The Real is nothing but this impossibility of its inscription: The Real is not a transcendent positive entity, persisting somewhere beyond the symbolic order like a hard kernel inaccessible to it, some kind of Kantian “Thing-in-itself” – in itself it is nothing at all, just a void, an emptiness in a symbolic structure marking some central impossibility. It is in this sense that the enigmatic Lacanian phrase defining the subject as an ‘answer of the Real’ is to be understood: we can inscribe, encircle the void place of the subject through the failure of his symbolization, because the subject is nothing but the failure point of the process of his symbolic representation. [Žižek 2008:195; emphasis in original]

Mormonism is potentially reifiable because Mormons truly believe their ideology is the true belief; it is not a just performance; for Mormons, their faith is really real not merely Real.

This appearance is essential: if it were to be destroyed – if somebody were publicly to pronounce the obvious truth that ’the emperor is naked’ (that nobody takes the ruling ideology seriously … - in a sense the whole system would fall apart: why”: In other words: if everybody knows that ‘the emperor is naked’ and if everybody knows that all the others know it, what is the agency for the sake of which the appearance is to be kept at any price: There is, of course, only one consistent answer: the big Other [le grand Autre]– it is the big Other which should be maintained in ignorance. This also opens up a new approach to the status of deception in ideology: those who should be deceived by the ideological ‘illusion’ are not primarily concrete individuals, but, rather, the big Other; we
could thus say that Stalinism has a value as the ontological proof of the existence of the big Other. [Žižek 2008:225]

In Žižek’s Lacanian lexicon, the objet petit a, is something that is a byproduct of human consciousness, “the embodiment of surplus-enjoyment” (Žižek 2008:51, 89), “the leftover which embodies the fundamental, constitutive lack” (Žižek 2008:54), is needed to fill a conceptual, ideological void, and is conceptually transcendental. The objet petit a is something sometimes best left in ignorance and not confronted in reality otherwise the lattice of illusions might crumble and fall. The ‘a’ is a quasi-algebraic symbol for the French word autre meaning other. The matter of ‘the little other ‘for the Mormons is the ever-anticipated Rapture. The objet petit a is the object and the cause of the desire which adherents “search in vain for it in positive reality because it has no positive consistency – because it is just an objectification of a void, of a discontinuity opened in reality by the emergence of the signifier” (Žižek 2008:104) like gold. There is one exception and that is a saint. “The saint, on the contrary, occupies the place of object petit a, of pure object, of somebody undergoing radical subjective destitution. He enacts no ritual, he conjures nothing, he just persists in his inert presence” (Žižek 2008:130). Later Žižek describes the object petit a as “a void in the centre of the symbolic order, a pure semblance of the ‘mystery’ to be explained, interpreted” (2008:209). This is interpreted to mean that a saint is the essence, the embodiment of righteousness, holiness, which by regression appears to be a passive position. This is not a characteristic of Mormon Saints; they are quite the opposite, they are active. Moreover, it is doubtful that an early Mormon would adhere to an interpretation that one was hollow, a void at the core.

Žižek outlined three types of ideological objects: voids (deficiencies or absences); large, unattractive objects left over or resultant from the past of which we are all aware; and an index or
circulating object, one that is known to exist or have existed and requires an ideological structure to understand it, e.g. capitalism (Leone 2010:209; Žižek 2008:177–263). Hence, for Žižek, ideology “requires an object of desire which hides the impossibilities, and deficiencies, and antagonisms in daily life, or in society within capitalism” (Leone 2010:209). Žižek’s rubric has a potential to answer a pertinent research problem that emerges out of a re-examination of Leone’s life-work: Can the object of Mormon ideological desire (the OMIDAR) be identified and located in reified form in the archaeological record? The provisional and qualified short answer is, yes. How? By way of Louis Althusser (1971), Leone contextualizes ideology within capitalism and posited:

[S]ince we are members of a capitalist society with an ideology of its own, and since we know that one way ideology operates is to make the present look inevitable by making the past look like precedent for modern conditions … , [Leone 2010:53]

and

… because … ideology’s actual history can be discovered in its tie to material variables, and because those variables are the subject matter of historical archaeology, then there exists the possibility for an important extension of materialist archaeology into historical archaeology. [Leone 2010:55]

Based on these premises:

Zizek’s typology is different from Lewis Binford’s famous one of technomic, sociotechnic, and ideotechnic artifacts. Zizek has no pretense of being all-inclusive. It comes out of his effort to understand ideology which, he argues, requires an object of desire which hides the impossibilities, and deficiencies, and antagonisms in daily life, or in a society within capitalism … and has to look real. The relationships in the here-and-
now are hidden by ideology and are projected onto past objects—actual or mysteriously absent but once present—that indicate a whole other reality where society worked as we would wish. [Leone 2010:209]

Whereas Leone and Žižek appear to be searching for the same ‘thing,’ i.e. an object of ideology, each approaches the search from different angles. By combining the two approaches, it is posited here that there is an increased likelihood of not only identifying but also locating the OMIDAR in reality. There are additional theoretical and methodological posits from Leone’s oeuvre that have a potential to assist in the resolution of the research problem.

Frustrated with the limitations of his initial research in Mormon Arizona and in Colonial Williamsburg, Leone transferred his passion to Annapolis, Maryland. Leone’s Archaeology in Annapolis project, begun in 1981 at the University of Maryland, was one of the first notable landscape-scale investigations in American landscape archaeology. The Archaeology in Annapolis project is also an early example of public archaeology, yet another innovative approach in the late 20th century. In Annapolis, Dr. Leone was most interested in interpreting the rules of perspective in order to focus “on the manner in which ideologically informed representations serve to naturalise the arbitrary nature of the social order … [and] the controlled rationalization of space” within 18th century Georgian landscape architecture and order which simultaneously promoted freedom and independence while “maintaining a system of slavery” (Leone 1984:25).

Daniel Miller and Christopher Tilley’s Ideology, Power and Prehistory (1984), which includes Leone’s paper on William Paca’s garden and other papers that orbit in and around landscape archaeology theory, roundly rejected scientific positivism in archaeology (historical, landscape, or otherwise), because there are particular types of information that would not
necessarily be readily cogent or familiar in other disciplines, such as the various and sundry technologies employed in the past recovered from complex sites and site complexes. The authors posed a similar scenario to one presented by Leone:

Statements about the past are not therefore ultimately to be judged by whether or not they can be tested, or by the outcomes of such tests, but in terms of the conceptual, logical relationships presented between the data and its theorisation, i.e. the internal coherence of any particular study, which can only be criticised in terms of internal conceptual relations and not in terms of externally imposed standards or criteria for ‘measuring’ or ‘determining’ truth or falsity. [Miller and Tilley 1984:151]

Miller and Tilley rejected the positivist conception of a research problem because, “[a] supposed symmetry between prediction and explanation simply does not hold in the social sciences” (supra). This is because, according to Leone, “[s]uch models are then fitted on the past and the goodness of fit is an index to their success as models” (Leone 1978:192). More, Miller and Tilley “do not conceive [the hypothetico-deductive method] as being ultimately parasitic on observation statements but rather the theory-data relationship is reflexive or dialectical in form; both are outcomes of the product of knowledge,” (Miller and Tilley 1984:151), i.e. ontology. This ‘method’ is rare, “because few archaeologists comprehend the rationale of cultural process and still fewer attempt to actualize it” and “few can take time to discover what other disciplines can contribute to their own range of problems” (supra). Leone repeatedly attempted to actualize these objectives in his life-work. First, though, the past must be put in correct order; then we may begin to study the data in terms of cultural evolution with or without other theories, perspectives, or methods from other disciplines.
In 2006, James Harmon, Mark P. Leone, Stephen Prince, and Marcia Snyder utilized LiDAR and GIS to qualitatively and orthographically visualize and re-visit two 18th century Maryland gardens at a landscape scale, William Paca’s Wye Hall Plantation and Tulip Hill Plantation, thus enabling “the entire site” at each location to become the focus of analysis (Harmon et al. 2006:649). Their paper, “LiDAR for Archaeological Landscape Analysis: A Case Study of Two Eighteenth-Century Maryland Plantation Sites” in *American Antiquity* presented processed data maps, comparisons, contrasts, i.e. landscape analysis, and not much else that is significant to a bibliographic essay on landscape archaeology theories besides being disclosive and transparent about how they captured and processed their remote sensing data. Harmon et al. (2006) provided examples of pattern locatable in the archaeological record with GIS and LiDAR imagery that have ties and implications for studies of ideology and historical ecology elsewhere. Indeed, their aim was “to test whether maps and images derived from LiDAR data could be used to accomplish these goals, and thus support interpretations of garden landscapes” (Harman et al. 2006:652). They can. Harmon et al.’s (2006) methodological approach was identified; it was landscape analysis. Harmon et al.’s theoretical paradigm iwa never specified; it was landscape archaeology for lack of a better qualifier. Because LiDAR imagery is available and amenable to landscape archaeology landscape analysis and historical ecology, Harmon et al.’s (2006) methods can be applied to a landscape archaeology landscape analysis of the MRHD—a comparative study area and data set amenable to viewing as ‘one site’). But first, both Leone’s original study area and the MRHD require situation within historical ecology by way of Marxist Ecologist James O’Connor. The environmental and historical background of the MRHD study area will be presented before Leone’s technologies are tested for presence or absence at MRHD.

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8 It is curious to note that Harmon et al. (2006) do not mention by name Samuel Galloway or his wife for whom Galloway built the Tulip Hill Plantation in their paper. Galloway and his wife are mentioned here for posterity.
Chapter III.

Theoretical Frameworks Employed During the Internship and Dissertation

*Landscape Archaeologies*

Mick Aston (1985) is claimed to have coined the term landscape archaeology with Trevor Rowley in 1974 (Chapman 2006:6). Due to a mandated increase in the use of geophysical and remote sensing techniques in advance of development and other construction projects in the UK, landscape archaeology emerged in the 1970s and hit a stride in the 1980s. Geographic Information Science and Geographic Information Systems (both GIS) substantially benefit the sub-discipline of landscape archaeology or any study of landscapes for that matter.

Barbara Bender, Sue Hamilton, Christopher Y. Tilley, and Ed Anderson’s, *Stone Worlds: Narrative and Reflexivity in Landscape Archaeology* (2007), concerned stone features in the UK exclusively. This is not unusual since the majority of early landscape archaeology research since 1974 centered on deciphering Bronze Age megalithic structures (Aston 1985). Scores of books have been written about Stonehenge and contain many maps produced in GIS using various methods of remote sensing or retrieved data (Chapman 2006), techniques that significantly expanded the scope and range of evidence available for interpretation then and now. Recent attention has been paid to the more subtle features surrounding or leading to or from the megalithic structures such as cursi, barrows, and footpaths. The origins of materials used to construct the megalithic structures are also of particular interest to environmental archaeologists.
Kurt Anscheutz, Richard Wilshusen, and Cherie Scheick’s (2001) review in the *Journal of Archaeological Research* began with an operational definition of a landscape approach to archaeology such that it is a “‘pattern which connects ‘human behavior with particular places and times’” (Anscheutz et al. 2001:157), an idea that has roots in the 1920s and earlier (Hirsch 1995). Recent scholarship has turned to a more direct natural-cultural continuum (Anscheutz et al. 2001:158). Indeed, according to John Brinkerhoff Jackson, a landscape architecture scholar, if a landscape is, “a space deliberately created to speed up or slow down the process of nature” (Jackson 1984:8), then “history becomes a substitute for ‘natural processes of growth and maturity and decay’” at the hands of humans (Jackson 1984:156). Landscapes are dynamic constructions, with each community and each generation imposing its own cognitive map on an anthropogenic world of interconnected morphology, arrangements, and coherent meaning (Anscheutz and Scheick 1998:6; Jackson 1984:156). In this context, Jackson promoted the interpretation that landscapes are not synonymous with natural environments but rather they are synthetic and contain cultural systems that structure and organize peoples’ interactions with their environments or the landscape they ‘create.’ Moreover,

If archaeology involves study of people (present and past) through their material and if landscape is perception of an area that has been affected by both natural and human actions (Council of Europe 2000), then landscape archaeology should necessarily be widely inclusive in terms of subject, method and discipline. Archaeologists help society, communities, and individuals appreciate that landscape is more than environment: That is doubly cultural – a cultural product culturally perceived. They also continually confirm that landscape is fundamentally a product of change, and so help prepare society and its members to cope with and take control of further change. [Herring 2012:486]
“Archaeology is the study of past human societies from the material remains that are left in the present. Landscape archaeology, then, is the study of past human societies through the traces left in present landscapes” (Johnson 2012a:516). From this line of reasoning it follows that the path forward is to bear in mind phenomenological anthropological theory and approaches while empirically researching and observing historic landscapes by any means necessary to address hypotheses and answer research questions and problems (Hamilton et al. 2006).

Julian Thomas’s Archaeologies of Place and Landscape (2001) discussed the emergence of landscape studies from the time of Gen. Pitt Rivers’s investigations of Cranborne Chase in England (published in 1887) forward unto the 21st century. For Thomas, the central problem of landscape archaeology has been its overwhelming empiricism due to its inherited and received disciplinary tendency to perpetuate the norms of positivist natural sciences, e.g. “period, sequence, identity, and objectivity” (Thomas 2001:165). While these criteria are important for increasingly accurate and precise understanding of past human activities on landscapes, the landscapes themselves have been treated more or less as backdrops and not as units of analysis in and of themselves. Traditional background research often begins with an inventory of previously recorded resources and a focus on the artifacts or specific sites with only a tacit reference to the landscape or landform in or on which the resources were located (Chapman 2006:10–11). This leads to an over-emphasis on site contents as opposed to the interrelations of sites within a landscape context that can inform us in the present more fully than any one site or its contents alone can (Dunnell 1992; Dunnell and Dancy 1983). Moving the scale of analysis away from individual and discrete artifacts, sites, or features towards the position of the artifacts or objects within social and environmental contexts is perhaps landscape archaeology’s biggest contribution (Ansheutz et al. 2001; Dunnell 1992).
Landscape archaeology also takes into account the ‘blank spaces’ between known sites where surface artifacts or features may be unknown or even absent. Human Geographer Yi-Fu Tuan provided foundational definitions of space and place in *Space and Place: The Perspective of Experience* (1977) that others have followed and further developed in landscape archaeology, e.g. Colin Renfrew, Christopher Y. Tilley, Barbara Bender, and Ian Hodder to name just a few in the UK. English Anthropologist, Social Scientist, Linguist, Visual Anthropologist, Semiotician, and Cyberneticist Gregory Bateson (1978) viewed the intersectionality of historical materialism (*hismat*), historical ecology, and landscape studies as a metapattern.

Bruno David and Julian Thomas’s edited volume, *Handbook of Landscape Archaeology* (2008) amassed the most current papers discussing landscape archaeology theory and praxis and grouped them under three broad themes: “landscape as fields of human engagement (which has overtones of Pierre Bourdieu running throughout); landscapes as physical environmental contexts; and reflections on representations of landscapes” (David and Thomas 2008:20; emphasis in original). Cultural Anthropologist Veronica Strang’s (2008a) “Uncommon Ground: Landscape as Social Geography” and “The Social Construction of Water” (2008b) brought focused attention to the social construction of meaning of landscapes and landscape features. Whereas David and Thomas’s *Handbook of Landscape Archaeology* aimed “to challenge and inspire archaeological practice well into the 21st century” (David and Thomas 2008:20–21), of the 29 chapters in this edited volume, only four are specifically about North America or the American context.

Daniel Miller and Christopher Tilley’s paper in their edited volume, *Ideology, Power and Prehistory* (1984), which included Leone’s paper on William Paca’s garden (Leone 1984) and other papers that orbited in and around landscape archaeology theory, roundly rejected scientific
positivism in archaeology (historical, landscape, or otherwise) because there are particular types of information that would not necessarily be readily cogent or familiar in other disciplines.

Miller and Tilley rejected the positivist conception of a research problem because “[a] supposed symmetry between prediction and explanation simply does not hold in the social sciences” (Miller and Tilley 1984:151). Additionally, Miller and Tilley “do not conceive [the hypothetico-deductive method] as being ultimately parasitic on observation statements but rather the theory-data relationship is reflexive or dialectical in form; both are outcomes of the product of knowledge” (supra; a Structurationist notion). Ultimately, Miller and Tilley argued that:

Statements about the past are not therefore ultimately to be judged by whether or not they can be tested, or by the outcomes of such tests, but in terms of the conceptual, logical relationships presented between the data and its theorisation, i.e. the internal coherence of any particular study, which can only be criticised in terms of internal conceptual relations and not in terms of externally imposed standards or criteria for ‘measuring’ or ‘determining’ truth or falsity. [supra]

Mark Gillings and David Mattingly advised cautiously in *Geographical Information Systems and Landscape Archaeology* (1999) that “no single, all encompassing definitions can be applied,” and where GIS is concerned, “practitioners are still undecided as to whether it represents a science or merely a tool,” or whether it is the “breadth and diversity of application” of GIS that should be promoted (Gillings and Mattingly 1999:2).

*Americanist Landscape Archaeology*
Cartographer Tom Patterson brought much needed attention to Americanist landscape archaeology in 2008. Leone credited Patterson with being the first to apply English philosopher, historian, and archaeologist Robin George Collingwood’s dicta to the history of archaeology: principally that history cannot be studied like the natural sciences because the past cannot be directly observed; the best one can do in the present is to reconstruct history based on data from historical sources and other forms of evidence (Leone 2010:15). Because it is not possible to go backwards in time physically, it may only be through land-use patterns that ideologies such as capitalism are legible on a landscape at a distance in both time and space from the present. The more we understand the mechanisms of ideologies such as capitalism in the present, the better we may be able to interpret the past. Landscape archaeology can assist in the accurate interpretation of past landscapes by organizing and presenting ‘time slices’ as units of analysis that can be compared and contrasted with feature-class and/or artifactual-material evidence resulting in a more accurate order of history (Van der Zee and Zuidhoff 2012). Hence landscape archaeology has tremendous potential to answer research problems and questions.

What distinguishes archaeological landscapes from other environments (or nonsocial landscapes) is their ability to signal and shape human behavior, the use to which humans actively put them to signal and shape desired behavior, and the archaeologist’s ability to interpret past human behaviors from their physical and documentary remains. [Branton 2009:52]

American Archaeologist Nicole Branton’s concepts of landscape necessarily require a locus, a place, and a space (Tuan 1977) which is physical and ideational, abstract and concrete (sometimes literally concrete), with multiple meanings to various individuals and groups, and “[c]onsequently, archaeologists should anticipate the potential for multiple landscape histories to
be represented in the archaeological record” (Anscheutz et al. 2001:187). This perspective is in response to the processual archaeological paradigm that “tended to award material evidence a status that is more ‘real’ than the society that produced it,” a critique that came from Julian Thomas (1993:26; pace Žižek 2008).

American-born landscape geographer Kenneth Olwig provided an operational definition of landscape that others have followed and developed. For Olwig (and others who followed), landscapes exist at an intersection of nature and culture such that it is important for archaeologists to understand cultural and ethnic community identities as much as if not more than their physical environment (Renfrew 1982; Olwig 1993). Indeed, “the narrowness of our many existing explanatory constructs limits understanding of the creative role of human agency in defining and in altering [our] own conditions for living” (Anscheutz et al. 2001:162). Anscheutz et al. advocated that GIS provides archaeologists

… with a new set of quantitative [and qualitative] tools for research of spatial patterns at macro- and microscales. GIS approaches range from natural environmental foci to those addressing the many nested relationships that people maintain with their physical settings and one another (see review by Kvamme, 1999). [Anscheutz et al. 2001:170]

Dunnell and Dancy advanced the notion of a “siteless survey” because,

… most sites in a traditional sense represent domestic or activity loci from which the exploitation of the surrounding environment took place. Using site to structure recovery limits data collection to a small fraction of the total area occupied by any past cultural system and systematically excludes nearly all direct evidence of the actual articulation between people and their environment. As a result, we are forced to puzzle out the
connections from the grossly incomplete, complex, multifunctional deposits called *sites*.

[Dunnell and Dancy1983:271–272; emphasis in original]

Moreover,

The combination of distributional approaches for examining nonsite assemblages with interpretive perspectives examining the “background” potentiality of spaces and social representations of these spaces (Hirsch, 1995) enhances the potential to evaluate critically the ritualized incorporation of special places on landscapes that are segregated from habitation and activity centers within a group’s built environment. [Anscheutz et al. 2001:178]

Dunnell’s main critique was that “archaeological sites methodologically and theoretically are flawed units of analysis” (Anscheutz et al. 2001:172). Dunnell’s solution was to examine not just discrete sites but to develop, “methods of constructing units of historical association from smaller-scale observational units” (Dunnell 1992:33).

In postprocessual archaeology, distribution maps of site loci may not be necessarily flawed units of analysis. Donald Hardesty and Barbara Little’s *Assessing Site Significance: A Guide for Archaeologists and Historians* (2009) provided much needed clarity and guidance for addressing historic landscapes. Their Feature System archaeological method encourages practitioners to generate lists of expectable resources based on known sites, districts, and landscapes in advance of field survey and inventory and promotes the drafting of context statements, cogent categories, and themes for resources that contribute or contributed to broad patterns of American history, architecture, archeology, engineering, and culture (United States 1991; NRB15). For a cultural resource to be properly evaluated for its information value, the
historic context is the analytical framework within which the cultural resource’s importance can be understood (Hardesty and Little 2009:19).

Site records indicate where we already have evidence people in the past performed daily life activities. Hardesty and Little roundly encourage collecting any and all relevant information at any scale of analysis available that can support themes relevant at the local, state, regional, and or national level. Some patterns in history may not be discernable until a context is written in which to situate evidence of past human daily life activities within natural environments, landscapes, and constraints of ideologies. Oral histories and archival records greatly increase present-day understanding of the meaning and significance of objects, features, and places located across vast landforms and in regional and even niche environments.

In this context, one can expect then that places everywhere exhibit traces of intimate human contact with the earth’s surface. Focusing the scale of analysis on prehistoric landscapes in the American Southwest, Director of the Hopi Tribe’s Cultural Preservation Office Leigh J. Kuwansisiwma and Adjunct Professor of Anthropology at Arizona State University T. J. Ferguson found, “[a]s a cultural landscape, Hopitutskwa is defined by landforms associated with deities and historical events, rivers, springs, trails, shrines, and what the Hopi people call itaakuku or ‘our footprints’” (Kuwansisiwma and Ferguson 2004:25). Thus, natural environments can and do become landscapes through intimate human contact such as simple compaction resultant from repeated standing, walking, or other forms of foot traffic. In this view there can be a symbolic immortality or timelessness associated with features on landscapes created by ancestors remembered and memorialized in the present. This is an organismic sociological view akin to Durkheim. In an organismic worldview, birth, life, death, and even the afterlife were or are acted out, symbolized on, and performed in landscape contexts.
Arjun Appadurai’s (1992) concept of an ethnoscape considered contexts in which “communities are able to sustain coherent cognitive maps based on perceptions, direct experiences and distant memories, constructed meanings, and imagination” (Ansheutz et al. 2001:167). Philosopher Bruno Latour (1993) paid particular attention to the construction, meaning, and uses of space in ‘modern’ times when looking at our multiple and various pasts.

The Mormon Culture Region and Settlement Patterns in Landscape Archaeology Theory

Focus will now be turned towards settlement patterns in the American West and their place in landscape archaeology theory. The term ‘Intermontane West,’ (or Intermountain West) is used as opposed to ‘the American West’ throughout this dissertation to refer to the geographical region that Mormons settled in the 19th and early 20th centuries; ‘American West’ connotes land only within the boundaries of the United States of America while ‘Intermontane West’ adequately encompasses the land east of the Sierra Nevada and the Cascade ranges, the Great Basin, the American Southwest or Colorado Plateau, Western Rockies, portions of British Columbia and Alberta, Canada, and Alta Mexico–areas of North America settled by Mormons and alternatively referred to as the Mormon Cultural Region (Meinig 1965) (Figure 6). In The Mormon Culture Region: Strategies and Patterns in the Geography of the West, 1847–1964, Donald Meinig asked questions that later historical archaeologists such as Mark P. Leone, historical geographers such as Richard V. Francaviglia, and historians such as Mark Fiege asked.

Case in point:
FIGURE 6. Mormon emigrant routes and the Proposed State of Deseret 1847–1900 (Kimball 1979:47), also referred to as the Mormon Cultural Region (Meinig 1965:199).
Landscape is not a series of isolated elements, even though individual entities can be very important. Rather, landscape involves the presence and visual combination of a series of elements which together compose a scene or compage, in this case a Mormon scene. … But a look at the distribution of individual elements will be of value in giving spatial bounds to Mormon country. Only by a careful analysis of these can we understand which are pan-Mormon, which are partially Mormon, and which are non-Mormon. In the proper combinations, both in quantity and quality, these elements become landscape.

[Francaviglia 1978:37, 39]

If Anthropology is a universalistic discipline, then landscape archaeology’s aim is to identify and locate the ‘fingerprint,’ ‘footprint,’ or ‘imprint’ of culture on landforms that transform natural environments into landscapes; a society’s web of influence and interaction between the society, other societies, the raw materials, landforms, natural environments, and landscapes in between.

In geographical terms, “[l]andscape, as used here, is an image of a place or area based upon some abstraction of reality, for it involves selection of certain elements as typical or significant” (Francaviglia 1978:xv). Ultimately then,

… ethnic representations do not necessarily have spatial representations, the formation of ethnic communities is cast in terms of social action, guided through tradition, and played out in the arena of people’s interrelationships with their environments to create their landscapes. [Anscheutz et al. 2000 in Anscheutz et al. 2001:180]

There has been a trend in landscape archaeology wherein, “archaeologists have expended considerable effort in explicating technology and subsistence patterns in relation to issues of ecological adaptation” (Anscheutz et al. 2001:171). Indeed, Anscheutz et al. (2001) devoted an entire subsection to the contrasting yet complementary developments and investigations into
settlement ecology, ritual landscapes, and ethnic landscapes within landscape archaeology. They began with an overview of recent settlement ecology research projects that recognize “history and cultural perception as contributing variables to the structure, organization and tempo of cultural change” and “archaeologically observed patterns of land use, occupation, and transformation over time.” (Anscheutz et al. 2001:177). Stewart McKee Struever (1968:133) demonstrated how subsistence tactics are built into cultural systems and how settlement patterns are essential corollaries to subsistence.

In 1915, C. J. Galpin, Head of the Division of Farm Population and Rural Life Studies at the United States Department of Agriculture (USDA) set a stage for others to investigate. Galpin studied Escalante, California in 1923 and then enrolled in the University of Wisconsin’s Master’s Program. Galpin published his Master’s thesis in the first volume of the journal BYU Studies. Galpin asked why the Mormons preferred the village settlement pattern “at a time when the isolated farmstead was practically the universal system” (Nelson 1952:xv). This quest developed into a doctoral dissertation by Lowry Nelson; it was published as BYU Studies No. 3. Nelson expanded on Galpin’s observations to encompass all of Mormondom. Nelson published his Ph.D. dissertation in Sociology and improved it over the next 20 years. Nelson identified seven essential characteristics of the time period of early Mormonism:

1. The spirit of nationalism.

2. Economic disorganization and industrial unrest which promoted discussion as to future economic policy and gave rise to many utopian schemes and experiments.

3. The doctrine of free land, based upon the theoretical importance ascribed to agriculture by the Physiocrats of France and promulgated in this country by Jefferson and later by Horace Greeley and others.
4. Preponderance of agriculture in the economic life.

5. The revival period in religion was in its ascendancy. Fear of hell racked men’s souls; and the hope of heaven lit up their countenances. The millennial [sic] hope was the overwhelming religious motivation of this period.

6. Intellectually, it was a time of extreme unrest. Humanitarianism and reform were the watchwords. Old institutions and organizations were not longer to be regarded as adequate. It was a period of isms and cults.

7. Emotional instability, literal acceptance of the Bible as revelation, renewed interest in the prophecies of the Old and New Testaments, characterized the peoples of the sections of New York and Ohio, in which Mormonism had its formative years.

[Nelson 1930:15–16]

Community building was in large measure a result or product of Mormon adoption of the farm village as the prototype pattern of land occupation because it worked with the PLSS. It was pragmatic. The “intense religious motivation … was the primary cause of success; but the village system made that success easier and the achievement of community building greater” (Nelson 1952:xiii). Because of Nelson’s interdisciplinary and intersectional research design and conclusions, his work has profound insights and implications for historical landscape archaeology and landscape analysis in the Intermontane West (Sellers 1962). Nelson identified three main types of Mormon settlement patterns: 1.) isolated; 2.) cluster or farm villages; and 3.) line villages (Nelson 1952:4–6) (Figures 7, 8, and 9). Nelson briefly mentioned a fourth, albeit provisional, pattern: crossroads (Nelson 1952:4). The crossroads pattern was and is too infrequent for Nelson to warrant its own full discussion as a pattern type, but it is a settlement pattern akin to a hamlet.
Figure 1. In the scattered settlement pattern, all homes are built on the farms, but are located without reference to a master plan. The whims of the settler mainly determine the location. This drawing is intended to show the kinds of variations which occur.

Figure 2. Although the crossroads pattern occurs now and then in the United States, it is by no means common and appears to be the result of accident rather than planning.

FIGURE 7. Scattered and crossroads settlement patterns (Nelson 1952:5).
FIGURE 9. Mormon Colonization in Utah, the Inner Cordon: 1847–1900 (Kimball 1979:45).
There was also a desire to settle the West “motivated by a sense of urgent need to prepare a dwelling place for the Saviour at His Second Coming” (Nelson 1952:28). Members of the Church of Jesus Christ of Latter Day Saints were so numerous they quickly outgrew their chosen home of Salt Lake City in the Great Basin and migrated outward in the so-called Mormon Corridor settlement pattern pejoratively referred to as fingers when graphically represented (Figure 7). Whether the pattern is referred to as ‘fingers,’ ‘cordons,’ ‘tiers,’ or some other descriptor, the fact remains that Mormondom expanded in stages as populations increased.

Richard Francaviglia went a step beyond Lowry Nelson’s seminal work on the Mormon Settlement Pattern (MSP) (Nelson 1930, 1952) and asked why Mormon towns have received “little to no attention … [by] Mormons themselves in creating a distinctive landscape or visual setting in the West” (Francaviglia 1978:xv). Leone (1973, 1974, 1977, 1978, 1979) investigated a similar question in his own ways from historical ecological, ritual, and ethnographic perspectives.

Historian Richard White’s (1991), “It’s Your Misfortune and None of My Own” A History of the American West, gave specific attention to the Mormon project. According to White, Mormonism was an exception to the historical progression of Capitalism in the global West. White found that Mormons “engaged in the most systematic attempt at community creation” because of the Mormon faith’s … cohesive, homogeneous communities organized around the church … [their] settlements [reminded] settlers that brotherhood and cooperation should characterize their efforts and that they were engaged in a religious as well as secular pursuit. They often cooperatively built schools, canals, irrigation ditches, meeting houses, and homes and distributed the land. [White 1991:301–302]
An opposing viewpoint on the arrival of settlers to Wyoming and the Snake River Valley suggested that the

… “colonization” effort, however, was not entirely organized and coordinated and it was only superficially a church endeavor. The church in Salt Lake City never endorsed it and it was accompanied by none of the tight-knit structure and planning and discipline that characterized other LDS emigrations and settlements. [Cassity and Wyoming 2010:106]

This observation came from an admonition by Charles Lindsay, a Mormon scholar, who found that for the Mormon settlers to the Big Horn Basin,

… it was each man for himself until he got there; then there was some co-operation. No arrangements had been made for either land titles or water rights prior to their reaching the Basin. This, again, was not characteristic of church supervision. [Lindsay 1932:164]

Donald Henriches Dyal holds a Ph.D. in American History, is a Mormon, and found, contrary to Lindsay that:

Mormonism has been suffused with positive agrarian values from its inception. While many of these values were similar or identical to those generally espoused in contemporary North American and European society, the Mormon agrarian values thrived and pulsated in response to religious needs. [Dyal 1980:207–208]

These two examples of Mormon-centric history from Lindsay and Dyal exemplify the multiplicity of liberal interpretations and understandings there are regarding Mormonism and Mormondom in the literature. It would seem that no two Mormons or non-Mormons have the same understanding or interpretation of Mormonism, Mormondom, or its historical trajectory (Leone 1977). It is unclear if both presentist accounts are true, both false, or if reality contains elements of each.
Nelson found that the ways “rural people arrange their habitations upon the land constitutes one of the important factors determining the nature of the social organization” (1952:3). In places of low Mormon population density, “schools and churches will be small and simple in structure and function compared to cities” (Nelson 1952:4). Isolated farms are commonly situated somewhere within the land grant and often ‘near’ a road or other transportation route. Farms are spread far apart; up to a mile apart (or more). Farm villages are clustered very often at transportation corridor intersections; homes are comparatively closer together while barns and fields were ‘away’ from the homes, yet not at an inconvenient distance. Line villages resemble both isolated and cluster village patterns; they have elements of both at play and in function.

The American Public Land Survey System (PLSS) borrowed much from ancient Greece and Rome including the Roman centuriation system. Because the PLSS artificially ascribed lines on landscapes, those lines were incorporated as property boundaries as well as transportation routes (wagon roads) since no one settler or farmer owned the line. Line villages therefore conform (more or less) with the Township, Range, and Section system and ‘clusters’ of homes were arranged along major transportation corridors facing one another. This arrangement satisfies the need for interpersonal contact while maintaining adequate distance for individuals and families to live their lives privately. And when it comes to resource sharing, i.e. tithing, having neighbors is preferable because more surplus can be generated by a group than by isolated individuals (Leone 1979).

From Nelson’s schema, it becomes increasingly clear how Grovont, Wyoming acquired its toponym—Mormon Row is essentially a line village with a cluster of homes arranged along a Section line road with houses facing each other but not directly. There were, however, relatively
isolated Mormon Row community farms. This is easily explained by the PLSS and the federal land grant programs; each Homestead Entry Patent (or other land grant) awarded the recipient 40–160 acres and not all of the settlers of Mormon Row could occupy the same 40–160 acres.

Ultimately Nelson found that the line village accomplishes two goals: residence on the farm and it brings families closer together on the landscape (Nelson 1952:19). Line villages have another advantage in that Mormon settlers of the Great Basin and the frontier West predominantly chose river valleys because floodplain terraces offer preexisting pastures, superactive silty soils, adequate moisture (often supplemented by irrigation), and relative security—travelers and invaders can be seen entering or leaving a narrow river valley. In a way, the geomorphology of river valleys benefitted Mormon settlers and the line village settlement pattern was (and is) better suited to long, narrow places (Nelson 1952:20)—a win-win. The settlers of Grovont, Wyoming-Mormon Row had a more-or-less level landscape atop the Ditch Creek alluvial fan and the northern floodplain terrace of the Lower Gros Ventre River, few if any adversaries, yet chose the line settlement pattern. It is along Mormon Row Road that the Grovont Branch LDS chapel and the Mormon Row school were built.

Settlers at Mormon Row brought with them dairy cattle. Land grant recipients were at once settlers, farmers, and ranchers. Surplus milk was processed into cheese and butter which was traded for other staples the homesteaders were unable to produce themselves (Cassity 2010:103). Agricultural surpluses offered some a form of capital for which other commodities could be acquired. Indeed, “the distance [to markets], the topography, and the inconvenience worked to keep the valley relatively enclosed and isolated” (Cassity 2010:105). The goal may not have been to acquire extensive capitalist surpluses, but rather to acquire landed freedom and land to redeem (convert) to Edenic conditions in advance of the Second Coming of Jesus Christ.
Nevertheless, “[w]here the water belonged to the public and where the land that it often was being diverted to was part of the public domain, it would seem that there was abundant opportunity for the realization of the Jeffersonian dream of small, independent farmers” (Cassity et al. 2010:10).

Archaeology of Flow and the Conceptual Agency of Geomorphology

At the same time as the re-emergence of landscape archaeology studies in Europe and America in the 1990s, there was a re-doubled focus on “culture and social relations, power and politics, identity and experience” (Thomas 2001:166) in processual archaeology (Binford 1962, 1982) and materialist archaeology (Leone and Potter 1999). It warrants repeating that … because … ideology’s actual history can be discovered in its tie to material variables, and because those variables are the subject matter of historical archaeology, then there exists the possibility for an important extension of materialist archaeology into historical archaeology. [Leone 2010:55]

In this perspective, landscape archaeology theory and landscape analysis method can encompass capitalism (and ideology) and agency if one explicitly searches for them.

In *Natural Causes: Essays in Ecological Marxism*, Marxist Ecologist James O’Connor (1998) observed that, based on historical materialism (*hismat* for short), Marx made “too little room for nature’s economy and too much for human economy” (O’Connor 1998:4) and “[n]ature transforms itself in unpredictable ways at the same time it is being transformed by human material activity” (O’Connor 1998:6). By way of French philosopher, anthropologist, and sociologist Bruno Latour, UK landscape archaeologist Matt Edgeworth investigated ways in
which, “[h]ydrological, social, geomorphological, political, material, ideational, symbolic, technological and economic factors are all mixed up together, like so many streamlines merging into a single current” (Edgeworth 2011:55). What distinguishes Edgeworth’s work from Latour’s is a focus on ways in which geomorphology has an agency when it is a product of human manipulation and how ‘socio-technical collectives’ can be discerned from archaeological contexts (Latour 1993).

Ultimately the two aspects—the socio-economic and the geomorphological—are not separate but inextricably intertwined as part of the same unfolding set of material relations. Archaeology of flow … is a place where these different aspects can be studied together. [Edgeworth 2011:54]

Regarding the intersection of landscape archaeology with geomorphology with flowing water, Edgeworth encouraged that, “[i]n most cases the same techniques and methodologies—excavation, documentary research, earthwork survey, site visits, geophysical survey, augur survey, LIDAR, study of maps and aerial photos, and so on—are relevant to both” (Edgeworth 2011:83). If a landscape geomorphologically altered by humans behaves as an ‘agent’ in response to the unnatural changes imposed on it, then perhaps the altered landscape can be considered an extension of the self, an ‘object,’ or something that functions as an object, and thereby enter in the realm of historical materialism (hismat). American geographer Carl Sauer introduced the idea of the agency of culture in 1925 “as a force in shaping the visible features of delimited regions on the Earth’s surface” (Cosgrove 1994:115). Thus landscape archaeology theory and landscape analysis method can, conceptually speaking, accommodate agency. Can landscape archaeology theory and landscape analysis method account for agency materially?
In Americanist (historical) geography or (landscape) history disciplines there has been a tendency in which,

...landscape is described in primarily Cartesian (material) terms, as parcels of property mapped and measured out across “natural” ecosystems, and dotted with places and features named after early explorers and settlers, or reflecting topographical attributes and the presence of economic resources. [Strang 2008a:53].

Australian archaeologist and philologist V. Gordon Childe brought the idea in 1928 and again in 1952 that, “[w]ith the increasing availability of evidence … researchers began interpreting the changing patterns of site distribution over time in terms of natural environmental fluctuations” (Anschutz et al. 2001:168). There have been at least seven major developments in the Americanist landscape archaeology field since the 1950s which include investigations into: “(1) ecological habitats; (2) settlement patterns; (3) subsistence-settlement systems; (4) encompassing both the terrestrial and the celestial spheres; (5) materializations of world view; (6) built or marked environments; and (7) stages for performance” (Patterson 2008:77).

Landscape studies after the 1950s in America focused on logical positivism and neoclassical economic models, and interpretations of empirical evidence recovered from a multitude of site assemblages to create sufficient data sets to be scientifically tested with the hypothetico-deductive method for statistical significance. With the introduction of faster computers, advanced geospatial analysis programs, e.g. GIS software and methods, and the development of new remote sensing techniques such as Light Detection and Ranging (LiDAR) technology, there has been a renaissance of late in landscape archaeology. Archaeologist Heather Richards-Rissetto (2017:10) emphasized that, to be understood in a fuller context, before being combined with environmental factors, social data must also be collected before it can be projected on maps.
Practical approaches are primarily concerned with the identification and interpretation of land-use patterns while theoretical and cosmological approaches place attention on cultural constructs, rituals, ideologies, and other structures or by-products of consciousness or culture as if on stages of performance (Patterson 2008:80), their place within cultural space, or their inferred meaning or function within daily life or society within capitalism (Tuan 1977; Bourdieu 1977, 1984 and his concept of *habitus*; Strang 2008:52). Materializations of worldviews, a relatively recent perspective in landscape archaeology in the Americas, incorporates cosmology, genesis stories, theology, spirituality, and celestial events among other pertinent cultural aspects, features, and functions of a social group. Hence, “[e]xtending landscape to the celestial sphere … afford[s] new insights into the timing and significance of practices … and their meanings in terms of particular belief systems” (Patterson 2008:79). UK postmodern landscape archaeologist Matthew Johnson’s phenomenological approach offers potential ways of investigating the material and the immaterial. First, a guiding definition of what a phenomenon must be established. A phenomenon is an exemplary fact or situation that begs explanation in the form of hypotheses (e.g. a paradox, a conundrum, a wonder, a miracle, a human experience). Philosophically speaking, a phenomenon is an object the mind or the body senses and seeks an explanation therefor. The scientific method and dialectics have been successful in explaining many phenomena, still many questions remain.

In *Landscape Archaeology: Between Art and Science: From a Multi- to an Interdisciplinary Approach*, Matthew Johnson (2012a) looks to the future by going back to the basics and starting over in postmodern fashion.

Historically, field-based disciplines have a stress on what is claimed as ‘direct experience’, particularly in terms of their vernacular imagination – in other words, the
colloquial language and everyday values deployed in field practice. Field-based
disciplines rest, in part, on the urge to go out and see for oneself, rather than rely on
others’ reports.

‘Direct experience’, however, is a problematic concept. Most crucially, the claims of any
discipline to be ‘scientific’ must rest not on the amount of direct experience gathered, but
rather in the way that experience is brought to bear on concepts and theories about it, and
vice versa. If landscape archaeology is to be rigorous and scientific, it must abandon
rhetorical appeals to an untheorised category of direct experience and reflect more
seriously on the relation of evidence to inference. [Johnson 2012a:515]

Johnson’s epistemology is clear even while acknowledging that landscape archaeology
“is an area of research that is full of woolly thinking” due to a “lack of conceptual clarity,” and
because “false choices most frequently surface not in analytical discussions but in chance, along-
the-way comments by practicing landscape scholars … and are rarely explicitly set out”
(Johnson 2012a:516)⁹. Indeed, Social Science is

… riddled with false, rhetorically loaded choices – between supposedly ‘theoretical’ and
‘practical’ approaches, between supposedly subjective and objective positions, between
supposedly ‘scientific’ and ‘humanistic’ positions and interests, between those who
supposedly stick to the evidence and those who supposedly go beyond it, between those
who are supposedly positivist/empiricist, and those who are supposedly postmodernist.

[supra]

This dissertation takes up the position of a ‘critical examination of field practices’
(Johnson 2012a:522) by approaching the MRHD (48TE1444) through lenses of historical

⁹ Leone explicitly set out to deconstruct Mormon ideology’s ontology through its social organization and uses of
technology in ritual in a reflexive manner in Roots of Modern Mormonism (1979).
landscape archaeology and historical ecological theories and landscape analysis methods while also acknowledging the phenomenal and or experiential aspects and qualities of the study area—something Leone did not do per se; Harmon et al. (2006) did acknowledge the experiential aspects of English gardens. This problem was resolved in the MRHD study area by groundtruthing anomalies and features revealed by LiDAR imagery in person. GIS, LiDAR, and other remotely sensed or retrieved imagery technology and utility thereof in landscape archaeology is discussed in the next chapter. Historical ecology is also discussed as it relates to the interface of humans, environments, natural resources, and change over time—a primary concern and focus of processual landscape archaeology.
Chapter IV.

Internship and Dissertation Methods: Landscape Analysis and Historical Ecology

Australian archaeologist Michael J. Rowland offered an integrated perspective on landscape analysis such that, “[c]ulture and nature change together as a result of diverse interactions, and the outcomes are historically contingent. Archaeologists are therefore well placed to investigate these issues, which involve the diachronic, multidisciplinary analysis of landscapes” (Rowland 2008:390). Perhaps landscape archaeology landscape analysis’s best application is diachrony, in which human-induced changes to the Earth’s surface can be shown to have negatively and positively affected natural environments, and even elucidate positivistic cause and effect. For example two maps can illustrate a dam and its impoundment before and after construction. Matthew Johnson’s phenomenological landscape archaeology approach is capable of topics that would otherwise not be amenable to a hypothetico-deductive or positivist research agenda. Most important is the landscape archaeological landscape analysis and deconstruction of the Mormon Row local legend of the origin of “Miracle” Spring. By deconstruction this legend, it is possible to ascertain the ‘truth’ if certain presumptions are accepted from a phenomenological anthropological perspective that acknowledges geomorphological ‘agency,’ psychology terms and states of consciousness, as well as the evolution of Mormon faith-based beliefs over time (Leone 1974, 1977, 1979, 2010).

*Landscape Archaeology Landscape Analysis*
Henry Chapman loosely defined landscape archaeology as, “an amalgamation” of three principle branches: landscape analysis, past reconstruction(s), and the generation of new theory to interpret recovered data. Landscape analysis is the first or at least one of the early steps of the process wherein previous maps are collated, chronologically ordered, and examined for clues. It is essential to organize previous surveys and resource records in order to build a virtual landscape model of past human activities and land-use practices in GIS. Often there is text associated with lines on a map, which means landscape analysis is therefore multidisciplinary (Francaviglia 2015). Moreover, “GIS only simulates the physical world and, in the case of archaeology, it can demonstrate how sometimes this simulation is the closest way of approaching the unknown, past realities being studied” (Chapman 2006:37). Landscape archaeology landscape analysis is a method within GIS—a method within a method.

Chapman also provided useful definitions of key terms. GIS is defined as:

An organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information. [ESRI 1995]

and

A GIS is a sophisticated database management system designed for the acquisition, manipulation, visualization, management and display of spatially referenced (or geographic) data. [Aldenderfer 1996:4]

Spatial Information Systems (SIS) and Computer Aided Design (CAD) incorporate elements of GIS; GIS incorporates elements of SIS and CAD. The distinction between these various modalities and technologies is increasingly becoming blurry. While not exactly studying the same type of ideologically altered landscape as the present dissertation, Gheyle et al.’s (2014)
“Integrating Archaeology and Landscape Analysis for Cultural Heritage Management of a World War I Militarised Landscape: The German Field Defences in Antwerp” encouraged “the integration of different data sources and techniques, such as aerial photography, maps and fieldwork, forms the basis for GIS … visualisations … in support of future heritage conservation and tourism possibilities” (Gheyle et al. 2014:504). Heritage tourism is important at the GTNP and to Jackson Hole, Wyoming in general, offering year-round revenue. Mormon Row is easily accessed without paying the entrance fee to the GTNP yet is squarely within its purview. It was recommended that, “the first step of … landscape research is the interpretation of a time series of aerial photos, combined with historical maps … and background literature, to achieve an overall view of the characteristics of the landscape areas and the dynamics in the study area” (Gheyle et al. 2014:507).

The second step is similar to the first: assemble environmental data and maps that are layered in GIS. Environmental factors are relatively less controvertible (and more “scientific”) than cultural factors, yet both suffer from inexactness and generalization at larger scales on maps (Chapman 2006; Monmonier 1991). Indeed, “[t]he emerging fusion of survey techniques is more iterative and less strictly sequential in application and intellectual process that the traditional two-stage approach” (Ainsworth, Oswald, and Went 2013:206). Hence, if various fields … share a model that deals systematically with each aspect of culture, acknowledging that all these are implicated in a dynamic articulation between social and material worlds, a vision emerges of cultural landscapes transforming over time, providing a useful foundation—an analytic basis of discussion—through which human-environmental relationships can be understood both in the past and in the present. [Strang 2008:55]
Airborne Laser Scanning (ALS) and LiDAR are equivalent terms. Photogrammetry is one of the more recent applications of ALS yet its use goes back to World War I and aerial photography. Essentially, two images of the same landscape taken at different positions ca. 6° apart can be arranged and viewed with special lenses to reveal a three-dimensional (3D) image in the mind of the viewer. This is also known as stereophotogrammetry or stereophotography or stereoscopy. United States Geologic Survey (USGS) topographic maps were traditionally drawn from stereophotograph sets. ALS or LiDAR can assist in removing human error and subjectivity and results in more accurate elevation models of landscapes and features by building 3D pointclouds in virtual reality on three projected axes. Again, the result, when printed, appears to be in three dimensions, yet is 2.5D if that can be said to really exist.

Small-scale or site-scale topography can still be accomplished with a theodolite and a total station to capture point, line, and polygon data with elevation, which is also considered landscape archaeology. Photogrammetry can be used at very close range on individual objects as can hand-held LiDAR devices. The result is a digital data file that can be projected on a computer screen in 2.5D and an object’s image can be rotated 360 degrees for closer examination.

*What is landscape analysis?*

Landscape analysis takes into consideration any and all cartographic information available. Cartographic information (maps) can be regressed like historical documents because historical maps are often historical documents with text (Francaviglia 2015). When digitized and manipulated in GIS, previously unexplored connections and intersections of an archaeological
study area can become evident within larger local, regional, state, and national contexts. The results are more often than not qualitative because the data is subjective; quantitative data results are possible in GIS if databases and tables are created that contain counts, populations, or demographic information that can be ranked or ordered along arbitrary or natural breaks of distinction for example.

Landscape analysis includes “those areas of archaeology that focus on the interpretation of features in the landscape including identification, mapping and the consideration of principal themes” (Chapman 2006:89–90). Themes include, “assessing the density of sites and their distribution of sites, considering this distribution in relation to other archaeological or natural features, or analysing archaeological site positions in relation to the archaeological and topographical landscape” (supra). Moreover, traditional landscape analysis has been a process of documenting changes in or on maps that correspond to changes in human land-use patterns and activities such as settlement and natural resource extraction. Distribution maps of discrete locations where people have and or continue to modify, build on, extract from, or otherwise occupy have been the norm in archaeological praxis since its inception; who did what and where. “Where it has been approached, further analysis might have involved considering the territorial boundaries based upon distributions or examining spheres of influence, although the types of approach are linked closely with trends within archaeological theory” (supra). Thus, “the archaeology only really makes sense in relation to the local topography and palaeo-landscape features” (Chapman 2006:99). Another application of remote sensing data has been conducted under or concerning flowing water (Edgeworth 2011). Some researchers have found that GIS has the potential to improve our abilities and opportunities to address various and dynamic archaeological significances. In order to use GIS as a powerful analytical tool, “we need to have
the wisdom, foresight, and analytical rigor to use the tools more creatively” (Mathers, Shelberg, and Kneebone 2005:177).

Indeed, map regression allows an archaeologist to approach fieldwork with themes and patterns from the past in mind. Map regression also informs an archaeologist in the field so that one is able to distinguish older topographical features or changes at the surface from more recent ground disturbing activities. In other words, the field archaeologist can distinguish features from one period of human activity from another (Chapman 2006:89). This is central to processual archaeology praxis, along with adding depth and breadth to our knowledge when arresting the perpetuation of false information or misinformation while studying technologies within cultural change over time (Binford 1962, 1982).

Chronologically ordering the past in maps and in reality may be considered positive archaeology and positivist if cause of change can be predicted and proven to have existed based on empirical evidence utilizing the hypothetico-deductive method. Thus, landscape analysis can be structured so that it is a positivistic method that uses topographic maps, recent and historic orthophotography or aerial imagery, point-line-polygon raster data, remote sensing technologies including radar and LiDAR, and environmental data in GIS to put the past in order chronologically and correctly—a goal of processual archaeology (Leone 1973, 1978)—to answer contemporary research questions concerning cause and effect. GIS provides advantages that paper-based maps lack, including facile switching from one image to another, image transparency, layering, comparison, and juxtaposition at multiple scales. All of these functions or actions are possible in GIS while interpreting an historical or archaeological landscape at a landscape scale as opposed to the site or artifact scale. Suffice to say, landscape analysis is a broad term that can encompass a spectrum of data types, origins, and uses to which it can be
applied. Capitalism can be a useful common denominator, with resulting patterns being “identified by archaeologists working back and forth across the range of scales at which capitalism was, and is, relevant” (Purser 1999:117) and “the sheer breadth and complexity of the topic demands a methodological creativity and interpretive flexibility we have yet to give ourselves the permission or authority to pursue” (Purser 1999:137).

*New Directions in Americanist Landscape Analysis in GIS*

Historical archaeologist Linda Stine recommended asking 10 pertinent questions before undertaking a landscape-scale investigation:

1. Who lived at the site and when did they live there?
2. Why did they live there?
3. How did they make their living?
4. What transportation networks were necessary?
5. What is the range of site types that should be connected to the particular site studied?
6. What social mechanisms were in place?
7. How does the site compare and relate to others in the region?
8. Which natural and social processes affected site formation?
9. How did these processes affect site formation?
10. What methods would best derive the information needed to answer these types of questions? [Stine 1997:230]

Several of Stine’s recommendations are steps or elements of a sociotechnic and socioeconomic focus within a processual archaeology (*sensu* Binford 1962, 1982). Additionally, the significance
of historical sites is in relationship to “the relative importance of documents, oral testimony, and the archaeological record in understanding or interpreting the past” (Hardesty and Little 2009:8); without these additional data sets, interpretation of sites and artifacts would be limited and significance potentially unknown. After all, it is fundamentally “‘peoples’ histories,’ which contribute to the variation observed in the archaeological record” (Trigger 1991:554).

Patterns in geomorphology, geology, soil, hydrology, or patterns that are the result of human modifications of the earth’s surface can become evident when several different types of cartographic images are superimposed or projected sequentially (Kaptijn 2009). Archival maps of transportation routes, habitation, and other manmade features are especially important as they can provide glimpses in time that may or may not be readily evident in the present on a landscape or in contemporary topographic maps generated from more recent aerial photography (Van der Zee and Zuidhoff 2012). Maps are also necessary to convey limits and boundaries, changes in topography or demography, and relative abundance of resources compared to other resources.

The overall benefit of geophysical survey in conjunction with remotely acquired visual information is an increased chance of locating significant historical and archaeological features and artifacts that might otherwise be unknown through subsurface sampling methods and pedestrian survey alone. Indeed, Rebecca Bennett (2013) advocated the use of LiDAR imagery as a survey method in conjunction with the standard survey methods of a jurisdictional authorizing heritage discourse (AHD). “The AHD is integrally bound up in the creation of lists that represent the canon of heritage. It is a set of ideas that works to normalise a range of assumptions about the nature and meaning of heritage and to privilege particular practices, especially those of heritage professionals and the state” (Smith 2006:27). Others have promoted
expanded use of LiDAR technology and imaging, but have cautioned that, “it is inadequate for a thorough investigation of microrelief structures” (Kokalj, Zakšek, and Oštir 2013:100).

Therefore, pedestrian survey, the oldest method in the book, is still fundamental to landscape archaeology and landscape analysis.

Just after the turn of the century, archaeological geophysicist and information technology (IT) pioneer Armin Schmidt (2002) proposed a list of the most important variables in consideration of methodological choices in geophysical survey techniques: noting that one should consider:

- the survey objectives;
- archaeological questions;
- previous remotely sensed evidence and results;
- current land-use;
- former land-use;
- underlying solid and drift geology;
- other local geomorphological and topographic factors;
- degree of access to the land; [and]
- time, money, personnel, and equipment available for the survey. [Schmidt 2002:9]

Nearly two decades later, all of Schmidt’s variables are useful in landscape archaeology landscape analysis.

Vicki Cummings (2008) provided examples of landscape archaeology landscape analysis techniques that combine multiple data sets and variables in GIS software. Cummings begins with site catchment analysis in the early 1970s which employed Landsat imagery, Thiessen polygon
assessment, and other forms of pattern recognition in geophysical or remotely acquired data.

According to Cummings, in a postprocessual view:

‘traditional methods’ were rather inadequate at illustrating the range of experiences such landscape can generate … [because] Cartesian notions of space, which is abstracted, timeless, and passive … and the observer is removed from a lived-in world and ends up seeing literally everything from nowhere. [Cummings 2008:287]

Around the same time as Cummings’s observations, others brought much-needed attention to the development and evolution of remote sensing techniques in the U.S (Evans and Farr 2007). James Wiseman and Farouk El-Baz provided an extensive historiography of noninvasive subsurface mapping and remotely acquired imagery techniques in landscape archaeology in the U.S. (2007).

The Apollo Mission and Space Shuttle Radar Topography Mission (SRTM) data may be more responsible for the renaissance of landscape archaeology than previously considered by others in part because of the cornucopia of published results from examination of SRTM data in the 1980s, such as earthwork feature studies in the UK and Europe. The Apollo Mission in the 1960s had the auspicious task of accurately mapping the surface of the moon for future moon landing and exploration sites. Satellites tasked with this responsibility also turned their instruments towards Earth, e.g. Landsat. Landsat imagery is primarily optical while SRTM imagery is inferential and relational. NASA’s Project Apollo was terminated in 1972, but the collection of remotely sensed data did not stop; if anything it increased because new applications were tested and new uses discovered as a result.

SRTM has been overlooked and its contribution minimized in other words. SRTM was essentially specialized radar technology and interferometric synthetic aperture radar (InSAR)
technology. InSAR or SRTM frequencies vary depending on the type of object or material being sought. Different radar frequencies can “reveal differences in texture, roughness, moisture content, topography, and geometry of features and surfaces” (Holcomb and Shingiray 2007:12) among other variables or characteristics. It must be acknowledged that remotely sensed or acquired data from radar technologies differ significantly “from an image acquired with optical remote sensors, analysis of radar data requires specialized training and image processing software in order to achieve adequate interpretation results;” to compensate and to expand the range of possibilities, multi-spectral, multi-sensor imaging technologies have been developed “in order to detect, enhance, extract, and analyze archaeological information from the radar image” (supra). Indeed, radar is an active microwave sensing system that supplies its own waves while orthophotography receives reflected light waves including the infrared and ultraviolet spectra. There are advantages and disadvantages to both technologies. The pros and cons of each technology can be ameliorated in GIS when resultant images are superimposed or compared side-by-side; each brings information that the other does not (Chapman 2006).

Using a metered pulse modulated in a sine wave carrier, distance is calculated based on the time taken for a pulse to return to the transmitter. Continuous wave transmitters and receivers further improved radar’s ability to track targets. LiDAR works on the same basic principles as radar wherein light pulses are aimed at an object or target and the delay in return time is calculated as distance. The first LiDAR or 3D laser scanning device was built in the 1960s and was intended for submarine detection from aircraft flying above the ocean surface. Since then, the technology improved dramatically when Global Positioning System (GPS) technology was developed. Using fixed surface positions (datums) and satellite telemetry, GPS accurately calculates position in longitude/latitude or Universal Transverse Mercator (UTM) coordinates.
UTM coordinates are based on horizontal position relative to vertical position and bands of longitude in the metric system known as UTM zones of which there are 60. Up to 150,000 pulses per second can be fired and received.

Modern LiDAR uses visible, near infrared, and ultraviolet spectra light to distinguish between metallic and non-metallic objects, water and vegetation versus soil or rock surfaces, and can even be sensitive enough to detect aerosols and water vapor in clouds. Wavelength-dependent variables and changes in the returned signal act as a signature in processing resulting in “bare earth” imaging where vegetation and metallic signatures are removed. Resultant interpolations appear “smoother;” comparisons between “rough” or “first return” LiDAR data containing vegetation and processed “bare earth” LiDAR data is useful in biomass surveys or ecotone delineations for example (Chapman 2006). “Bare earth” imaging is especially useful in archaeology as it can reveal subtle changes in surface topography that would otherwise be obscured by vegetation.

The combination of multiple spectra-sensing technologies improves our ability in the present to interpret the past. Whereas soil mapping in the past was accomplished almost exclusively with aerial photography, soil chemistry, even at a relatively small scale, is now discernable from space with finely-tuned instruments. “Any landscape analysis that relies on sites located by aerial photography is in danger of being rewritten ad nauseum as the unpredictability of oblique crop-mark survey introduces new sites into the equation at random,” due to shadows or other distortions however (Cheetham 2008:575).

GIS would have little imagery to incorporate as basemaps had NASA’s Space Shuttle Program not captured radar-facilitated elevation data across the globe. Indeed, the first Conference on Remote Sensing in Archaeology was held in 1984 and was sponsored by NASA,
the National Science Foundation, and the National Geographic Society (Wiseman and El-Baz 2007:1). Several conferences followed in the U.S. and in Europe that included colloquia and special sessions. The Archaeological Institute of America (AIA) and Society for American Archaeology (SAA) both sponsored workshops in remote sensing applications in the 1990s.

The advantage of radar-derived data, like laser-derived data (e.g. LiDAR imagery) is accuracy, precision, and the generation of DEMs that reveal subtle changes in the surface of the Earth that might otherwise be imperceptible at a landscape scale or in person. Terrestrial LiDAR and hand-held LiDAR technologies permit small-scale discrete mapping and modeling at the sub-millimeter-scale (Richter 2014). For example, paleodermatoglyphics, the fingerprints of the makers of ancient ceramics, could be studied using hand-held LiDAR technologies.

LiDAR is also a sophisticated type of DEM. DEMs are built virtually on three projected axes from triangulated microwaves or laser beams that reflect changes in distance from a surface or object. Triangulated points may be plotted in Cartesian space to form Triangular Irregular Networks (TINs). TINs or Polyhedral Irregular Networks (PINs), when connected at vertices, form Delaunay triangles. Delaunay triangles, when projected on three axes, appear to display area, aspect, and elevation. This results in the optical illusion of length, width, and height or depth, or a 3D image. Interpolation of TIN or PIN data gives the appearance of smoothing out polygonal vertices; splining, kriging, and inverse distance weighting (IDW) interpolations further smooth the appearance of the resultant images in GIS. Interpolation processes are accomplished at a touch of a button currently, but it took a lot of groundbreaking experiments and manipulations to arrive at the user-friendly Google Earth functions and tabs that are freely available to the public. DEMs, whether projected on a computer screen (as a raster), a projection screen, or on a printed page are two-dimensional (2D). The manipulation of projection and
virtual axes results in an image that is considered 2.5D. All of this is accomplished by assigning multiple values to cells within a virtual Cartesian grid system; height is represented most often by a change in shade along a greyscale or a color ramp in GIS programs (Chapman 2006).

Because, “DEMs cover extensive areas, they provide a regional context in which archaeological sites can be studied” (Evans and Farr 2007:92).

Airborne Laser Scanning (ALS) and LiDAR are equivalent terms. ALS or LiDAR can assist in removing human error and subjectivity and results in more accurate elevation models of landscapes and features by building 3D pointclouds in virtual reality on three projected axes. Again, the result, when printed, appears to be in three dimensions, yet is 2.5D if that can be said to really exist.

Small-scale or site-scale topography can still be accomplished with a theodolite and a total station to capture point, line, and polygon data with elevation. Photogrammetry can be used at very close range on individual objects as can hand-held LiDAR devices. The result of either technique is a paper or digital data file that can be projected on a computer screen in 2.5D and rotated 360° for closer examination with the intended result of the revelation of details related to cause and effect that might otherwise be illegible or invisible. Postprocessual and postmodern approaches are still developing in a Darwinian sense, so it is not possible to ‘sort for ease and whiz’ in a Darvillian (Darvill 2005) sense just yet, but almost. What can be discerned is the role humans have had in transforming natural environments into capital and byproducts of labor. The next sub-chapter will address historical ecology sometimes known as ecological history.

Historical Ecologies

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10 This meme from Darvill (2005) alludes to subjectivity which is at the center of every scientific investigation and cannot be avoided. There will always be bias and presuppositions whenever any questions are asked.
In order to make the most of Leone’s extension of Collingwood’s and Rappaport’s inquiries into historical ecological practices and ritual (Leone 1972a, 1972b, 1973, 1974, 1977, 1978, 1979, 2010), especially the Mormon adaptive strategy and the uses of specific technologies to accomplish certain societal goals, more must be outlined and understood regarding historical ecology. What is historical ecology or ecological history? The common denominators of ecological ritual and historical ecology are 1.) ecology and 2.) capitalism; historical ecology is therefore a means of understanding historical ecological ritual.

Marxist Historical Ecologist James O’Connor (1998) presented his materialist conception of history in *Natural Causes: Essays in Ecological Marxism* and suggested “some ways in which this traditional account may be strengthened by incorporating both natural and cultural ‘environmental’ factors” (O’Connor 1998:4). He observed an “‘inner connection’” between the two, not how the two “are both each other’s context and content” (O’Connor 1998:25). Since landscape archaeology concerns both natural and cultural factors, an understanding of historical ecology theory is necessary in order to situate Leone’s historical archaeology of Mormonism.

To begin, Karl Marx’s perspective in his own time as a starting point is warranted:

Some green critics of Marxism claim that Marx’s anthropocentrism was so extreme that he denied the obvious fact that nature (combined with human labor) is the source of material wealth, to which Marx would reply, nature (with labor) is the source of wealth defined as use values. In *capitalist societies*, however nature is not the source of wealth defined in terms of exchange value. The simple fact that capitalists fail to price nature’s bounty (but rather consider it a “free good”) proves that in capitalist practice nature is not regarded as productive of wealth (exchange value). [O’Connor 1998:3; emphasis in original]
Others found that, “according to Marx … man enters into a relation with nature in order to obtain the means of sustaining his life, and he enters into relations with other men in the process of deriving his livelihood from nature” (Wood and Wood 1978:59). In this context, then, “social labor mediates between human and natural history; labor is the material interface between society and nature” and “the ‘human impact’ on nature turns on the ways that social labor is organized, its aims or ends, on the distribution and use of the social product, and on human knowledge of, and attitudes toward, nature” (O’Connor 1998:5; emphasis in original).

More,

Many ecologists believe that the use and conservation of resources is a moral activity, one closely bound up with the survival of the group, … [hence] … There seems to be a kind of compensatory social law at work. As capital delinks technical skills and the division of labor from older cultural forms, ethnic or identity politics asserts itself more forcefully. Similarly, as nature is humanized and production depends less on unspoiled gifts of God and more on technology, chemical fertilizers, imported water, and the like, the politics of place declares itself more vigorously. [supra; emphasis in original]

The terms ecology, environment, and nature should be spelled out before moving forward. Ecology is formally a branch of Biology that concerns the relationships of organisms to each other within natural environments and including humans. Humans are organisms; humans operated and continue to operate within cultures, societies, and ideological constructs as well as natural and altered-environments also known as landscapes. Therefore, historical ecology is the study of human-organism-environment interactions over long periods of time; landscape archaeology concerns the traces thereof, their meanings, and our present-day understanding of
the traces of the past. The concept of “environment” has a more specific meaning that that of “nature.” To wit:

The *Oxford English Dictionary (OED)* defines “environment” as “the set of circumstances or conditions, especially physical conditions, in which a person or community lives, works, develops, etc., or a thing exists or operates; the external conditions affecting the life of a plant or animal. Also, physical conditions viewed in relation to the possibility of life. The key word in this definition is “conditions,” which means “a thing demanded or required as a prerequisite to the granting or performance of something else.” If we define the “performance of something else” as the material production of human beings, the environment is clearly “required as a prerequisite.” Human life is dependent on “The external conditions affecting life,” namely, the environment of “nature.” It follows that some conditions are more suitable for some kinds of labor (and life) than other conditions, [O’Connor 1998:24]

and

“[w]hen we humans appropriate ‘resources’ from the environment for material production, we change the environment; no species, including our own, can use its environment without modifying it.” [*supra*].

Thus,

While Marxism has succeeded in demonstrating how the concept of nature is “socially constructed” in different modes of production, the irreducible autonomy of nature, as enabling and constraining human projects, tends to be neglected or marginalized (although not by Marx himself, who clearly stated that production is mediated by “natural processes independent of man”). [*supra*]
In the final analysis, some places are simply better, as in, some places more productive or contain more resources than others that can be or were transformed through labor into commodities (Leone 1974, 1977). The reality of any landscape is that resources are not unlimited and are furthermore unequally distributed (Skirbekk 1994).

According to O’Connor,

… environmental history is the study of how human agency shapes and modifies “nature” and constructs built environments and spatial configurations, and how natural and cultural environments both enable and constrain human material activity; and, conversely, how human activity both enables and constrains cultural development and “nature’s economy.” … The world accomplishes this by labor (technology and the divisions of social labor; power and the social divisions of labor), defined as socially organized, symbolically mediated material production, distribution, exchange, and consumption. In the drift of environmental history toward Marxist-type methods, “human activity” and labor is seen as the mediation between culture and nature. The history of nature, is, thus, in part, the history of labor. [O’Connor 1998:52]

O’Connor argued that:

Historians have to operate at all levels of abstraction (and their many mediations) to delineate exactly how and why economic and other forces have depended upon the environment; how nature is both enabling and constraining human material activity; and how changes in the environment modify (and are modified by) political, economic, and cultural/social changes. [O’Connor 1998:55]

O’Connor concluded that environmental history is inherently a space-bound discipline operating “at the level of site specificity defined in various ways, for example, as a watershed, as
successional activity or the dialectics of change between native and exotic species, as changes in agricultural soil, and so on” (O’Connor 1998:59).

Curiously, in the 20th century, O’Connor found that both cultural-historical landscape and environmental preservation efforts were flourishing and “[e]conomic geography has made a 180° turn … [towards what] Marx called ‘active materialism’” (O’Connor 1998:53). Also curious is what O’Connor meant by “Marxist-type methods” (O’Connor 1998:52).

If the term “Marxian” is substituted for “Marxist-type”, then a clearer idea of what O’Connor meant can be ascertained. Environmental history methods are capable of interrogating antagonisms and struggles over and concerning natural resources, their commodification, and the labor required to do so throughout human history from a Marxian perspective without involving or necessarily following the ideological tenets or beliefs of political or state Marxism except by comparative example or parallel in a time and a place that participated in Marxism or Capitalism writ large. Mormons participate(d) in Capitalism, thus Marxist is appropriate when describing their struggle in relation to the U.S. federal government, a power structure and authority.

As a reminder, ideology is a mask, a foil for something bigger, a fantastical Lévi-Straussian Other that structures and directs social realities both internal and external to empirical experiences of the Subject. Žižek’s (2008) “the big Other” is an immaterial structure or collection of social conventions, codes, norms, laws, et cetera. Like “the big Other,” Mormonism is believed by its followers to be true (Leone 1977:56), that is, Mormonism exists simultaneously inside and outside of individual Saints as Subjects; it serves to perpetuate Mormon society. Much the same can be said about Capitalists who simultaneously experience joy and suffering and structure societies around a belief in Capitalism.
Professor of American History Donald Worster proclaimed that environmental history’s principle goal “became one of deepening our understanding of how humans have been affected by their natural environment through time, and, conversely, how they have affected the environment and with what results” (Worster 1988:290-291). O’Connor’s critique of Worster’s conceptualization of historical ecology can be summed up thus:

Worster’s usually keen formulations of issues give way to a discursive meandering. I believe that this is so because he doesn’t see that culture provides modes of cooperation, normative rules, etc., that are imported into production or labor, in this way becoming productive forces in their own right. … Nature and culture are separated; the latter permits people to live within the constraints of the former; labor itself drops out of this account, i.e., material activity seems to merely function as a way for humans to “live in equilibrium.” [O’Connor 1998:67]

O’Connor countered that “[i]ndividual capitals are simply unable to transform in unproblematic ways the conditions of production, which are first and foremost specific or particular use values, into exchange values” (O’Connor 1998:155) adding that the dualism of history-nature “which some regard as the heart of the Judeo-Christian tradition and many others as the product of the scientific and capitalist revolutions, is apparent everywhere, sometimes in inverted forms” (O’Connor 1998:80). In O’Connor’s view, “the dualism between cultural and environmental interpretations of history and landscape evaporates,” because “[l]abor mediates culture and nature, so to speak: Labor brings the two together in productive ways, yielding the material means of life” (O’Connor 1998:83). This is useful for historical archaeologists who employ a landscape archaeology perspective; a landscape can be read ‘backwards,’” because “[a] kind of capitalist ‘successional activity’ can be documented by the stages of property relations
and the commodification of nature in [a] region” (O’Connor 1998:85). In the modern era, properties and real estate with views can garner a higher selling or rental price (e.g. the exchange value of a sunrise or sunset view). Thus land, water, air, and sky transformed into commodities by humans through imputed values is capitalism writ at the landscape scale.

Patterns involved in the erstwhile ‘perpetual drive to impose order’ on natural environments worldwide is the subject of landscape archaeology writ large. Indeed, landscape archaeology landscape analysis and historical ecology can reveal patterns of human manipulations of environments from antiquity to the recent past. The recent discovery of more than 50 previously unknown geoglyphs located using drones in the Andes Mountains of Peru possibly related to pre-Nasca Paracas and Topará cultures (Greshko 2018) was accomplished by discerning the unknown from the known. A similar analysis can be done with irrigation within the dissertation study area resulting in the ‘discovery’ of the truth ‘hidden’ within legend.

Is ideology subjective and ideal (created by and existing in material apparatuses and its practices)? Is ideology a determined and epiphenomenal superstructure or an autonomous discourse with its own effectivity capable of constituting subjects? Is ideology negative and critical (a distortion or inversion) or neutral (the articulated discourse of class, fraction or party)? [Larrain 1991:1]

After interrogating Thatcherism from 1979 to 1990 and the works of Antonio Gramsci, Larrain concluded that both ideology and material conditions are “necessary aspects of the same complex phenomenon” (Larrain 1991:26).
Chapter V.

Environmental and Historical Background of the Mormon Row Historic District Study Area

Prehistory of the Greater Yellowstone Ecosystem

Deward Wal ker, Jr. and Pamela Graves (1999) compiled a comprehensive index of Native American prehistoric, precontact, and protohistoric land use modalities within the Grand Teton National Park (GTNP) and National Elk Refuge (NER) in their report, An Assessment of American Indian Occupation and Uses of the Cultural and Natural Resources of Grand Teton National Park and the National Elk Refuge. This volume is so comprehensive, even the complete transcripts of the Treaties signed by the affected tribes which legitimate their continued involvement in the Greater Yellowstone Ecosystem (GYE) are included. There is not just one group, band, or tribe which is or was endemic to Jackson’s Hole or the GYE. Rather each of the 35 treaties or agreements codifies cultural affiliation with the GYE and includes active programs with groups such as the Tribal Youth Corps (TYC) who helped perform maintenance in the MRHD (48TE1444; the study area) in the summer of 2016. Tribes traditionally used the GTNP, the NER, and the whole of what is known in the modern era as the GYE for “subsistence, trade, ceremonial, and/or other purposes” including “flora, fauna, mineral resources, hot springs, ceremonial sites, and the viewshed itself, as well as for many historical reasons including the tribes’ prior utilization of the region, … hunting, gathering, and trade as well as sacred and ceremonial practices” (Walker and Graves 1999:v).
It should also be emphasized that the regional tribes do and did not consider the GTNP and NER as a separate, self-contained area, but rather elements of a much broader cultural area (Walker and Graves 1999:5). More, Native American worldviews are sometimes complicated for non-Native people to understand due to a Western philosophical separation between “‘cultural resources’, ‘archaeological resources,’ and ‘natural resources’” (Walker and Graves 1999:19, 57). From a Native America point of view, “all resources are sacred” (Walker and Graves 1999:v–vi).

Sometimes referred to as the “high country adaptive system,” the affected tribes of the GYE hunted and gathered resources in a yearly round knowing where and when particular resources were available and their interconnected relationships to other resources. “Cultural sites are inextricably tied to tribal spirituality, and vice-versa,” and after reviewing over 300 sites, it became clear that, “all groups tend to hold the ties between cultural life and geological zones sacred” (Walker and Evans 1999:57). Moreover, “[t]ribal spiritual leaders emphasize that geographic location is vital to the effectiveness of rituals” (supra). Sacred knowledge of the landscape is and has been kept among tribal members so that sites do not lose their power nor negatively affect those who are not prepared to receive the wisdom and teachings of a place of power. Therefore, one can acknowledge without knowing the full extent and significance that there is a “profound emotional attachment to the flora, fauna, and natural landforms of a tribal person’s environment” (supra). One must also be mindful when investigating Native American cultural landscapes that there may not always be material cultural evidence at a site.

William Tall Bull, a Cheyenne Tribal elder, expressed virtually the same sentiment in a lecture given at Dull Knife Memorial College in Lame Deer, Montana in 1995 on the subject of
cultural ecology. The following excerpt adequately sums up Walker and Graves’ perspective which they collected from regional elders:

Everything that they took, there was a prayer what was given to the plants, the animals, and things. And every evening there were prayers from every lodge, thanking for everything that they had seen that day. Thanking for using the names of these plants and spirits. The relationship with these was very strong and the instructions on how to live were also very important. [Tall Bull 1995:3]

The project area contains evidence of past Native American land uses such as hunting, resource extraction, and occupation, but due to decomposition primarily lithic debitage, cores, flakes, flake tools, formal tools, and biface projectile points remain in the archaeological record. Stone features occasionally appear visible to archaeologists and field technicians, but few are able to discern ecofacts from stone features, and this leads to many ‘tipi’ rings or fire rings (hearths) not being recognized or recorded.

Native Americans were the first land managers, to use a modern concept, and they performed their traditional practices and prayers for thousands of years before Euro-Americans indel in upon the landscape their own ‘fingerprints,’ so to speak. There are a number of different Native American site types that can be identified archaeologically in the region. Some sites, as mentioned above, are not quite visible or knowable to others outside of a particular cultural tradition. Residential bases, locations, field camps, stations, and caches are the predominant types of sites archaeologists can encounter and land managers can protect in the GYE (Walker and Graves 2007:60–61). Each has its own signifiers or indicators of past land use.

It is known from ethnographic records and archaeological sites that tribal people of the GYE gathered in large groups at particular times in the year. Most often, these larger sites were
situated in sheltered locations such as canyons or valleys near water, food, and fuel. Winter
encampments are often termed villages, but may or may not have been occupied year-round.
Camas processing camps have been located in the northern portion of Jackson Lake but are
inundated below the current lake level. The Lawrence Site is an example of an extensive camas
processing location with numerous hearths and ovens, sometimes called camas ‘lids’ in other
parts of the country. Camas might have been prevalent in the project area before it was settled
given the soil types and moisture regime, yet native vegetation was systematically replaced by
fodder crops beginning with Euro-American settlement in the late 19th century. Many Native
groups collected and processed camas bulbs for long-term storage and trade. Camas is an
excellent source of starch, Vitamin C, and other nutrients that help people restore energy levels
in the early spring when other foods are or were scarce or dwindled in supply.

It is estimated that people began using the area known by archaeologists as the Lawrence
Site starting about 8,000 years before the present (BP). Campsites are typically categorized as
shorter-term occupation sites in the archaeological record, and were similarly located near
resources. The Henn Site, in the southern portion of the NER, dates between 7,000 and 3,000 BP
based on diagnostic projectile point chronologies. This suggests that people utilized Antelope
Flats north and east of Grovont, Wyoming/Mormon Row and the area around Blacktail Butte
within the study area at least 7,000 years ago and probably longer. Native groups were displaced
in the mid-19th century by Euro-American settlers.

Sweat bath sites, trade sites, trails, encampments, and of course ‘tipi’ rings are still
evident on the landscape if one is careful to identify them as such. It is not always conclusive if
an ‘alignment’ of quartzite cobbles is in fact a ‘tipi’ ring without tribal consultation. Creation
sites, dance grounds, game drives and or jumps, fishing sites, and dwellings also were and are
present on the landscape, but their identification, like ‘tipi’ rings, are less obvious to non-Native archaeologists. Similarly, horse enclosures, sheep trapping sites, hunting and/or gathering sites, and teaching sites may not have left artifactual or empirical evidence discernable by 21st century archaeologists, but are nonetheless significant.

Horses were introduced to North America ca. 1750 by Spanish conquistadors. Wild horses are technically feral, and there is not an analog for cattle. Bovine species were introduced to the New World by Columbus’ voyages in the 15th century. Bison are of course indigenous to North America and were one of the fundamental natural resources of the Plains tribal groups who occupied the GYE in historic, protohistoric, and prehistoric times. All parts of the bison were used.

Cairns can be problematic. Several cairns encountered in the study area have been associated with historic-era land use as opposed to precontact land use as evidence by their conspicuous locations in corners of fields or along Public Land Survey System (PLSS) Township, Range, and Section lines, even quarter-Section corners. Similarly, piles of cobbles can be associated with homesteaders and not tribal peoples, again by reference to their locations just outside fencerows and fields (Daugherty et al. 2007:128). There are no known medicine wheels in the study area, but this does not preclude their possible existence. Perhaps the best known medicine wheel is located in the Bighorn National Forest of Wyoming, and is a National Historic Landmark. Full descriptions and cultural significance of the various site types briefly discussed above can be found in Walker and Graves (2007). It is possible that Kelly Warm Springs (48TE449-450) was used in prehistory as a bathing site or had other medicinal properties associated with the geothermal mud and spring water. It is also possible that a relict geothermal water source about one mile south of Kelly Warm Springs had significance in prehistory as well.
Vegetation

GTN) and the GYE are home to a wide range of biotic communities (Walker and Graves 2007). High elevations and climatic conditions permit and limit which species can survive in the environment or ecological niche—including humans. There are over 1,000 vascular plant species identified within the GTNP’s three growing zones: Valley (6,400–7,000 ft. above sea level (ASL)), Canyons (7,000–10,000 ft. ASL), and Alpine (above 10,000 ft. ASL). Eastern Cottonwoods (Wyoming’s State tree; *Populus deltoides*); and Quaking Aspen (*Populus tremuloides*) thrive in the Valley zone where there is abundant water, and can be found lining the Snake and Gros Ventre rivers as well as providing windbreaks along some of the established homesteads, irrigation ditches, and roads of the Mormon Row cultural area (Grand Teton National Park 2006:33). Elsewhere, Cottonwood and Aspen groves naturally established themselves along the foothills of the mountain ranges and near springs. Cottonwoods had traditional medicinal uses as well as fuel and building material uses in pre-contact time by Native Americans of the region. Bark was used for colds, pneumonia, and fever (Walker and Graves 2007:406). Aspen bark was scraped and given to women before childbirth.

Occasionally, single specimen Blue or Engelmann spruce (*Picea pungens*) and Subalpine (Abies lasiocarpa) or Douglas-fir (*Pseudotsuga menziesi*) trees were planted by homesteaders to mark property corners or provide decoration (Walker and Graves 2007:31). In pre-contact times, Spruce, like Douglas-fir, was used to treat coughs and in sweatlodges (Walker and Graves 2007:404); Douglas-fir was also used to flavor smoked meat and to make bows (Walker and Graves 2007:407). Lodgepole pines (*Pinus contorta*) populate the slopes of Blacktail Butte and parts of the foothills below Shadow Mountain where there are well-drained glacial soils.
Lodgepole pines had numerous uses including cambium as food, pitch as gum, sap and seeds were eaten, tools and parietal objects were made, and infusions were taken to combat tubercular coughs (supra). Limber pines (*Pinus flexilis*) may occasionally be extant within the project area as single specimens in drier areas, and were used widely like Lodgepole pines as food and shelter (Walker and Graves 2007:405). Maple trees, possibly Rocky Mountain Maple (*Acer glabrum* Torr.), Alder (*Alnus* spp.), Willow (*Salix* spp.) were seen in the project area, and each had medicinal and/or material uses in Native cultures, as well as uses for the homesteaders. Botanist Robert D. Dorn (1975:99) lists *Salix bebbiana, Salix drumondiana, Salix lemmonii, Salix lasiandra caudate*, and *Salix wolfii* as species found in Teton Park (presumably the same park as GTNP), Teton County, Wyoming. *Salix bebbiana* was also noted by Dorn on Blacktail Butte. A few Russian olive (*Elaeagnus angustifolia*) were seen in marginal areas. Russian olives are considered an invasive species (USDA 2016), having been introduced by the early 1900s in Western North America. Juniper (*Juniperus scopulorum*) were observed near the Gros Ventre River (Shaw 1968:5). Birch (*Betula occidentalis*) may exist on the south face of Blacktail Butte.

Trees and shrubs other than those marking property or serving a purpose as a windrow were largely removed by homesteaders to make room for irrigation ditches, homesteads, hay, and oat fields in the historic era. Ironically, it was over-irrigation, or flooding, which was used, along with fire, to eradicate Big sagebrush from the Mormon Row landscape. Botanist Donald N. Hyder wrote a booklet, *Spray---To Control Big Sagebrush* (Station Bulletin 538) to encourage use of Butyl ester of 2,4-D in the “control of big sagebrush, not for its eradication” (Hyder 1954:12). By the time of this federal missive, the Mormon Row community had all but vacated the sagebrush steppe. The Mormon Row community, however, likely used excess irrigation ditch water to flood the sagebrush-laden fields before and after the turn of the 20th Century to clear
their parcels for improvements per the Homestead Act of 1862 (Public Law 37-64; 12 Stat. 392),
the Enlarged Homestead Act of 1909 (35 Stat. 639, as amended), and others. “Big sagebrush will
not stand with its feet in the water, and it is easily killed by flooding. Silver sagebrush, like
rabbitbrush, can produce new sprouts at the stem base after fire or other killing back of the
crown” (Hyder 1954:7).

Trees and shrubs evident today are often volunteers encouraged by the GTNP to re-
populate the landscape and return it to a more native vegetative state. Vegetation restoration
efforts in the GTNP have been extensive and are ongoing. Invasive species control is a
component of vegetation restoration and is another ongoing effort put forth by the GTNP’s
Division of Science and Resource Management (SRM) in cooperation with the Biological
Resources Division (BRD) of the United States Geological Survey (USGS) in conjunction with
the National Park Service (NPS) Inventory and Monitoring Program. Before settlement, the
landscape was covered by Big sagebrush (*Artemisia tridentata*), Antelope bitterbrush (*Purshia
tridentate*), and a variety of native grass species. The vegetation characteristic of the Mormon
Row cultural landscape is sagebrush steppe. Big sagebrush, three-tip sagebrush (*Artemisia
tripartita*), and low sagebrush (*Artemisia arbuscula*) are returning to the areas outside of the
Mormon Row Historic District (MRHD). Wyoming three-tip sagebrush (*Artemisia tripartite
rupicola*) may be in the study area, otherwise there may be immature three-tip sagebrush dotting
the landscape. The predominance of sagebrush is in part due to the climate, the precipitation
regime, and the shallow, rocky, well-drained soils composed of glacial outwash and loess with
which Jackson Hole is replete.

There are numerous rabbitbrush in the study area. They were likely *Chrysothamnus
nauseosus* and *Chrysothamnus vicidiflorus*, the second species being a larger shrub-like plant
with longer flowers than the former, which is closer to the ground and has smaller clusters of flowers than the Douglas variety. Horsebrush (*Tetradymia canascens*) is similar to both rabbitbrush species and may also have been seen in the project area. Red-osier dogwood (*Cornus stolonifera*) is common near streams and the Gros Ventre River. Dogwood had numerous utilitarian and material uses in precontact times, as well as medicinal or spiritual uses (Walker and Graves 2007:392). Indian hemp, also known as dogbane, (*Aposynum cannabinum*) is likely to exist near the Gros Ventre River, and may have been seen, but the author was unclear if the plants were dogwood or Indian hemp as they look very similar in the early part of the growing season. Kinnikinnick (*Arctostaphylos uva-ursi*) is a useful plant with many food and medicinal uses, including a smoking herb. The author identified kinnikinnick first as pinemat manzanita in pine groves by its smell, then later noted taller manzanita shrubs near the Gros Ventre River and along Ditch Creek in the project area also by its distinctive sweet smell. Pinedrops, also known as broomrape (*Orobanche* sp.) look like reddish asparagus when they are young, but soon flower and do not resemble asparagus at all. Rogue asparagus (*Asparagus officinalis*) was located during survey in the SE1/4 SE1/4 corner of Section 2, T 42 N, R 115 W near the former Albert Nelson homestead.

Crested wheatgrass (*Agropyron cristatum*) and Bluebunch wheatgrass (*Agropyrum spicatum*) were observed closer to the Gros Ventre River, and Giant wild rye (*Elymus cinereus*) was noted in Section 26, T 43 N, R 115 W. Ricegrass (*Oryzopsis hymenoides*) was also observed nearer to the Gros Ventre River in sparse patches. Bluegrass varieties were also observed in Section 35, T 43 N, R 115 W. The bluegrass could also have been oatgrass (*Danthonia* spp.). Idaho fescue (*Festucia idahoensis*) was present in drier areas. A few varieties of squirrel-tail (*Elymus elymoides*) were noted near the Gros Ventre River. Many of the historically cultivated
fields were and are today planted in bromes. The exact species of brome (*Bromus spp.*) varied somewhat depending on soil conditions and native plant species. Pinegrass (*Calamagrostis rebescens*) was observed near the Grand Teton National Forest boundary in Section 14, T 43 N, R 115 W. Sedges were not noticed, but may exist in marginal areas or near the Gros Ventre River. Trisetum (*Trisetum spp.*) were likely in the area in marginal area as well. Cheatgrass (*Bromus tectorum*) is a scourge which came from Russia via contaminated grain in the late 1890s (Mack and Pyke 1983; Pellant 1996). Cheatgrass was noted in disturbed areas. The areas of Antelope Flats, Dry Farms, Grovont-Mormon Row, and the town of Kelly, Wyoming could also have been areas of native hay and undoubtedly Big sagebrush before they were homesteaded.

Yarrow (*Achillea millefolium*) has multiple medicinal uses both traditionally by Native Americans and historically by Euro-Americans. Horsemint, or giant hyssop (*Agastache spp.*) was spotted in Sections 33 and 34, T 43 N, R 115 where vegetation has reverted to native species for the most part. The author ate some of the horsemint and found it a mild variety with more of a hyssop taste than mint, and with large flower heads that were easy to chew. Oniongrass (*Melica spectabilis*) was noted and the author was tempted to taste it, but did not trust that it was edible like chives. Sweetclover (*Melilotus officinalis*) appears as an invasive species, even if it is a brilliant yellow or a passionate purple native species seen in former hayfields of the Mormon Row community. Alfalfa (*Medicago sativa*), while an excellent fodder crop and Nitrogen fixer in soils in marginal areas, can easily crowd out native species. Relict patches of alfalfa were spotted, yet may have been sweetclover; the two look very similar from a distance.

Hops were found growing in three places: the vicinity of the former J. L. May homestead in Section 5, T 42 N, R 115 W; growing outside the Andy Chambers Homestead 48TE995; and the McCollister Historic District 48TE1162. Hops (*Humulus lupulus*), while native to Europe,
Western Asia, and North America (Colorado and New Mexico; USDA 2002b:2), is most likely a cultivar introduced to the landscape in the Mormon Row community. “*Humulus* distribution in the Rocky Mountains is scattered and uncommon,” (*supra*), a “geographic distribution of *Humulus lupulus* suggests that populations of var. *neomexicanus* in CO, NM, UT, AZ, NV, and WY” (USDA 2002b:3), and has “an opportunistic, fragmented distribution pattern and may be undergoing range expansion or local extinction” (USDA 2002b:4). By far, the most common use for hops is as a preservative in beer, but it has many medicinal properties as well. WebMD lists the following medicinal properties for hops:

Hops is used for anxiety, inability to sleep (insomnia) and other sleep disorders, restlessness, tension, excitability, attention deficit-hyperactivity disorder (ADHD), nervousness, and irritability. It is also used to improve appetite, increase urine flow, start the flow of breast milk, as a bitter tonic, and for indigestion. Other uses include prostate cancer, breast cancer, ovarian cancer, high cholesterol, tuberculosis, bladder infections, intestinal cramps, an intestinal disorder called mucous colitis, nerve pain, and prolonged painful erection of the penis (priapism).

Hops is sometimes applied to the skin for leg ulcers and as an antibacterial agent.

[WebMD 2009]

Just because the Mormon faith has a prohibition against the consumption of alcohol does not mean that they did or do not use plants such as hops (*Humulus lupulus*) for other purposes in the historic-era or presently. Hops can be a nice decoration around a homestead, and has been encouraged by the GTNP to repopulate and decorate at a restored historic site called White Grass Dude Ranch, listed on the National Register of Historic Places (NRHP) in 1990 (personal
communication, Shannon Dennison, 2016). Mormons do have a moral objection to gambling and successfully thwarted attempts to allow gambling in Jackson Hole (Huyler 1983:84).

The author found it refreshing that some portions of the study area contained cryptogamic crusts. *Mushroom, the Journal of Wild Mushrooming*, an online nexus for information about mushroom foraging, has this to say about cryptogamic crusts:

[They are a] tightly bound mesh of various cyanobacteria, lichens, mosses, and fungi, hold the soil down, prevent soil erosion, and provide a hospitable environment for germinating plants. They were probably the first land-based communities of life. In untouched deserts like those in Arizona, New Mexico, Colorado, and Wyoming, over 70% of the ground cover may be cryptogamic crusts. Unfortunately, the[y] are very vulnerable to crushing (as when you walk on them, or drive over them in an SUV), and it is very difficult for them to recover from this. Soil, freed from the constraints of a footstep’s worth of crust, drifts over the neighboring crust and kills it (the crusts are photosynthetic, and require sunlight to survive), and the process of making our Western openlands look more like the Sahara continues. This vulnerability to crushing is hardly surprising, as these communities evolved millions of years before there were any organisms with feet. [Shernoff 2016]

Given the land use history in the project area, the presence of cryptogamic crusts suggests two things—that there are areas which were not disturbed, suggesting further that the biotic community there is more or less native, and there are areas which were previously disturbed, yet through the process of abandonment and reversion to more native environmental conditions, in which the crusts have re-established. Either scenario is a benefit to native species and biodiversity in a region heavily impacted by ranching and agriculture in the historic period.
Water-based plants will not be discussed as they do not substantially contribute to the overall vegetation regime of the study area except to note that thermophilic algae exist in Kelly Warm Springs and the Mormon Row Ditch (Jackson and Castenholz 1975). Indeed, the warm water of Kelly Warm Springs joins The Savage Ditch (48TE1851) to form Mormon Row Ditch (recorded as part of 48TE1444—MRHD), and allowed the residents of Grovont-Mormon Row to water cattle and fields for more days during the year than other homesteaders could. Life depends on water. Generally speaking, the project area is densely vegetated making pedestrian survey a limited prospect. Were it not for LiDAR imagery, the author might not have located many of the newly identified cultural resources during this survey and inventory project because of nearly 100% vegetation cover.

*Soils and Depositional Environment of the Project Area*

Vascular and non-vascular plants predominantly grow in soil in the project area, with the exception of thermophilic species in the warm waters of Kelly Warm Springs and the present-day Mormon Row Ditch (48TE1444). Parent material in soil composition plays an important role in limiting or permitting certain types of vegetation and animal habitat that the soils’ chemistry can support. Certain species can only exist in particular soil types or environments.

Where glacial meltwater washed away most of the soil, the cobbles and poor, thin soil left behind cannot retain moisture or nutrients. Sagebrush, certain wildflowers and grasses can tolerate such desert-like growing conditions. Thus the geologic history of a region determines the vegetation and ultimately the wildlife, too. [NPS 2005]

Streams of all sizes deposit and redepot mineral particles over time. Therefore, an understanding of the parent materials and resultant soil series types is useful in deciphering the
vegetation of a landscape. As mentioned above, this is a sagebrush steppe environment with wild hay, bromes, and fescues represented in the grasses category. While superactive and fertile, the growing season fairly limits what can be grown by humans for consumption as food for themselves or animals. Cattle ranchers may have had an advantage in terms of foods for consumption, as the landscape was abundant with forage in non-drought years. Another advantage of bromes and hay crops is the retention of loessal topsoil.

The ground is blanketed by Aeolian loess deposited after the last glacial epoch and the distribution of fine mineral particles it produced. Colluvial and alluvial fan deposits spread out from the mouth of Ditch Creek covering the vast majority of the project area in gravelly loam soils. Aeolian loess and alluvium of Ditch Creek rest atop outwash gravels and glaciofluvial deposits. There are places where loessal soil is 10 ft. deep or more, e.g. Section 26, T 43 N, R 115 W, and there are places were contact with outwash gravels and cobbles is just below the surface. Sections 2–4 and 9–11, T 42 N, R 115 W could and probably have received flood sediments, especially as a result of the flood on 18 May, 1927, but are nascent (entisols and similar young soil series types) if present. The flood of 1927 stripped the Gros Ventre River alluvial floodplain of its soil and redistributed it elsewhere, as it has for æons (Love ands Reed 1971:26–28). Large erosional scars are evident in Section 9, T 42 N, R 115 W near Kelly, Wyoming. Soils are so thin and skeletal next to the Gros Ventre River that the USDA Web Soil Survey does not map units in many areas (Figures 10 and 11). Otherwise some of the deepest and most fertile soils in Jackson Hole are in the project area near Blacktail Butte (Daugherty et al. 1999).
FIGURE 10. Soil parent material map legend to accompany Figure 11.

Tetonia and Tetonville soil series are of the second largest distribution in the study area. Tetonia silt loam series soils consist of very deep, well drained soils formed in loess, and are coarse-silty, mixed, superactive Calcic Pachic Haplocryolls—simple, thick mollisols with a tendency towards accumulating calcium carbonate (caliche) derived from the weathering of lime-rich loess and evapotranspiration. Alkalization of soils also occurs in loess-based soils if water impoundment (aquic conditions) occur and dissolved minerals accumulate. Tetonia soils are listed as having a brief frost-free period of 20–55 days and a precipitation regime of 12–22 in. per year. Major uses of Tetonia soils are cultivation of dryland winter wheat, barley, oats, alfalfa, hay, and grazing, as well as irrigated wheat, barley, seed potatoes, and range (NRCS 2016). Tetonia has associations and complices including Tetonia-Lantonia and Tetonia-Tineman, with distributions ca. 3% of the project area land surface. Lantonia soils are characterized by deep loess deposits with a calcic horizon. Native vegetation includes Idaho fescue, big bluegrass, prairie junegrass, bluebunch wheatgrass, balsamroot, geranium, lupine, yarrow, and small amounts of Big or three-tip sagebrush.
FIGURE 11. Soil parent material map of the outwash terraces and alluvial fans of the study area on a 1:94,000 scale orthographic projection (NRCS 2016).
Tetonville soil series consist of somewhat poorly drained soils that formed in alluvium. Tetonville soils are sandy-skeletal, mixed Mollic Cryofluvents—young entisols laid down by rivers or streams with a relatively cold climate regime and a mollic epipedon with a frost-free season of less than 90 days. Tetonville soils are used for irrigated cropland, rangeland, homesites, and other community uses, recreation, and wildlife habitat. Native vegetation is narrow leaf cottonwood, willows, Kentucky bluegrass, alpine timothy hay, Nebraska sedge, and Baltic rush in the intermountain valleys of western Wyoming. Tetonville has associations and complices including Tetonville-Riverwash and Tetonville-Wilsonville. Tetonville-Riverwash covers ca. 5% of the project area. Wilsonville soil series consist of very deep, somewhat poorly drained soils that formed in alluvium. They are coarse-loamy, mixed, superactive, nonacid Mollic Cryofluvents similar to, but not competing with Tetonville soils.

Leavitt-Youga complex soil series consist of very deep, well drained soils that formed in alluvium or colluvium derived from crystalline and sedimentary rock. Leavitt soils are on relict fan aprons, coalescing fans, terraces, hills and mountain slopes. Youga soil series consist of very deep or deep, well drained soils formed in glacial till, outwash, alluvium, Aeolian deposits, or similar material. Youga soils are on upland hills, plateaus, foot slopes, fans, and mountainsides. Leavitt and Youga soils are fine-loamy, mixed, superactive Ustic Argicryolls—relatively arid, cold, clayey mollisols used for native pastureland and for recreational purposes, and may exhibit alkalization characteristics especially in areas where surface water is impounded creating aquic conditions. Native vegetation consists of Thurber fescue, Big sagebrush, and widely spaced aspen. The Leavitt-Youga complex covers ca. 5.5% of the project area, and can be seen in the Ditch Creek drainage as opposed to the larger alluvial fan feature.
Greyback and Greyback-Thayne complex soils consist of very deep, somewhat excessively or excessively drained soils that formed in alluvium. Greyback soils are on alluvial fans and high terraces, are loamy-skeletal, mixed, superactive Ustic Haplocryolls similar to Leavitt-Youga except are relatively older mollisols. These soils formed in thick, very gravelly, calcareous alluvial parent material with a depth of ca. 40 inches with a frost-free season of less than 60 days. These soils are used as native pastureland, as irrigated hay meadow, and in places are used for tilled crops. Native vegetation is bluegrass, sagebrush, and cactus. Thayne soils are very similar to Greyback soils in every respect except Greyback soils have more than 35% gravels in the upper portion, and Thayne soils less than 35%. Thayne soils are used for irrigated and dry cropland, and for native pasture. Native plants are bluegrass, timothy, sagebrush, and clover.

Grobutte-Thayne complex soils consist of deep, well drained, calcareous soils that formed in gravelly alluvium and colluvium, and are classified as loamy-skeletal, mixed, superactive, calcareous, frigid Ustic Torriorthents—relatively young entisols with hot and cold extremes, otherwise quite similar to Greyback and Thayne series soils. Grobutte-Thayne complex soils are used for rangeland, recreation, and wildlife habitat. Native vegetation is wheatgrass, big sagebrush, and balsamroot in the mountains and hills of western Wyoming and is of small extent. Grobutte-Thayne complex soils comprise ca. 3.2% of the study area.

Charlos series soils consist of very deep, well drained soils that formed in glacial outwash and alluvium. Charlos soils are on nearly level to strongly sloping glacial deposit and stream terraces such as the Late Pinedale West Spalding Bay Channelway outwash terrace near Jenny Lake within the GTNP (Love and Reed 1971; Nash and Beaujon 2006). Glacial outwash terrace of the same relative age exist on the east half of the GTNP, but will not have been named as such.
as it is not associated with the same glacial lobe. Antelope Flats and Mormon Row are composed of Pleistocene outwash gravels and drift of the Burned Ridge moraine (map symbol Qo₄b; Figures 10 and 11). Medium and coarse granitic sands are distributed through the Charlos solum, ranging in weight from 20 to 60%. Rounded granitic pebbles and cobbles ranges from 2 to 30% in the A and Bt horizons on nearly level to strongly sloping glacial outwash and stream terraces adjacent to granite and gneiss exposures. Charlos soils have been used for dryland and irrigated production of small grains and hay and for range. Native vegetation consists of wild grasses and open stands of western yellow pine. Charlos soils represent about 2.3% of the landscape in the study area.

Taglake-­Sebud association soils represent ca. 2.7% of the soils in the study area. Taglake soils are deep, well drained soils that formed in glacial till, often very stony sandy loam with a mollic epipedon before encountering gravel, cobbles, and stones. Taglake soils are on undulating to steep moraines, and are loamy-skeletal, mixed, superactive Ustic Haplocrypts—inceptisols of the youngest age with relatively arid and cold temperature regimes. Taglake soils have been used for recreation and for wildlife habitat. Native vegetation is lodgepole pine, lupine, and elk sedge. Sebud soils formed in very deep, well drained till, outwash, alluvium, slope alluvium, and colluvium derived from igneous, metamorphic or sedimentary rock. These soils are on alluvial fans, fan remnants, till plains, moraines, hills, and mountains. Sebud soils are loamy-skeletal, mixed, superactive Ustic Haplocryolls—relatively arid and cold mollisols very similar to Taglake series soils, hence their association. Sebud soils are used mainly for rangeland. Potential native vegetation is mainly western wheatgrass, rough fescue, bluebunch wheatgrass, green needlegrass, Idaho fescue, annual forbs, and woody plants. Therefore, the main difference between Taglake and Sebud is the vegetation which can establish itself thereon given the climate
and moisture regimes, i.e. trees vs. grasses. Generally speaking, ground cover is dense throughout the project area.

Lastly, Turnerville soils are represented in a relatively significant distribution in the study area, comprising ca. 2.8% of the landscape. Turnerville soils are very deep, well drained soils that formed in thick, weakly calcareous Aeolian silts that have been partially reworked by water in some areas. Turnerville soils with their association with water are fine-silty, mixed, superactive Ustic Glossocryalfs—silt loam alfisols with relatively arid and cold climate regimes in forested areas with elluviated “tongues” of sand noticeable in horizons of the upper portion of the solum. Turnerville soils are used for production of barley, oats, alfalfa, and pasture, and for forestry purposes. Native vegetation is lodgepole pine with an understory of grasses and shrubs. This series was established in 1945 in the Star Valley Soil Conservation District, Wyoming, another Mormon community to the south of Jackson Hole, Wyoming (NRCS 2016). In fact, a number of soil series in this region were established based on soil types found in the Star Valley region, and were named after prominent families or locales in Star Valley history, e.g. Thayne, Turner, Von Leavitt; see above. Some of the most curious geomorphic features in the study area can be found in Section 35, T 43 N, R 115 W and Section 2, T 42 N, R 115 W.

Geology

When what is Wyoming today was under ocean water, massive, thick layers of sandstone were deposited on top of basement rock composed of 3.1 to 2.8 billion years (Bya) old Precambrian biotite gneiss, quartz plagioclase gneiss, and amphibolite at the base of the Grand Teton Range (Love 2001c). Cambrian age Flathead Formation sandstone was deposited starting
540 million years ago. Sea levels rose by at least 320 ft., and dwarf sea level changes predicted by climate change theorists today. During the intervening 1.5 billion years between these two geologic events, the siliceous basement rock weathered and eroded in an unroofing, a redistribution the Earth’s crust via sand-sized particles. Water is and was a major factor in this process.

Billions of years of weathering and erosion combined with a deep body of water allowed finer particles of silt and mud to settle atop the Flathead Formation as the Gros Ventre Formation (Hendrix 2011:29–33). At this time in Earth’s history, the continental plate which became the land in present-day Western Wyoming was situated near the equator. Marine water temperatures were warm and some of Earth’s first animals appeared during the Cambrian period, 521 to 250 million years ago (Mya), e.g. trilobites. Diatoms also thrived. Diatoms are a type of phytoplankton nearly completely covered by a silicon cell called a frustule. Much of what we know about the evolution of diatoms comes from fossil records during the Jurassic period, from 201 to 145.5 Mya. Diatoms may have red algae-like progenitors which date to the Triassic period, from 252 to 201 Mya. Algae are some of the oldest life forms preserved in the geologic records, dating back 1.6 to 1.7 Bya in the Paleozoic. Silicon-based diatom frustules and the exoskeletons of multi-celled organisms and animals dissolved in warm marine water and became a silicogenous ooze at depth in the ocean that surrounded the North American craton, the land mass of which Wyoming and the GYE are the westernmost part. Through various diageneses, the silicogenous ooze at the bottom of the ocean became diatomaceous earth (chalk), diatomite, limestone, dolomite, and chert over time through various lithification processes. Trilobites and other early animals burrowed their ways through silicogenous sediments and their traces can sometimes be seen in sedimentary rock strata.
The Middle Cambrian Gros Ventre Formation contains two Death Canyon Limestone Member layers above a stratum of Wolsey shale atop Flathead sandstone. Another, Park Shale Member, is as much as 220 ft. thick, and contains beds of limestone conglomerate, as well as fossil trilobites, brachiopods, and algal tumuli called heads (Love and Reed 1971:66–77). The Late Cambrian Gallatin Limestone Member is the last limestone member before a dolomite sequence from 530 to 500 Mya. Gallatin limestone crops out on Blacktail Butte as the first geologic member seen from the north, and is overturned by up to 80°. Paleozoic, Middle to Late Ordovician Bighorn dolomite is 300 to 500 ft. thick, massive, and siliceous or locally dolomitic limestone within the GYE, and is 440 to 425 Mya above Gallatin limestone and below Devonian Darby Formation dolomite at Blacktail Butte. Devonian Darby Formation dolomite formed between 390 and 345 Mya and can be 350 ft. thick. The Earth went through another limestone-producing period during the Mississippian, from 345 to 310 Mya.

It is not entirely clear how or why silicogenous ocean floor sediments became dolomite through Magnesium replacement. Dolomite is a sedimentary mineral carbonate, CaMg(CO$_3$)$_2$, while limestone is calcium carbonate, CaCO$_3$. Mississippian age Madison limestone (MM) in the GYE can be up to 1,000 ft. thick and was formed during the Kaskaskia sedimentary sequence 359 to 318 Mya. Madison limestone underlies much of the GYE including the hydrothermal region of Yellowstone National Park providing much of the parent material of the travertine formations enjoyed by visitors. Curiously, Madison limestone does crop out in the project area near the geothermal springs in Section 1, T 42 N, R 115 W, exposing circa 100-foot-tall canyon wall to the north, and an over 140-foot-tall exposure to the south. Madison limestone is also exposed on Blacktail Butte and is overturned 50 to 80 degrees from normal or horizontal. Indeed, the whole Blacktail Butte appears drastically dipped towards the north, almost vertical. It is not
clear how this occurred while elsewhere geologic strata are nearer to horizontal. Isostatic rebound is one explanation, but the declination of the dip is less explainable.

Blue Miner Lake and Shadow Mountain, Wyoming 7.5’ geologic quadrangles (Love 2001a, 2001b) reveal a large exposure of Mississippian Madison (MM) along an inferred and a labeled dipping normal fault (Figure 12). The exposure is approximately 1.5 miles wide and 7.5 miles long, has a sister feature to the north and another east of Shadow Mountain, approximately 1 mile wide by 1.5 miles long exposing Triassic Chugwater siltstone, sandstone, and shale below younger Tertiary age Miocene Teewinot Formation limestone, claystone, and pumicite thinly interbedded with claystone, marlstone, and tuff. Locally, the Chugwater siltstone, sandstone, and shale are exposed northeast of the Gros Ventre Slide event near the top of Slide Lake in an area known as the Red Hills because of their distinctive color (Love, Reed, and Christiansen 1992). Sundance Formation limestone contains some interbedding of shale while Gypsum Spring Formation is composed of red shale, some dolomite, and white gypsum. Where gypsum has leached out, lithified carbonate breccia has replaced it.

Cobbles in streambeds and alluvial terraces in the project area are resultant from clasts in cobble-bearing formations, post-glacial outwash deposits, and natural weathering and erosion of bedrock. Paleocene and Upper Cretaceous Pinyon conglomerate composed of quartzite roundstones (cobbles) in a matrix of clastic conglomerate and/or rust-colored sandstone with occasional flakes of gold (Bell 1902; Love 2001b) and Middle and Lower Miocene Colter Formation follow the Ramshorn Anticline to the east of Shadow Mountain, a massive exposure of Tertiary age Miocene Teewinot Formation limestone, claystone, and pumicite. Vertebrate fossils have also been located within Colter Formation tuff, sandstone, ash, and mafic volcanic conglomerate layers.
1:24,000 scale map mosaic using Blue Miner Lake, Shadow Mountain, Moose, and Gros Ventre Junction, Teton County, Wyoming 7.5’ geologic quadrangles (Love 2001a, 2001b, 2001c, 2001d).

FIGURE 12. 1:24,000 scale geologic map mosaic of the generalized pedestrian survey boundary (Love 2001a, 2001b, 2001c, 2001d).

*Historical Background of the Mormon Row Historic District*
Fort Bridger was established near South Pass in Wyoming Territory in 1842 by fur trappers Jim Bridger and Louis Vasquez along the Black Fork of the Green River southeast of present-day GYE. According to Wyoming historian Michael Cassity,

... between 1842, when the first avowed emigrant train passed through Wyoming until the eve of the Civil War in 1860, probably a half-million homesteaders, religious refugees, and gold-seekers traveled through Wyoming …. If the [Mormon and Oregon] trails are regarded as not just ruts on the ground, but as physical manifestations of the human activities that left them, they hint at the larger changes under way. [Cassity 2010:5]

The presence of Church of Jesus Christ of Latter-day Saints (Mormons) was so significant that possession of Fort Bridger was transferred to the Mormons in the 1850s and additional land was settled nearby (Cassity 2010:6) and “reports of cultivation of grain as well as livestock were substantial, and there may have even been irrigation that early” (Nelson 1952:4–6).

Brigham Young and 148 Church officials organized the Great Mormon Migration westward into Wyoming then southwest into the Great Basin. Mormon pioneers and scouts blazed a trail that quickly became a two-way road on the north side of the Platte River while the Oregon Trail was one-way and on the south side of the river (Francaviglia 2015:60). Upon seeing the Great Salt Lake in 1843, John C. Freeman wrote that his party of explorers, “’beheld the object of our anxious search—the waters of the Inland Sea’” (Arrington and May 1975:6). Is the Great Salt Lake the object of Mormon ideological desire? The short answer is, no, but it was an ideological destination, a terra nullius landscape that could be settled and transformed by the
hand of humans (Arrington and May 1975:5) into something extraordinary—a holy land for Mormons called Deseret.

According to Leone (1974, 1977, 1979, 2010), Joseph Smith, Jr. translated “deseret” as a Reformed Egyptian word for honey bee even though Reformed Egyptian is a non-existent language. Out of this context, the beehive became a cogent symbol of the new religion and can still be seen today in Mormon iconography. The beehive expresses the relationship of the individual to the society wherein the individual can realize himself only through his place in the whole (Leone 2010:101).

As a political unit, the provisional State of Deseret challenged the federal government’s stance on separation of church and state as well as the legal definition of marriage. Despite a resistance to incorporation, the Territory of Deseret did incorporate, formed six counties, appointed judges, created a criminal code, and formed a militia. Brigham Young encouraged Mormons to “create their own beet sugar, textile, and iron industries” (White 1991:241). There was a ready supply of labor from within so none was needed from without. The germ of Deseret sprouted in 1849 and a provisional state did exist for just over two years, but was never ratified by the US Federal government. The present-day State of Utah emerged out of the territory involved in the Treaty of Peace, Friendship, Limits and Settlement between the United States of America and the Mexican Republic, which was the peace treaty signed on 2 February, 1848 in the Villa de Guadalupe Hidalgo that ended the Mexican–American War (1846–1848). The Territory of Deseret did not achieve statehood for a variety of reasons, and the Utah Territory was formed in 1850 instead, which led to different frustrations due to the reduction of the Mormon theocratic nation-state to a subordinate state of the federal government (Leone 1979).
Approximately 500,000 emigrants travelled along the Oregon-California-Mormon Trails on their way west towards the Pacific coast; between 1840 and 1860, at least 45,000 of them were Mormons (White 1991:189). All was not pacific, however, and President James Buchanan ordered troops to the area in 1857 to quell hostilities. The Mormon “Nauvoo Legion” responded with their guerilla militia and burned Fort Bridger and Fort Supply nearby, stole thousands of cattle, and set fire to US Army supply wagons and the surrounding area (Eldredge 2008). President Buchanan sent a Peace Commission to the Utah Territory and Territorial Governor Brigham Young that included a pardon for Mormon people. After the deaths of hundreds of men, women, and children, the Utah War, sometimes called the Great Mormon War, ended on July 12, 1858 when U.S. troops occupied Salt Lake City and Brigham Young accepted President Buchanan’s conditions.

The federal government intervened in the State of Utah in 1879 when it outlawed polygamy based on the Supreme Court case of United States vs. Reynolds (White 1991:174). In 1882, the Edmonds Act passed and further restricted Mormon cultural practices, but did not infringe upon their beliefs as protected by the U.S. Constitution and Bill of Rights. The expanded Edmonds-Tucker Act of 1887, however, made it a criminal offense for the LDS Church to hold assets in excess of $50,000, which in effect “crippled the church’s corporate and communal activities,” (supra) and the desire of Mormons to achieve homeland of their own. They continued to try despite opposition and penalties. Frontier Mormon communities managed to self-rely more than depend on outside resources, and some continued well into the 20th century, including Grovont, Wyoming/Mormon Row which was originally settled in the second wave of Mormon expansion in the 1890s (Francaviglia 2015; Leone 1979).
**Historic Context of the Study Area**

**Grovont, Wyoming-Mormon Row Historic District (48TE1444)**

In their “Survey Report of Selected Historical Cultural Properties Located within Grand Teton National Park, Wyoming”, Ann Hubber and Janene Caywood found that the Mormon Row Historic District (MRHD; 48TE1444) began with this history of Grovont:

In 1894, Mormon James I. May recognized the opportunity proffered by the lands in the lee of Jackson Hole’s Blacktail Butte and initiated a “gradual and diffuse” Mormon migration. Scouting an alternative to his rocky homestead in Rockland, Idaho, May found flat land, protection from the prevailing winds, accessible (if not abundant) water from the nearby Gros Ventre River, and flourishing waist-high sage; the sage would have to be grubbed in backbreaking labor but it testified to fertile soil beneath. Two years later, James returned to Blacktail Butte with his wife Ann, son Henrie, and family and neighbors from Rockland: Charles and Mariah Allen, ad their five children; newlyweds James and Mary Ann Allen Budge, and Roy and Maggie McBride. … Subsequent settlers filed on a linear progression of claims that proceeded both geographically and chronologically from the Budge homestead at the south to the northern limit of land within the partial umbrella of Blacktail Butte and within reach of the diverted waters of the Gros Ventre And Ditch Creek. By 1915, when John Riniker filed his claim at the northern extreme of Mormon Row, homesteaders included Edward Geck, Arthur Mahon, Joe Pfeiffer, William (Billy) Ireton, Thomas Murphy, John Rutherford, Dick Van den Brock, John A. Moulton, Thomas A. Moulton, J. Wallace Moulton, Andrew Chambers,
Thomas Perry, Joseph Eggleston, Jacob Johnson, Hannes Harthoorn, Henrie May, Warren Henrie, J. Henrie, John W. Woodward, George Riniker, Albert Gunther, W. Shinkle, R. Shinkle, James May, Elizabeth May, and James Budge. Talmage [sic. Tillman] Holland claimed land on the arid eastern outskirts of the community in 1917. John Hoagland’s 1926 claim to steep and swampy land on the west flank of Blacktail Butte provided a delayed conclusion to Mormon Row homesteading. ... These were primarily small-scale irrigated and dryland farms, worked by family and neighbors, and providing subsistence and winter feed for the small dairy, sheep, and beef-cattle herds that served as the area’s primary cash crop. [Hubber and Caywood 1997:14–15]

Bishop James I. May came to the northern floodplain terrace of the Gros Ventre River and the Ditch Creek alluvial fan in Jackson’s Hole in 1894 to scout out the best soil. Indeed, a descendant of one of the original Mormon Row settler families, Candy Vyvey Moulton recounts family history thus:

[Bishop May] [t]ook note of the nearby Gros Ventre River that could be diverted to provide water for crops. He eyed the tall, straight timber near the Snake River and knew it would do for building a home and other necessities of the ranch he dreamed of creating.

[Moulton 2007:63–64]

In July, 1896, with his wife Elizabeth, two children, and 45 head of cattle (Daugherty et al. 2007:93–94), Bishop May set about proving up 160 acres in the NW quarter of Section 4, T 42 N, R 115 W, and “in 1901, the family lived in a comfortable five-room house” (supra).

Eventually May cultivated 150 acres of hay once he had filed for a Desert Land Entry patent of 160 acres (Daugherty et al. 1999:94). Bishop May received his original Cash Entry Patent in 1902. His wife and children received additional parcels after 1910. James Budge and
family, Thomas Hanshaw, Nels Hoagland, Albert Nelson, William S. Kissinger, Frank and Roy McBride, Frank Sebastian, Fred Lovejoy, Martin and Joe Henrie, and others followed suit, each receiving 160 acres or more after improvements were made and or irrigation ditches were dug (Daugherty et al. 1999:93).

Returning to settlement patterns in general, Hiram M. Chittenden (1858–1917) came from auspicious beginnings. He graduated West Point military academy in 1884 a 2nd Lieutenant in the U.S. Army Corps of Engineers and ended his career Brigadier General. A conservationist and Progressive, Chittenden surveyed and recommended some of the major improvements made in Yellowstone and Yosemite National Parks as well as the port locks in Ballard, Seattle, Washington for whom they were renamed in 1956. In 1891, Lieutenant Chittenden was assigned the responsibility of surveying and laying a road into Yellowstone (Dodds 1973:13–23) via The Grand Loop which linked Mammoth Hot Springs, the Geyser Basins, and Yellowstone Lake by way of the Grand Canyon. Later Congress ordered an extension of the Loop to include West Thumb of Yellowstone Lake, Old Faithful, and Craig Pass. In 1892, anti-railroad sentiment was raised high, but again Chittenden was in charge or forging ahead new roads and a railroad spur into Yellowstone (Dodds 1973:17–18), yet he resisted. Tourists had long complained about the dust problem increased traffic caused on the dirt roads to and from Yellowstone.

Chittenden managed to halt the introduction of railroads into Yellowstone by promoting the voices of park visitors who expressed a preference for well-maintained gravel roads (Dodds 1973:18). As alluded to above, railroads did not make significant inroads into Jackson’s Hole either, and this course of events contributed to the market availability and sale of commodities to
which the settlers there had access. The nearest railroad to Grovont, Wyoming-Mormon Row was 38 miles away in Victor, Idaho.

In 1897, Chittenden once again came through Jackson’s Hole on his way to see the Wind River Range, across and down the Gros Ventre River into the Valley of the Green southeast of Jackson, Wyoming. The rest of his party departed at Jackson for Yellowstone and Chittenden for Cheyenne. Chittenden then advocated for reservoir locations he had scouted in Wyoming and Colorado (Dodds 1973:28–29). In 1901, Chittenden was again requested to work on a roads project in Wyoming. This time, the frontier residents

… had agitated for years for federal construction of a wagon road from Fort Washakie … along the Wind River to the mouth of the Buffalo Fork of the Snake River near Jackson Lake near the southern boundary of Yellowstone Park to give them a southern entrance into the park. Since the government did not build civilian wagon roads, the request for the road was justified as militarily necessary to connect the garrison at the fort with the ostensibly hostile Indians in the Jackson Hole country. [Dodds 1973:114]

Present-day U.S. Highway 287 passes through Laramie and Moran, Wyoming in the GTNP before joining U.S. Highways 26, 191, and 89 which lead into Yellowstone National Park, originally the route of the wagon road from Fort Washakie mentioned above.

Chittenden also had a hand in the recommendations for improvements to the Quartermaster Department at Yellowstone to bring electricity to the administrative and public buildings as well as the construction of the impressive stone North Entrance Arch near the Northern Pacific railroad station at Gardiner, Montana, sometimes called the Gardiner Arch (Culpin 2005). Other substantial engineering work was accomplished in Yellowstone in 1903, including nine important bridges.
Whereas Chittenden was not Mormon, he was born in Yorkshire Township which is 90 miles from Manchester County, New York, and Hill Cumorah, the place where Joseph Smith Jr. reportedly discovered the golden plates that he translated into *The Book of Mormon: An Account Written by the Hand of Mormon upon Plates Taken from the Plates of Nephi* (Smith 1830).

Whereas no reservoirs at the hand of Hiram Chittenden were created to supply irrigation water to Grovont-Mormon Row area residents, a new wave of settlers could have and likely did arrive via the new route he scouted and built from Fort Washakie to Moran, Wyoming which terminated roughly 15 miles to the north and has been superseded by U.S. Highway 26 and U.S. Route 287.

Glenn Burkes’ *History of Teton County* (1972b) continued where his previous tract left off: the land issue, by which he means who would eventually own and administer much of Teton County, Wyoming. Yellowstone Park Timber Land Reserve was ordered by President Benjamin Harrison in 1891. In 1907 it became Teton Forest Reserve, which comprised the entire forested area draining into Jackson Hole. Teton Forest Reserve became Teton National Forest, and in 1943 became the Jackson Hole National Monument through an Executive Order. Inholders including dude ranchers opposed any extension of the Yellowstone National Forest to the south and the State of Wyoming legislature wrote a resolution preventing such an expansion.

John. D. Rockefeller helped establish what later became the National Elk Refuge on the northern edge of Jackson, Wyoming. In 1912, the U.S. Congress authorized the creation of the original National Elk Refuge in Jackson Hole that comprised ca. 2,760 acres. Additional private lands were purchased and donated resulting in the over 24,000-acre Refuge as known and administered today (Walker and Graves 2007).

Two cornerstones of the Mormon Row community were church and school. The other cornerstones were dairy cattle and hay (Moulton 2007). Sandstone pillar post bases in a
rectilinear pattern are all that is left of the former Mormon Row School (48TE2039) recorded by the author in 2016. Prior to 2016, the sites of the LDS church and school had not been previously recorded, yet are well-within the boundaries of 48TE1444. Hannes Harthoorn donated the 1-acre parcel upon which the Mormon Row School was built in the NW ¼ NW ¼ NW ¼ of Section 33, T 42 N, R 115 W to the community. Site 48TE2039 is recommended eligible under Criterion B for its association with Harthoorn who “left the Netherlands after 1900, drawn to Jackson Hole by the promise of land” (Daugherty et al. 1999:119) and was an original founding member of the Grovont Branch community.

Mr. Phil Sultz granted permission to use his 1961 photographs of both the Grovont Branch LDS Church and Mormon Row school in the site records for 48TE2061 and 48TE2039 respectively. Both images are curated at the Jackson Hole Historical Museum Archives. The Sultz photograph reveals that the school was originally a one-and-a-half-story wooden framed four-square building with a central chimney and a pyramidal shingled roof with dormers and a shed-roofed extension on the north elevation. Entry to the school appears to have been through the shed-roofed extension. There are two backhouses (outhouses) behind a gabled shed or garage of one or two pens, wood framed, and side entry. A pair of seesaws is just visible beyond the shed or garage. The interior of the school “had two rooms upstairs where the teacher lived, and two rooms downstairs where she taught” (Kreps 2006:113)

Wyoming Senator Joseph Mauull Carey,

… accepted malicious gossip as truth, claiming that the Snake River Land Company never informed the Wyoming congressional delegation of their plans, that farmers were being run off their land in Mormon Row, and that the Snake River Land Company failed to cooperate in locating a power line across their property. [Righter 1982:74]
Historic-era photographs reveal that there indeed was electricity and possibly a telephone line at the school and or church. Due to extenuating circumstances,

A badly needed high school on Mormon Row (Jackson High School being fifteen miles away) was not built because taxpayers were unwilling to finance such an expensive project when it seemed likely their school district would, in the near future, lose its ability to maintain a new school, … [and] the few remaining farmers would have [had to shoulder] the entire tax burden of operating a new school. [Saylor 1971:198]

The primary complaint of Jackson Hole settlers and businessmen in 1929 … was that the Snake River Land Company project was taking valuable agricultural land out of production. Specifically, they deplored the loss of “Mormon Row,” an area to the east of Blacktail Butte and along the Gros Ventre River. Here a number of homesteaders had taken up good bottom land and, if not prospering, were existing. The evidence suggests that most wished to sell, but a few did not. Van Vleck and the commercial interests feared the departure of the Mormon Row settlers would hurt their Jackson businesses. They prevailed upon the governor to oppose inclusion of Mormon Row in the project on the basis that it was valuable agricultural land. Although the Snake River Land Company did not necessarily agree with [Frank] Emerson’s Analysis, [Vanderbilt] Webb deferred to the governor’s wishes, announcing that no further purchased would be made in the area. Ironically, shortly after this decision, a number of Mormon Row settlers who were eager to sell wrote the governor to the effect that with friends like him they needed no enemies. By late 1930 Emerson had recanted, and the Mormon Row’s lands were reinstated in the purchase program. [Righter 1982:64]
Wallace Moulton, a member of one of the second-wave Mormon Row settler families, served as 2nd Counselor, was ordained an LDS Church Elder in 1918, and was Superintendent in 1930 (May 1996:3). Wallace was one of the first to sell his land to the Snake River Land Company (SRLC; Moulton 2007:148) after the Kelly Flood of 1927. In the end, most of the surviving settlers were enticed and their land purchased prior to 1950 by the SRLC (Burkes 1972a, 1972b; Righter 1982). The SRLC donated the land to the federal government and in 1950 the land was used to expand formally the GTNP to its current extents including an international airport. The MRHD (48TE1444) was formally nominated for listing on the NRHP in 1996.

Whereas the history of the Grovont, Wyoming-Mormon Row community has been extensively documented, the environmental history of Kelly Warm Springs has not received the same degree of scrutiny. Archival research in the production of the author’s Internship returned several maps that have the potential to fill a significant data gap regarding the history of Kelly Warm Springs.

The purpose of the next chapter is to apply landscape archaeology landscape analysis and historical ecology to the Mormon Row legend of the origin of “Miracle” Spring in order to ascertain the truth. There is a presumption that the process of archaeologically deconstructing a legend has the potential to reveal kernels of truth contained therein. As a result of the experiment and exercise, a new technology and potential OMIDAR was identified. The chapters following will return to the research problem presented in Chapter I and situate the new technology and potential OMIDAR within Leone’s oeuvre, test for its presence at both study areas—Leone’s Little Colorado River settlements (Leone 1972a, 1974, 1979) and the MRHD ( Schroeder 2017)—before testing the technology against Žižek’s criteria (2008).
Chapter VI.

Testing Leone’s Untested Hypotheses

Based on Leone’s oeuvre, four technologies emerge as having the potential to resolve the research problem outlined above: fences, town plans based on the ideal Plat of the City of Zion, Mormon temple architecture, plan, and program, and dams. Each technology has been presented within Leone’s structuralist processual archaeological *cum* historical ecological and ethnographic context plus architectural structural analysis in Chapter II. The next step is to search for these technologies in a comparative study area and data set at the MRHD within Grand Teton National Park. In a comparative study area and data set, each technology can be tested for its presence or absence. The next step of this process is to test Leone’s technologies against Žižek’s rubric and schema. If there is a positive match, then the OMIDAR will have been located. If there is not a positive match, either the OMIDAR cannot be located in reified form or there is yet another technological object that satisfies all of the criteria still unidentified. There may be technologies or combinations of technologies that more fully satisfy the criteria also. There is also the possibility that an archaeological deconstruction of a local legend (a ‘given product’ *sensu* Leone and Potter 1999:7) will elucidate clues to the identity of a technology or technological object that satisfies all the criteria.

In Lacanian psychological terms, if desire is at its core the desire to desire some thing, then in materialist terms, the process of searching itself produces the object which initiated or caused the search in the first place (Žižek 2008:180). The OMIDAR must be a ‘thing’ (Leone and Potter 1999) that is ‘the perfect, the ideal, the stable in the past’ (Leone 2010), a material and
ideological void or a deficiency that is resultant from the past; that participated in daily life in the past; is something about which all are aware yet may hide in plain sight as it mediates lived reality and ideological desire (Žižek 2008) within constraints of modern capitalist society and the limits of nature. The OMIDAR may not be the most obvious or visibly apparent technological object; it should not be if it is indeed a mask for something bigger. Thus it is not “how to grasp the multiplicity of determinations, but rather of how to abstract from them, how to constrain our gaze and teach it to grasp only the notional determination” (Žižek 2008:x–xi; emphasis in original) when archaeologists, anthropologists, or ethnographers attempt to get into the mind of a Mormon, as Leone suggested.

As a presupposition, in order to define something as a ‘thing’ (Leone and Potter 1999), an object, an artifact, one must participate and already believe in an ideology (a Lévi-Straussian Structure). The experiment, the exercise is to see more than the ‘thing’ into its multiplicity of meanings, and then return with cogent explanations of how the ‘thing’ fits in with the ideology, and the rest of culture, and change over time. The present has the benefit of accumulated and accessible information and data about the past. The past can be easily made to look inevitable, but that can also be an example of repetition of popularly held belief or legend. By deconstructing and re-examining legends the truth is uncovered; masks are taken away. There is, however, a risk of seeing too much behind the mask or not enough when one does this. The difference between the ‘Real’ and ‘the real’ is not arbitrary; the OMIDAR must be an embodiment of both the myth of fulfillment and the reality of its absence because it is a reified void-object representative of the Other.

In step one, each technology identified and examined by Leone will be analyzed and discussed as it relates to Leone’s hypothesis. Fences, settlement plans based on the ideal Plat of
the City of Zion (Smith 1833; Leone 1973, 1978), Mormon temple architecture, plan, and program (Leone 1977), and dam re\construction (Leone 1974, 1979) will be discussed and tested in order. In step two, each technology identified and examined by Leone will be searched for and identified (or not) in the MRHD comparative study area. In the third step, each technology identified by Leone will be tested against Žižek’s rubric and schema to determine if there is a match. In this way, three steps of the test are efficiently addressed in order within chapter subsections and in one chapter. By keeping the test together the data and argument does not get disconnected or otherwise spread out within the overall text.

Fences

It warrants repeating what Leone espoused in “Archaeology as the Science of Technology: Mormon Town Plans and Fences”:

Mormons built fences throughout the nineteenth century and, today, they continue to build fences, walls, partitions, and other separators. … Like any artifact, especially one for which we have the historic context, we can make fences tell us about the rest of the culture—in this case Mormon culture. [Leone 1978:197]

According to Leone, fences are a causative agent. Leone ass cautious however to draw an analytical distinction between reconstructing a historical context and doing an analysis of the determinative characteristics of technology. In a reflexive archaeology there is an opportunity to learn about Mormons from their fences at the same time we may investigate ways fences influenced Mormonism. Hedgerows, windrow trees, white picket fences, and corrals are “a nonrandom pattern of fence use. The kind of fence used was decided by what was kept in, or as
the case will show, what was kept out” (Leone 1978:197). Leone’s analysis concluded that wind, sand, predators, Gentiles, and neighbors were kept out by fences. Indeed,

Fences are an ecological necessity for any agrarian regime in the plateau country of Arizona. They separate competitive niches from each other and protect all artificially created niches from the universally destructive wind. The ecological functions of fences could be further specified, considering this region, but I think their primary role as a piece of enabling technology is established. [Leone 1978:198]

Thus not only does the fence serve an engineering purpose, it also has social and ideological functions, namely “fences provided the visible distinction between individual property holdings” (supra). More than just providing visual distinction between individual property owners, a Mormon fence separates the private from the public. Professor in the History of Landscape at the Visual and Environmental Studies Department at Harvard University John Stilgoe pointed up rather adroitly that:

Square fields were simply planned and quickly fenced, at least in the beginning, when standing trees provided ready lumber. Most 160-acre farms (“quarter-sections”) were divided into 20- or 40-acre fields, many of which were square. But many more fields were rectangular; long, narrow fields were more easily plowed because the team and plow had to be turned less often. Men chose the best wood for rails and fenced the newly cleared land, unmindful of their descendants’ trouble. [Stilgoe 1982:192]

In Leone’s view, fence technology enabled certain social tasks to occur while co-facilitating egalitarianism and social hierarchy. After establishing themselves and subduing the environment, some Mormons were more financially successful or had more capital than others, thus status and wealth differences were fostered and contained within the boundaries of fences, too. If, as Leone
suggests, we accept a technologically deterministic look at fences, we see that, “… despite overwhelming changes in Mormon culture, there is an unchanged relationship between a key set of artifacts and a set of religious symbols. Fences still keep the same things in and keep the same things out” (Leone 1978:198).

Leone’s conclusion that fences ‘still keep the same things in and keep the same things out’ is not under scrutiny here. What is under scrutiny is whether ‘any agrarian regime in the plateau country of Arizona’ could or did benefit from the use of fences. If fences are ‘an ecological necessity for any agrarian regime,’ then any group of settlers of any nationality or religious ideology could employ or did employ this technology with an ecological purpose in mind. In this perspective, fences are not endemic nor are they exclusive to Mormons. This does not immediately disqualify fences as an ideal technology rather it raises questions and thereby weakens Leone’s argument that, “Nothing has been said here about town plans and fences that is necessarily true outside of Mormonism” (Leone 1978:199). Without a comparative study, it is not conclusive that fence technology benefitted only Mormons. Indeed, the impetus for this dissertation is the block quote from Chapter I that leaves open the question as to whether fence technology is the ideal technology. If a comparative study has not been done on another Mormon settlement or another ethnic or religious group, how can Leone be so certain that fences accomplish everything he says they do?

Ann Hubber and Janene Caywood, writing for Historical Research Associates on multiple historic properties within the GTNP, found that

Fencing for both farms and ranches was often constructed of lodgepole pine logs in the early years of settlement in Jackson Hole. The “buck and post” fence represented a considerable investment of time and labor; those who possessed the capital purchased
barbed wire for post and wire fencing after 1900. The post and wire fence was popular among homesteaders because it cost less, required less time to erect, and required less maintenance. It was not uncommon to find both types of fencing used on a single property during the first few decades of the 20th century. By the 1920s, steel fence posts appeared at homesteads in the park. The picturesque buck and pole fence enjoyed a revival however during the same period as dude ranches and tourist facilities proliferated.

[Hubber and Caywood 1997:23]

Hubber and Caywood also found that:

… patterns associated with the agricultural use of the remainder of the land base also remain. This pattern of land use is exemplified in landscape features such as circulation systems (roads, irrigation systems), vegetative patterns indicative of agricultural land use (cultivated fields), and boundary demarcations such as fences that mark field and homestead boundaries. [Hubber and Caywood 1997:73]

This passage appears to align and support Leone’s conclusion that fences (among other technologies) facilitated Mormon settlement patterns, yet it must be acknowledged that Hubber and Caywood were not writing specifically about Mormons or solely about Mormon Row in their NRHP multiple property nomination form (Hubber and Caywood 1997); they evaluated and nominated various historic properties some of which were Mormon, e.g. Mormon Row. Ann Hubber, Christine Miller, and Janene Caywood nominated the MRHD (48TE1444) in a previous, separate document in 1996. Hubber et al. (1996) mentioned fences or fence use sparingly in their nomination form for the MRHD (48TE1444). Passages that contain reference to fences are listed here.

When referring to the linear pattern of the settlement, Hubber et al. found:
This linear pattern is reinforced by fence and field lines that conform to the cadastral survey, and by the linear character of the lateral field ditches. … The structures and land uses that supported homestead families are still reflected in the landscape in the forms of field patterns, irrigation systems, grazing lands, residential clusters (including both dwellings and secondary buildings such as barns and chicken coops), and fencing. 

[Hubber et al. 1996:1]

Additionally, Hubber et al. observed and remarked that:

Although physically separate, both the domestic and work areas are located adjacent to and surrounded by a perimeter fence that defines the residential unit. Wood and wire fences delineate functional areas associated with livestock use. … Fence types throughout the Mormon Row are primarily utilitarian, constructed of easily procured materials: wood & wire defining the fields, and wood and rail for stock corrals. Remnants of buck and rail fence (a.k.a. buck and pole) are also visible throughout the area, although much of it appears to be replacement (as on the Chambers property), or has been dismantled and “stacked” as on the Kafferlin/Woodward property (south of the historic district). There is no picket or other decorative fencing evident, reflective of climatic as well as economic conditions. [Hubber et al. 1996:4–5]

Whether constructed entirely from wood poles or only partially, a frontier fence can disappear in a moment, reduced to ash in a wildfire or obliterated by a flood. Fences are largely absent from the Ditch Creek alluvial fan and the northern floodplain terrace of the Gros Ventre River in the MRHD study area because they were removed by previous administrations and land managers of the GTNP in an effort to return the landscape to more natural conditions and facilitate wild animal movement, especially elk and pronghorn antelope. Fences were seen as a
distraction from the natural beauty that surrounds the MRHD (Hubber et al. 1996:2). Buck and rail fences also burned in sweeping wildfires that affected the northern portion of the study area in the late 1990s. Original fences that bordered and or subdivided historic homesteads outside of the formal historic district boundaries are now absent as a result. The few original fences within the MRHD were considered features but were not considered contributing elements or cultural resources eligible to the NRHP on their own merit (Hubber et al. 1996:2). There were reasons.

In the State of Wyoming, fences are defined non-sites. Indeed per the “Wyoming State Protocol, Appendix D: Exclusions: Defined Non-Sites and Property Types Requiring No Formal Documentation”:

Utility lines, pipelines, stock dams, troughs, and associated windmills, elevation/bench/section markers, rip-rap, isolated motorized vehicles, appliances, and mobile homes, fences and enclosures, unnamed two-track roads, water/gas wells, and water control channels, laterals, spreaders, canals, and ditches that are not designated by name on the USGS Topographic maps unless any of these property types exhibit significant architectural or engineering features, or are associated with a National Register-eligible site or district (either within the boundary, or clearly related to the significance of a NRHP-eligible site or district). [Wyoming 2012:1–2; Wyoming and BLM 2012:1–2; Appendix A in this dissertation].

Despite the Wyoming State Protocol, fence technology provisionally satisfies Leone’s criteria (Hubber et al. 1996; Hubber and Caywood 1997), but do they satisfy Žižek’s criteria? To repeat, Žižek finds there are three types of ideological objects: voids (or absences); large, unattractive objects left over or resultant from the past of which we are all aware; and a circulating object,
one that is known to have existed and requires an ideological structure to understand it, e.g. Capitalism or Mormonism (Žižek 2008; Leone 2010).

Fences are largely void space. While fences served a particular function in Mormon society (Leone 1973, 1978), it is not clear that fences determined Mormon society if the City of Zion was never fully actualized (Francaviglia 2015). There appears to be a disconnect or a deficiency. Fence technology compartmentalizes space (Hubber et al. 1996; Hubber and Caywood 1997) while being permeable; a general type of deficiency. Despite their skeletal construction, materials, and techniques, fences keep certain things in and certain things out (sensu Leone 1978:199). In this regard fences appear to satisfy part of Žižek’s criteria in that they create a mystery, a resultant phenomenon. Fences may be considered large in that they visually disrupt large and small areas by demarcation and separation.

The compartmentalization of farm task spaces may not be endemic to the Mormons however; any religious, ethnic, or cultural affiliation could have engaged in the compartmentalization of task and living spaces through the employment of fences. Any homestead or working farm in America could have been, was, or is divided into use or task areas such as corrals, sheds, coops, and garden spaces using fence technology. Nonetheless, by virtue of their function in the compartmentalization of task spaces within property boundaries, fences participated in some capacity within capitalism. Fences facilitated the cultivation or ranching of discrete areas that produced commodities by separating environment from landscape; that which is within the perimeter of a fence on the frontier is landscape; that which is outside the perimeter of a fence (and not within someone else’s fence perimeter) is the environment to put it most simply. In this context, fences participated in capitalism in an important way. Fence technology qualifies as a circulating object that functioned in the daily life of Mormon homesteaders,
farmers, and frontier settlers while hiding in plain sight within capitalism. Fences also performed this role on non-Mormon farms.

Fences are material leftovers from the past about which all are aware; few do not know what a fence is if asked. Fences participated in daily life of settlers and circulated albeit marginally within capitalism. Fences “contain” property; property is capital; fields of fodder or livestock are commodities that can also be loosely considered the means of production. Fence technology appears to mask its real identity when placed within the context of the ideal City of Zion where they hypothetically served a sanctified role and purpose (Leone 1973, 1978), yet without material evidence, fences are more void than they are substance. In this articulation, fences are more like a memory or a notion neither of which is material archaeological evidence.

Mormon fences are not necessarily large, unattractive leftovers that everyone is aware of; not everyone can distinguish a Mormon fence from a non-Mormon fence for example. Leone’s argument advocates more for the picket fence than the buck and rail fence. There are no extant picket fences at Mormon Row, however. More than this, it is difficult if not impossible to locate a fence that is physically absent. Furthermore, fences do not appear in LiDAR imagery. This does not immediately disqualify fences as resources, rather this curious phenomenon renders fences difficult to quantify or qualify on maps, hence problematic.

If a resource cannot be measured, described, and situated within at least one historical context, it is difficult to record much less advocate integrity, significance, and or eligibility for the NRHP. One can take a photograph of a former fence line and document what remains of the feature, but what exactly is being recorded? It would appear that the specter of a fence, an impressionistic memory of a fence that once was but is no longer extant, is the resource being recorded. This hypothetical scenario demonstrates the problematic nature of fences as historic or
archaeological features in the authorizing heritage discourse (AHD) concerning such resources. That the State of Wyoming has defined historic fences as non-sites avoids the problematic nature of recording, assessing, and evaluating all historic-era fences in the state.

Following Leone’s positivist and deterministic path, “we can, for one thing, be sure that technology really did and does cause Mormons to do some things, and we can be just as sure that Mormons manipulated technology to accomplish certain of their ideological principles” (Leone 2010:121). By taking technological determinism seriously, we can see the effect of artifacts on culture” (Leone 1978:199). This leaves open the question whether fences were an object of Mormon ideological desire.

Fences do not appear to have been an object of Mormon ideological desire in a Žižekian sense (Žižek 2008). There is the Kantian notion of a transcendental ideal fence; there is a Lévi-Straussian notion of a fence that is a byproduct of cultural agreement and it may be perfect in a structural-functional sense, but in neither paradigm is it material or real. There is no abstract notion, no ideal fence that resolves all antagonisms in daily life in Mormon theology or ideology that is known to this author. Furthermore, ideological distortion is not written into its very essence (Žižek 2008:25). In a vernacular sense, fences really do make better neighbors, but is that enough of a mystery requiring ideological filling to qualify as an OMIDAR? The short answer is, no. Thus, based on the reasons given above, fences are not amenable to archaeological recordation and are therefore not recorded as historic resources unless a fence is extant, retains material integrity, and exhibits qualities that are deemed significant under the various Aspects of integrity (United States 1991).
Absence of evidence is not evidence of absence; we know very often in the present that there once was a fence at a certain location or surrounding a certain property. If the following passage is true:

The structures and land uses that supported homestead families are still reflected in the landscape in the forms of field patterns, irrigation systems, grazing lands, residential clusters (including both dwellings and secondary buildings such as barns and chicken coops), and fences, [Hubber and Caywood 1996:1]

then it would appear from this observation that fences were and are notable yet relatively less significant than field patterns, irrigation systems, grazing lands, and settlement patterns when listing the visual characteristics that lend integrity and eligibility to an historic landscape or district nomination form. The reason may be the absence of material evidence. A lack of ideological distortion (Žižek 2008:25) and absence of material evidence disqualify fences as the ideal technology (pace Leone 1973, 1978), therefore fences do not qualify as the OMIDAR. This leaves open the possibility that settlement plans based on the ideal Plat of the City of Zion (Smith 1833) qualify as an OMIDAR.

Settlement Patterns and the Ideal Plat of the City of Zion

Historian Richard White brought attention to the Mormon project as an exception to the historical progression of Capitalism in the global West at the turn of the 20th century. Indeed, Outside of some small utopian colonies, the Mormons made the only sustained attempt among incoming whites to avoid incorporation into the world markets. Joseph Smith, the founder of Mormonism, had enunciated a law of consecration and stewardship which
presaged Karl Marx’s dictum, “From each according to his abilities, to each according to his needs.” Early attempts to put this law of consecration and stewardship into practice failed, but when the Mormons settled in Utah, Brigham Young tried once again. Young imagined a nearly self-sufficient Utah with an economy based on cooperation rather than competition. [White 1991:240]

Mormons were “motivated by a sense of urgent need to prepare a dwelling place for the Saviour at His Second Coming” (Nelson 1952:28). “To gear their peculiarly fantastic dream life connected with other-worldliness to the practical and mundane affairs of irrigation and livestock, was the primary problem of Brigham Young” (Nelson 1930:24).

Nelson surmised

The scarcity of capital goods and the necessity of constructing irrigation works, roads, and bridges make this type of organization indispensable to success. Cooperation also expressed itself in community control of irrigation water, various public utilities, manufacturing and merchandizing enterprises. [Nelson 1930:27]

Wyoming Historian Michael Cassity discussed the Mormon settlement of Star Valley south of Jackson, Wyoming and many of the observations therein could be applied to Grovont, Wyoming-Mormon Row to the northeast:

As with other Mormon rural villages, the impact of religion on the landscape was substantial in Star Valley with the settlers’ communal emphasis, with their orientation on the church as central location, with their similar architecture, and in one important way that bears on homesteading and stock-raising. The half dozen Mormon villages strung along the river were more rural, more agricultural, than other villages and towns in
Wyoming; in this regard they resembled Mormon towns elsewhere for they used a similar layout to that employed elsewhere in the LDS society. [Cassity 2011:102]

Placement of structures appears to have been a matter of choice delimited by the PLSS (*sensu* Nelson 1952). Quite simply the Mormon Row settlers collectively decided to improve different blocks of public land near one another along a transportation corridor as opposed to allowing the federal government to randomly disperse them miles apart from each other (Hubber et al. 1996). May and Budge settled first and “anchored a series of ranches and farms that became known as Mormon Row” (Daugherty et al. 1999:93). Others who arrived later or non-Mormons could only have been granted land that was more distant from Mormon Row Road and this caused the community to disperse across the landform while being connected spiritually. Thus, rather than participate in the lottery system promoted by Prophet Smith, Mormon settlers on the land northeast of Jackson, Wyoming scoped out suitable land near one another then filed for and acquired land patents from the various federal government homesteading programs. This pattern of settlement superseded Smith’s lottery system throughout the Intermontane West as a matter of fact and practicality not ideology.

Candy Vyvey Moulton’s *Legacy of the Tetons: Homesteading in Jackson Hole* (2007) is specific to Grovont, Wyoming and Mormon Row; she is a descendant of first-wave and second-wave Mormon settlers of the community, the May and Moulton families. Moulton recounted that the McBrides were neighbors to the Mays in Rockland, Idaho before settling Flat Creek near Jackson, Wyoming south of what became Mormon Row (Moulton 2007:65). The Nick Wilson Family settled the area at the east base of Teton Pass in what would become the town of Wilson, Wyoming circa 1889 (Moulton 2007:22–23). The Allen Family also came over from Idaho at the same time and settled north of Mormon Row in the Spread Creek area (Allen 1981). Eventually,
the majority of arable land on the Ditch Creek alluvial fan and the northern floodplain terrace of the Lower Gros Ventre River was allotted to and occupied by Mormons. Crystal Nethercott was quoted saying in Connie Weinike’s *Jackson Hole: Crossroads of the West*, “The whole valley was mostly Mormons until after the war [WWII]” (Weinike 1996:44). Crystal Nethercott is related to Al and Reigo Nethercott, both Mormon Bishops and each one of Brigham Young’s Avenging Angels (Huyler 2003:145).

Grovont, Wyoming-Mormon Row was settled along a wagon route from Jackson to Moran, Wyoming (Hubber et al. 1996:6) (Figure 13), referred to as the DIM Trail on the Cadastral map of Township 43 North, Range 115 West (hereafter, T 43 N, R 115 W) drawn by William O. Owen based on surveys conducted in 1892–1893 and Owen’s Cadastral map for T 42 N, R 115 W based on surveys conducted in 1893–1894. The route is also indicated on the 1901 USGS Grand Teton 1:125,000 scale topographic 30’ quadrangle and on the 1901 and 1929 USGS topographic quadrangles for Teton County (BLM 2016, 2017). A faint trace of a shallow and narrow linear feature in LiDAR imagery was used to located suitable locations for photodocumentation and measurement. LiDAR imagery and the historic topographic maps mentioned above were layered in GIS. The georectified 1901 USGS Grand Teton 1:125,000 scale topographic 30’ quadrangle almost exactly aligns with the linear features traced in 2014 LiDAR imagery (landscape analysis; Figures 14 and 15). This is a testament not only to the exquisite mapmaking skills of the USGS at the turn of the 20th century; it also demonstrates the phenomenal results and power of LiDAR imagery in GIS in the 21st century to reveal details of the Earth that otherwise would not be perceptible to the naked eye in person.
The DIM Trail and Mormon Row Road met certain social and ideological needs of the community; the community had an *axis mundi* and access to people, places, and markets. The two main commodities that the Mormon Row settlers had for themselves and to exchange for other commodities or cash were hay and cattle (and by extension dairy products).

The DIM Trail was recorded as feature-site 48TE2067 and was recommended eligible to the NRHP under Criteria A and D for its participation in events significant to the history of the area at the local level and the informational value the resource may provide future researchers (Schroeder 2017) (Figures 16 and 17). Mormon Row Road superseded the DIM Trail and became the main transportation corridor through Grovont, Wyoming-Mormon Row and is still the main circulation route.

FIGURE 15. Aspect southwest of DIM Trail within Section 15, T 43 N, R 115 W towards Section 22; note vegetation change revealing location of wagon route (a) (Photo by author 2017).
FIGURE 16. Detail of 1:9,000 scale LiDAR imagery used to locate DIM Trail segments in Section 15, T 43 N, R 115 W (Map by author 2016)
FIGURE 17. 1:24,000 scale topographic projection of segment of DIM Trail indicated on 2014 LiDAR imagery and groundtruthed in 2017 compared with 1901 USGS Grand Teton 30’ topographic quadrangle depiction of road from Jackson to Moran, Wyoming (Map by author 2017).
Figure 18 is the 2013 Master Title Plat for T 42 N, R 115 W in Teton County, Wyoming (BLM 2016). Figure 19 indicates all of the land grants and titles currently in the BLM GLO records by grantee and year. This map looks more like a patchwork quilt than does Figure 2. If homesteads and land grant allotments are, metaphorically speaking, charm quilt blocks are “stitching in the ditch” patterns, then the cultural resources of the inventory area are contextually connected to one another like a patchwork quilt that blankets the entire study area. By combining and projecting historic and modern maps, land grant patents along with the complete archaeological record in GIS, one can generate maps to hang like tapestries that tell a story about Mormon Row. Does or did Grovont, Wyoming-Mormon Row resemble the Plat of the City of Zion (pace Leone 1973, 1978, 2010)? The short answer is a qualified no; the settlement pattern of the MRHD does satisfy the criteria of Lowry Nelson as a line-farm village (Nelson 1952). Is a Mormon settlement such as Grovont, Wyoming-Mormon Row a void or an absence that creates a sense of mystery that requires filling? The MRHD is a place of cultural value within GTNP, another place of cultural value. The MRHD fills a void of nostalgia with real farm houses, barns, and fences from the past. The Grovont Branch chapel and school were removed as were most of the surviving buck-and-rail fences bordering the surrounding homesteads and hay fields. Livestock were kept together on the lee side of Blacktail Butte.

Grovont, Wyoming-Mormon Row is not vile or unavoidable; it is quaint and avoidable if one does not desire to drive to it to see it. Grovont, Wyoming-Mormon Row did participate in capitalism and it may be considered an index by its typonym—no other settlement in Jackson’s Hole, Wyoming received such an obvious name. Whereas Grovont, Wyoming had a wagon route through the settlement that provided access to outside markets, e.g. Oklahoma cattle markets.
An historical ecological perspective is required to understand the commodification of hay in rural Wyoming in the 19th and early 20th centuries and the growth, development, transportation routes, and dissolution of settler communities over time. To understand the historical ecological projects settlers of the Little Colorado River valley and Grovont, Wyoming-Mormon Row engaged in requires explanation as much as Mormonism requires explanation to outsiders, hence it is Mormon ideology that is the enigma and not the scattered settlements themselves, though they do contribute to the mysteries in their own unique ways.
FIGURE 19. 1968 USGS 1:24,000-scale topographic quadrangle for Moose, Wyoming with land grants, assignees, year, and number of structures along Mormon Row Road annotated by Craig Moulton (Downing 2014; map courtesy Jackson Hole Historical Museum Archives).
Mormon village settlements did follow three main types (Nelson 1952) and Grovont, Wyoming-Mormon Row was and is a line village with isolated satellite farmsteads nearby. Abandoned villages and settlements may be considered voids or absences, large and unattractive, leftover from the past, that circulated within capitalism and Mormonism, but not everyone is aware of them unless recorded as historical sites or districts such as the MRHD. Even if recorded as an historic district, not everyone will be aware of them or the structure necessary to understand them in their full contexts without substantial interpretation publications and texts. Lastly the technology of settlement planning based on the Plat of the City of Zion worked and continues to work to facilitate community cohesion and cooperation, but the ideal City of Zion was never completed, therefore it cannot be said confidently that the Plat of the City of Zion is an object that embodies all of Žižek’s criteria. Did Grovont, Wyoming-Mormon Row have an LDS temple (Leone 1974, 1977, 2010)? Mormon temple architecture, plan, and program will be discussed in detail in the next section11.

Mormon Temple Architecture, Plan, and Program

Mormons regard their church “as true,” that is founded by Christ using his Prophet Joseph Smith, Jr.: they believe the Second Coming will take place in America, and more precisely in Independence, Missouri, which was also the scene of the Garden of Eden; they hold the United States Constitution to be divinely inspired, and if it is not a revealed document like the Bible, it is the next thing to it. [Leone 1977:56]

11 Whereas schools are not considered a technology in Leone’s argument, their intimate relationship with Mormon church culture warrants their inclusion, albeit provisional, here, and because there is newly discovered documentation available from the internship (Schroeder 2017).
Compounding this factor illuminated by Leone is the secret nature of the architecture, plan, and program inside a Mormon temple such as the Washington Temple (Leone 1974, 2010). Whereas a Mormon temple is technically and architecturally a void space, or more precisely a multitude of void spaces like cells in a beehive. This was intentional at the Washington Temple; Leone did not provide any other intimate tours of any other Mormon temples, so it is not known if every Mormon temple resembles honeycomb in any way. This is a deficiency in method not necessarily a deficiency in notion.

The notion that a Mormon temple is a physically large leftover from the past is not disputed. Leone goes to great lengths to situate the historical context of the sacred architecture and symbolism of Mormon temples (Leone 1974, 1977, 2010). This much is not in question nor is a Mormon temple’s participation as an index object in the daily lives of Mormon adherents; Mormons are directed to visit a temple at least one time in their mortal lives (Leone 1977).

Mormon ideology is necessary to understand the meaning of a Mormon temple; this is also not in question. Mormons have raised the capital necessary to construct 81 temples in the United States and 189 worldwide (lds.org 2018). What is under scrutiny here is whether the void space inside a Mormon temple is known to all. If the ceremonies and experiences that occur inside a Mormon temple are secret and cannot be told unto another Mormon or Gentile, then it cannot be said that everyone is aware of Mormon temple architecture, plan, and program as an object of ideological desire (sensu Žižek 2008). Lastly, there is only one archaeological Mormon temple, the remains of the original Nauvoo Illinois Temple fully dedicated in 1846. The Nauvoo Illinois Temple was reconstructed and on 27 June 2002 was rededicated on the 158th anniversary of the death of founder Prophet Joseph Smith and Hyrum Smith. The Nauvoo Illinois Temple does not qualify as a candidate for historic preservation but the whole site is a National Historic
Landmark District (web.archive.org 2018). The Nauvoo Illinois Temple is something of a mysterious void-object that requires an ideology to explain it, i.e. Mormonism. The Nauvoo Illinois Temple is, however, not the ecclesiastical or economic center of the Mormon religion, the Salt Lake Temple in Salt Lake City, Utah is. The Washington Temple may be referred to as a political and economic center of Mormonism due to its location in relation to the nation’s capital.

Last but not least, Leone found that,

… insofar as we see this ideological artifact as a political building in theological guise, we can begin to fathom its deeper purpose. The temple is a very real and quite concrete challenge to the present conception of things in the United States, as the Mormons think they perceive them. [Leone 1977:56]

This articulation results in a paradox, “a massively confusing paradox” (Leone 1977:58). The Mormon temple’s inner plan and program is secret, “it is a closed magnet in the sense that it draws but does not draw inside; it tempts but does not satisfy,” thus the outsider, the Gentile, the non-Mormon American (or citizen of another country) “can get close but not across,” because “the two must remain distinct in order for [Mormonism] to continue to exist. The two categories must exist but not cross or mix” (supra). This uneasy antagonism serves to perpetuate Mormonism as a response to the status quo.

There is a rectangular pad of poured concrete that relates to the former Grovont LDS Church. This concrete pad measures 2 ft. 4 in. long and 6–8 in. in width. There is another poured concrete feature which measures ca. 2 ft. by 2 ft. square. It is not known what function either of these concrete features served but the likely formed part of the foundation and a doorstep. It is unclear from the only surviving photograph of the Grovont LDS Church where these features relate to the building. There is a slight depression in the space where the church once stood. This
depression measures ca. 25m (80 ft.) by 12.5m (40 ft.) and is shallow. The entire ca. 1-acre parcel is recorded as the site boundary for 48TE2061. Thomas W. Perry received a Homestead Entry Patent for 160 acres in the W½ SE¼ and the S½ SW¼ Section 28 on 4 May 1917 (BLM 2016, 2017). Perry was Presiding Elder of the Grovont Branch from 1916–1919 (Jenson 1941:307). This site, 48TE2061, represents all that remains of the Mormon Row LDS Church at Grovont, Wyoming, a focal point of the community. Daugherty et al. noted:

In the summer of 1917, local residents constructed a frame Latter Day Saints meeting house on one acre of land sold by Thomas and Bertha Perry. School was held in the basement of the church that year. By 1922, a separate school had been built on acreage south of the Grovont Church. Both the school and the church were removed in the 19[60]s. The church was moved to the Teton Village road north of Wilson, where it houses a pizza parlor today. [Daugherty et al. 1999:213]

48TE2061 was recommended eligible under Criterion A for its contribution to events significant at the local level. Thomas Perry is associated with the donation of land and as Presiding Elder of the community; it is recommended eligible under Criterion B. There is no structure standing at this location; it was not recommended eligible under Criterion C. There may be a buried component to this site; it was recommended eligible under Criterion D for information it may yield in our understanding of the history of Mormon Row. This feature-site potentially contributes to an expanded Mormon Row Historic District (MRHD; 48TE1444) boundary or a Rural Historic Landscape or both as 48TE2061. That Grovont, Wyoming-Mormon Row had a chapel is significant; the community was large enough to warrant having its own place of worship, its own House of God. The Mormon community in Jackson’s Hole was not large enough to warrant the construction of a temple proper, however. This does not disqualify
temples or the technology of temples as a provisional OMIDAR, it merely demonstrates that not every Mormon community had direct access to a temple. Whereas a Mormon temple is a cogent material example of technology this may not be the condition Leone observes; the condition is really a combination of two conditions: Mormon theology and capitalism. Antagonistic conditions or ideologies are not objects in the strictest sense of the word; conditions may function like objects, but they are experiences (phenomena) and are therefore not material. Whereas the temple, the physical mass and void-containing structure, the place, the space, can be betwixt and between two ideologies and serve to perpetuate such a condition or set of conditions, creating a sense of mystery which requires ideology to fill it, an ideology does not have material substance and cannot be its own object no more than can a combination of two or more ideologies be an object. Perhaps the object Leone seeks is external to the church, mundane, and “of the earth.” Dams are literally “of the earth” and Leone investigated their cyclical construction, destruction due to flood, and eventual reconstruction. This process can be symbolized by a hash line and written as re\construction.

Ritual Dam Re\construction

The social life of Mormon villagers was far richer than that of farmers living on isolated farmsteads. The cohesiveness of the Mormon community and the high degree of cooperation among its members offered a sharp contrast with the individualism of most American frontier communities. In short, the Mormons seemed almost to have realized the ideal society of sturdy, independent yeoman farmers envisioned for America by Jefferson. [Arrington and May 1975:15]
Similarly Cassity et al. found that, “[w]here the water belonged to the public and where the land that it often was being diverted to was part of the public domain, it would seem that there was abundant opportunity for the realization of the Jeffersonian dream of small, independent farmers” (Cassity et al. 2010:10).

Leone investigated historical Mormon dam reconstruction on the Little Colorado River valley of Arizona in the late 19th century in a quest to discover the relationships between ideology and technology by interrogating Mormon High Councils, local authority hierarchies, and calendrical ritual (Leone 1974, 1977, 1979). Dams initially appear to satisfy the criteria for an object of ideological desire, yet they fail at an elementary level.

Dams are not a void in the traditional sense of the word. A dam is a physical mass and volume. Dams create or may result in the formation of a void space if there is no water behind them, though rarely are dams not holding water. In this sense they may be regarded only as a deficiency. Dams may be large and unattractive leftovers from the past about which we are all aware as in the case of the most charismatic dams on the Colorado or Columbia rivers. In other places, dams may be far from public view and surrounded by barriers to protect water supplies from tampering or contamination. Many reservoirs are located several miles from the users, thus it cannot be said that dams are an object of which all are aware.

Dams by definition do not circulate. Dams impound water that has a future exchange value and a price to consumers when it flows to its destination and in this sense may be regarded as circulating within capitalism. Hydroelectric dams participate in capitalism in a very real way; many in the West were built by the U.S. Bureau of Reclamation, participated in historic war efforts, have powered and continue to power large metropolitan areas, and have generated and continue to generate millions of dollars annually. A man-made reservoir was constructed near
Mormon Row, and like the Jackson Lake Dam, the water did not benefit Grovont, Wyoming residents. Daugherty et al. reported that:

Using the old Elk Ranch holdings above Spread Creek as a nucleus, the Snake River Land Company fenced every purchased homestead between Spread Creek and the Buffalo Fork to raise hay for “wild game” and livestock. Cultivating hay required maintenance and improvements to existing ditches. … In the early 1940s, the company built the Uhl Reservoir, an earthen fill dam 800 feet in length. The National Park Service took over several of the systems after 1950 and continues to maintain many of them in conjunction with extant grazing permits in the park. [Daugherty et al. 1999:171]

This example points up the fact that not all Mormon settlements built or maintained dams. If not all Mormon settlements built, maintained, or even used dams, it cannot be said that everyone knows about them or that they are unavoidable. Dams are simply not ubiquitous.

Preliminary Conclusions and Discussion

While fences served a particular function in Mormon society, it is not clear that fences determined Mormon society if the City of Zion was never fully actualized (Francaviglia 2015). The ideal City of Zion is closer to Slavoj Žižek’s concept of the “objet petit a,” an object of ideological desire necessary to fill a void created by the “Big Other;” a structure or collection of social conventions, codes, norms, laws, et cetera that exist simultaneously inside and outside of an individual Subject; something that is sometimes best left in ignorance and not confronted in reality otherwise the lattice of illusions might crumble and fall. What remains is a desire to desire something and that keeps Subjects engaged. Settlement plans based on the ideal Plat of the City
of Zion were built and many thrive unto today (Nelson 1930, 1952), but none is the City of Zion. Perhaps it is not the fence but what the fence ‘contains’ within its boundaries within Mormon settlements that is the real object of Mormon ideology.

Leone tried again to locate the object of Mormon ideological desire in 1977 (before it was a concept sensu Žižek 2008) as Mormon temple architecture, plan, and program, and again was only partially successful. Only inter item Mormon Saints are permitted to experience the interior architectural program of a Mormon temple as it relates to the endowment ceremonies (Leone 1977). Mormon temples, therefore, are not an object about which all are aware.

Leone investigated historical Mormon dam re\construction on the Little Colorado River valley of Arizona in the late 19th century in a quest to discover the relationships between ideology and technology by interrogating Mormon High Councils, local authority hierarchies, and calendrical ritual (Leone 1974, 1979). Whereas the Mormon historical ritual response to dam re\construction was unique and special to the Mormons of the Little Colorado River valley in the 19th and early 20th centuries (Leone 1979), an historical ecological response is not an object. A response very nearly functions like an object but has no material substance nor was the practice ubiquitous, i.e. not all historic Mormon settlements built dams. There are or were no manmade dams at Mormon Row for example. The closest dam to Mormon Row was and is the Jackson Lake Dam. The Jackson Lake Dam is not hydroelectric; Jackson Lake Dam does provide irrigation water to the Snake River Valley over 40 miles away in Idaho but not locally (Fiege 1999). Dams initially appear to satisfy the criteria of an object of ideological desire, yet they, too, fail at an elementary level.

Whereas no dams were constructed by Grovont, Wyoming-Mormon Row settlers, earthen berms were constructed at some point around Mud Springs in what appears to have been an
attempt to contain surface water like a pond so that a year-round flow was (and still is) maintained. Analysis of 2014 LiDAR imagery revealed manmade earthworks near the southern and western margins of Kelly Warm Springs (Figure 20). As it so happened, a reservoir was created naturally a few miles east-southeast of Grovont, Wyoming-Mormon Row during the Gros Ventre Slide event on 23 June 1925. It, however, did not ultimately bring the benefits of impounded water to the community. Rather it brought devastation and destruction on 18 May 1927, and set back the progress made in the roughly 30 years prior.

Now that Leone’s four technologies have been tested against Žižek’s criteria, the results can be presented as a table (Table 1). The four technologies are arranged from left to right in order of their chronological discussion within Leone’s oeuvre. Žižek’s criteria are listed in descending order yet there is no descent; all four criteria are necessary in order to evaluate whether or not a technology is an object of Mormon ideological desire.

To summarize, fences are a void or absence resultant from the past the social function of which not all are aware of in Mormon ideology, yet their role in capitalism is understood. The inability to record fences as an historical cultural resource when physically absent makes them problematic. Fences did and still do facilitate Mormon ecological ritual and social organization, but ultimately they are more void than substance and are therefore disqualified as the OMIDAR.

Settlement plans based on the ideal Plat of the City of Zion are not voids or absences because they have material substance. Settlements are leftovers resultant from the past that participated in capitalism more directly than fences. In this perspective, Mormon settlements have a physical footprint and material presence, yet are, like fences, more void than substance.
FIGURE 20. Earthen berms revealed by 2014 LiDAR imagery constructed near Mud Springs also known as “Miracle” Springs and formally known as Kelly Warm Springs (48TE449-450) to contain surface water for later use in Mormon Row Ditch (48TE1444) (Map by author 2017).

TABLE 1
LEONE’S TECHNOLOGIES TESTED AGAINST ŽIŽEK’S CRITERIA

<table>
<thead>
<tr>
<th>Technology</th>
<th>Fences</th>
<th>Plat of City of Zion</th>
<th>Mormon Temple</th>
<th>Dam Re\construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Žižek’s criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Void or absence</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Resultant from the past</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Of which all are aware</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Circulation in capitalism</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Mormon settlements participated in the ideological objective of creating an abode for Jesus Christ and the Chosen Ones in advance of His return, yet none has achieved the ideal status originally envisioned by Joseph Smith; it cannot be said that Mormon settlements based on the ideal Plat of the City of Zion are a technology of which all are aware. This aspect makes the Plat of the ideal City of Zion a void. Its idealism could not be achieved in pragmatic reality on the ground; compromises were made based on local conditions, available natural resources, transportation routes, and topography.

Mormon temples appear initially to satisfy Žižek’s criteria as an object of ideological desire, but a closer investigation reveals a fundamental flaw. Temples are technically void space within the walls; this is not disputed. The original Nauvoo Illinois Temple is archaeological and can be considered in this light as an absence and a leftover from the past. Mormon temples as the ecclesiastical and economic centers of Mormon society did and still do participate in capitalism—it took and takes capital to construct a temple and economic matters are handled by Elders within them—yet they do not generate capital sui generis. This does not immediately disqualify Mormon temples as the OMIDAR, rather it elevates the role temples held in Mormon adaptive strategies and social organization. Whereas a Mormon temple is, in structural analytical terms, “very real and quite concrete” (Leone 1977:56) and contains void space within, the program within a Mormon temple is a closely guarded secret. Only endowed Mormons can know what happens within a Mormon temple and those that know cannot talk about the experience to Gentiles or other Mormons, therefore it cannot be said that all are aware of the ideological significance of a Mormon temple.

Lastly, for all of their functional importance to the continuation of Mormon ecological ritual, dams are not actually voids. Like temples, dams are ‘very real’ physical masses.
Technically, dams artificially create a void behind them that are ideally filled with impounded water. When dams collapsed or washed out, the whole community and extended social network was engaged in their re\construction which has immediate ties to Mormon ideological tenets of cooperation and righteousness (Leone 1979). Whereas all are familiar with what a dam is and does, dams are not ubiquitous; not every Mormon settlement constructed dams and therefore did not employ the adaptive strategy of re\construction anywhere and everywhere Mormons settled in the Intermontane West. Still, the goal and desire of 19th and early 20th century Mormon settlers to the Intermontane West was the creation of a New Zion in advance of The Rapture and dams played a critical role in the actualization of this desire and achievement of this goal when employed. The bottom line is that dams were employed to do work. Work in this articulation involves the work that water can do and does when it flows through irrigation networks. Leone acknowledged this, but did not investigate the role of flowing water through the irrigation network in the same trenchant manner as he did the ecological ritual of dam re\construction.

The following chapters of this dissertation will pay special attention to irrigation technology, its uses, its structures and features, and the role irrigation has in historical ecology. The role irrigation has and has had in Mormon ideology will also be inspected through the various mentions Leone makes concerning this technology in order to ascertain whether or not irrigation technology satisfies Žižek’s criteria as an object of ideological desire. In order to do that, dissertation research situates irrigation technology within the MRHD in the GTNP and Leone’s study area in Arizona before examining irrigation features within the AHD concerning said cultural resources. Testing this technology against Žižek’s criteria as a potential object of ideological desire rounds out the remainder of the research portion of this dissertation. A final discussion and conclusion close this dissertation.
Chapter VII.

Landscape Archaeology Landscape Analysis of the Gros Ventre Slide-Kelly Flood and the Truth behind the Legend of the Origin of “Miracle” Spring

*The Legends of the Origin of “Miracle” Spring*

Reed Moulton, one of the last residents of Grovont, Wyoming-Mormon Row, spoke in John Parrott’s Jackson Hole High School History class about the origin of “Miracle” Spring as he remembered it as a child (date unknown but possibly in the 1990s). Reed recalled that:

> Just before the flood the farmers were building a cannal [sic] to the Gros Ventre river.

> After the flood the church was used as a mortuary. That is when the Kelly Warm Springs came up. Because the water didn’t freeze in the winter, the ranchers called [it] “Miracle” Springs. After the flood, the U.S. government completed the canal. [JHSSM n.d.:2–3, transcript, Accession number 2002.0054.001]

Candy Vyvey Moulton, a surviving relative of Reed Moulton, recounted the events preceding and following the Kelly Flood of 18 May 1927 in *Legacy of the Tetons: Homesteading in Jackson Hole* (2007). The first edition of Moulton’s family history was published in 1994. The second edition contains a special section on Mormon Row and a chapter on the history and an historical re-enactment of the Handcart Migration (Moulton 2007). The cover is the now iconic T. A. Moulton Barn, a contributing element of the MRHD (48TE1444) commonly referred to as the most photographed barn in America (Figure 21).
FIGURE 21. Digital image of photographers taking pictures of the T. A. Moulton Barn with the iconic Teton Range in the background (middentomori.com 2015).

Moulton recounted the origin of “Miracle” Spring thus:

The Mormon Row homesteaders were late in planting their crops that spring; they had been too busy helping less fortunate neighbors who lost their homes and loved ones in the flood. When they planted crops in early June, the homesteaders knew they would be hard pressed to mature. Rocks and mud filled the irrigation ditches, temporarily ruining their use as water conveyances.

Some good came from the flood for the Grovont families, however, because state and federal aid poured in, making it possible to rebuild the irrigation ditches that had been damaged and to finish those that had never been completed.

After the flood, the area was assured it could get water from the Gros Ventre to raise hay and oats. The settlers gave thanks for their fortune. Their appreciation became more profound when, shortly after the flood, a warm spring developed at the mouth of the Gros Ventre canyon.
The natural spring provided running water for the Moultons and others homesteading along the north end of the row near Blacktail Butte. For more than twenty years, the families had hauled river water, but a disaster brought a blessing. No longer did they have to travel regularly to the Gros Ventre to get water for gardens or livestock; now a small creek provided it naturally. Because the water was warm, it ran year-round. Mormon Row residents called it the Miracle Spring. [Moulton 2007:121]

Author and filmmaker Bonnie Kreps quoted former Governor of Wyoming and U.S. Senator, Clifford Hansen, who told an audience at the Jackson Hole Historical Society and Museum (JHHSM) (date unknown) that

Prior to 1927, there was no open water in Mormon Row. Livestock were watered by pumping from wells. Ditch Creek regularly iced over and ceased flowing in the vicinity of the present location of the Teton Science School. The Kelly land slide of 1925, followed by the flood of 1927, changed things for those hard-working homesteaders. In 1927 a warm spring erupted a mile north of Kelly. The flood of 1927, caused by the partial failure of the dam, swept away the town of Kelly, but it created a warm water supply for the livestock which Mormon Row ranchers kept in increasing numbers. The grateful ranchers named it Miracle Spring. [Kreps 2006:117]

Director of Historical Research and Outreach at JHHSM Samantha Ford found:

After the flood swept through, nothing was left but a three mile wide swath of broken trees, boulders and other debris that ruined the farmlands that had been painstakingly cleared. Ditches were flooded, head gates were destroyed … [h]owever, they did discover that the nearby Mud Springs had begun to produce water that could be their new
source of irrigation. Because the waters were warm and it flowed year-round, the name was now “Miracle Springs,” [Ford 2016a]

and

The nearby Mud Springs (only good for mud) began producing water after the Kelly flood and became known as Miracle Springs. Today, it is known as Kelly Warm Spring. As the modern name suggests, the water it produced was warm so that the nearby homesteaders could make use of the spring year-round. In 1929, [Joe] Heninger and his neighbors filed for water rights on Ditch Creek, which fed into the spring. [Ford 2016b]

Now that the five published versions of the legend of the origin of “Miracle” Spring have been collected they can be examined for similarities, differences, and most importantly discrepancies. Through a landscape analysis of geological, geomorphological, archaeological, and historic records data in GIS including LiDAR imagery the truth behind the legends is sought. That which one seeks is “produced by the signifying texture itself” (Žižek 2008:180). “It is to the eternal credit of ‘structuralism’ to have ‘de-hermeneuticized’ the very field of the symbolic, to have treated the signifying texture independent of the universe of the experience of meaning” (Žižek 2013:697). The ‘signifying texture’ exists apart from the Earth and from the people who envision(ed) it, here the Mormon ideological desire for and of a New Zion. The signifying texts which form the ‘signifying texture’ are the five published accounts of the origin of “Miracle” Spring. The legend of “Miracle” Spring perpetuates Mormon ideological desire and thereby serves to perpetuate Mormonism. The published accounts are material ‘things,’ ‘artifacts,’ data (Leone and Potter 1999). In this articulation the five published accounts are material evidence of an immaterial belief beyond an historical event. Taken individually as objects, the legends serve as data amenable to comparison, contrast, and verification of facts.
The best available evidence was used to confirm or contradict what is known about the origin of “Miracle” Spring. Through an examination of the discrepancies in the accounts there was an expectation that the truth would be revealed, and in the reverse analysis, artifactual evidence on or in the ground could subsequently be tested against the ‘signifying texture.’ There are kernels within the various legends, maps, and site records that point to the truth of the ‘miracle.’ If, “the process of searching itself produces the object which causes it;” if “it is an exact parallel to Lacanian desire which produces its own object-cause” (Žižek 2008:180), and if there is a perfect match between the material evidence and the ideological ideal, then the antagonism between the ‘real’ and the ‘Real’ will have been resolved.

On 23 June 1925 ca. 50,000,000 yd³ of earth on Sheep Mountain rotated and slid downhill in a mass wasting event that dammed the Gros Ventre River just east of Kelly, Wyoming (Figure 22). A 5-mile-long lake known as Lower Slide Lake formed behind the Gros Ventre Slide. After a severe winter and an extended rain-on-snow event the landslide dam collapsed and on 18 May 1927 sent up to 6 ft. of water 25 miles downstream (USFS n.d.:2: Figure 23). The Kelly Flood demapped the Town of Kelly, Wyoming and six people perished including three members of the Kneedy Family, members of the Grovont Branch Church of Jesus Christ of Latter-day Saints. Two other Grovont, Wyoming-Mormon Row community members, sisters Cora Sebastian and Mary Lovejoy, lost their lives on that fateful day while trying to escape the wall of water.

The author ‘accidentally’ located a mangled T Model Ford chassis and associated parts half-buried in gravel and sand on the northern bank of the Gros Ventre River approximately one mile from Kelly, Wyoming during pedestrian survey in 2016. It was recorded as archaeological site 48TE2056 and was recommended eligible to the NRHP under Criterion A for its
FIGURE 22. Aerial oblique view of the Gros Ventre Slide (Love and Reed 1971:27; photo by P.E. Millward).

FIGURE 23. The Grovont, WY/Mormon Row community and landscape after the Kelly Flood of 18 May 1927 (JHSM Accession number 2005.0021.039; photographer unknown).
participation in events significant at the local level related to the Kelly Flood. It is not known whether the Kneedy Family owned a T Model Ford, but it is clear from the account of the flood that the Almy Family did own a vehicle, though the make and model are not specified. Other Kelly, Wyoming residents could have owned a T Model Ford and were not in the vehicle when the flood swept through. Given the location of the mangled vehicle approximately one mile west (downstream) of Kelly and the account presented by Moulton, it is possible that this vehicle was the Almy’s.

_Preliminary Results of the Landscape Archaeology Landscape Analysis of “Miracle” Spring_

Despite the unfortunate historical event, the Gros Ventre Slide Geologic Area and Kelly Warm Springs are popular attractions within the Park (Figure 24). Perennial warm temperatures between 85 and 115 °F may have fostered _E. coli_ bacteria and _Naegleria fowleri_ amoebæ which were detected in 2016 and forced GTNP to make management decisions regarding public use of the water. _Naegleria fowleri_ can enter through human nasal passages and can cause “an almost always-fatal central nervous system disorder called primary amoebic meningoencephalitis” (Koshmrl 2016). Additionally, illegal releases of non-native goldfish have complicated the management process and pose “a direct threat to the health of the Snake River” (Yelk 2015:3).

Reed Moulton’s reverie contains factual errors. The first line from Moulton suggests that water went to the Gros Ventre River; water came from the Gros Ventre River. Mormon Row farmers were not building a canal, they were building a ditch. Mormon Row farmers were not
building a ditch to the Gros Ventre River, rather they were building an extension to a pre-existing ditch from the Gros Ventre River, Savage Ditch (48TE1851), named after Albert “Savage” Nelson who had a homestead near the mouth of the Gros Ventre River canyon. Nelson acquired this nickname due to a Savage rifle he carried when he was younger and a game warden. Nelson’s Savage Ranch predates the Savage Ditch (Allen 1981:248). Hilmer Bark and Robert E. Miller filed the first water right for Savage Ditch on 15 May 1911 (Permit No. 10707) not Albert Nelson. Savage Ditch withdrew water from a headgate on Gros Ventre River in Section 1, T 42 N, R 115 W. Enlargements of Savage Ditch were identified for the record in 2016 by the author. Enlarged Savage Ditch extension (Permit No. 2855E) diverts to the west of the main ditch and has a lateral along the southern border of the NW¼ Section 2, T 42 N, R 115 W (Schroeder 2017).
Andrew H. Chambers arrived to Mormon Row in 1912 and received a Homestead Entry Patent for 160 acres in the S½ NW¼ and N½ SW¼ Section 28 on 14 August 1916. Chambers constructed a log house (18 by 20 feet), a stable (16 by 16 feet) and a partially built new dwelling (Daugherty et al. 1999:126). Chambers did not list a ditch as an improvement on his land originally, but by 1927 he “constructed an irrigation system and switched to raising cattle and hay” (Daugherty et al. 1999:147). Chambers filed for supplemental supply to 70 acres with an original supply from Ditch Creek through Johnson & Eggleston Ditch (48TE1178), Permit No. 9992, and for 1.0 cubic feet per second (cfs) to another 70 acres (Schroeder 2017). Permit No. 4975E—Enlarged Savage Ditch—was filed by Grovont, Wyoming-Mormon Row community members Andrew Chambers, Henry Gunther, Hannes Harthoorn, Joe Heniger, Joseph May, John Moulton, J. W. Moulton, T. A. Moulton, and Mae Kafferlin on 18 June 1934. This permit via Enlarged Savage Ditch (48TE1851) supplied by the Gros Ventre River is likely the ‘canal’ to which Reed Moulton was referring. The federal government did assist surviving residents with reconstruction of ditches after 1929.

There is no question that the Grovont Branch LDS church was used as a mortuary after the Kelly Flood. What is in question is the timing of the eruption of Mud Springs “(only good for mud)” (Ford 2016b). Grovont, Wyoming founding member William S. Kissinger filed a water right for the Mud Spring(s) Ditch (48TE2077) on 24 July 1896 to deliver 0.92 cfs to 65 acres. Kissinger received a second water right, Permit No. 2970, on 22 December 1900. Permit No. 2970 was for 0.57 cfs to be delivered to 40 acres in the NE¼ NE¼ Section 3, T 42 N, R 115 W. By logistical regression, it is obvious that Mud Spring(s) Ditch had enough water supply before 1927 to supply a maximum of 1.49 cfs to 105 total acres.
Mud Spring(s) Ditch (48TE2077) and Enlarged Mud Spring(s) Ditch (48TE2076) were located and recorded in Sections 2 and 3, T 42 N, R 115 W by the author in 2016 (Schroeder 2017). The orthography of the name for these cultural resources deserves explanation. The name for the water source was alternately spelled Mud Spring and Mud Springs and sometimes both within the same archival document. For convenience and to dispel confusion, the names for the ditch and its enlargement have been conflated. This leaves open the question: Where is this Mud Spring(s) and why did it not freeze over in winter?

Concerning Candy Moulton’s published version of the origin of “Miracle” Spring, the spring of 1927 was late and notably wet as opposed to the summers and autumns of 1917 and 1918 when approximately 20 percent of the regional homesteaders sold or abandoned their claims due to drought conditions (Daugherty et al. 1999). The statewide average of 20.5 inches for precipitation in Wyoming in 1927 was and is a record high (North Carolina Institute for Climate Studies 2017). As a result of the late season in 1927, those crops that went in prior to the Kelly Flood were sown or were in the process of being sown later than normal in an already short growing season of approximately 90 days. Those crops that were sown on the northern floodplain terrace of the Lower Gros Ventre River were subsequently obliterated along with their fences, livestock, and any buildings or structures mostly Mormon homesteaders had constructed in an effort to redeem or otherwise improve their granted land and acquire a patent therefor. The town of Kelly, Wyoming was surveyed by Western Historical Studies and recorded as 48TE1181, yet no site report, site records, or maps of resources is available. 48TE1181 remains unevaluated. One fact is certain: the town of Kelly, Wyoming was demapped as a result of the events of the Kelly Flood of 18 May 1927.
Landscape archaeology landscape analysis of all available archival and historic maps was performed using archival materials and maps curated by the GTNP Archives. Landscape archaeology landscape analysis of all available archival and historic maps assisted in the recordation of Kissinger’s Mud Spring(s) and Enlarged Mud Spring(s) ditches (48TE2077 and 48TE2076 respectively) as well as the Ideal Ditch and Enlargements (48TE2092) and Sebastian Ditch (48TE2074) among others etched and stretched across the northern floodplain terrace of the Lower Gros Ventre River and the Ditch Creek alluvial fan as they relate to the Grovont, Wyoming-Mormon Row settlement. As with any landscape analysis, maps and archival documents were chronologically ordered before they were imported into GIS and examined closer for evidence in LiDAR imagery before groundtruthing in person to verify their material existence. Landscape analysis begins and ends with material evidence available in the present about the past. Landscape analysis allowed the author to archaeologically deconstruct the evidence behind Kelly Warm Springs (48TE449-450) further. The additional evidence leads to the provisional identity of the object of Mormon ideological desire in the archaeological record.

It is evident in William O. Owen’s 1894 Cadastral plat map of Township 42 North, Range 115 West (T 42 N, R 115 W) based on surveys conducted in 1891 and 1892 that there were not one but two geothermal water sources (BLM 2016) (Figure 25). Owens indicated and drew “warm Sulphur springs” in the location of Kelly Warm Springs as it is known today. Owens also indicated and drew “Springs” in the SE¼ SE¼ of Section 2, T 42 N, R 115 W. Between 1972 and 2012, 10 site records and reports for archaeological survey, testing, and inventory of, in, and around Kelly Warm Springs (48TE449-450) were written and submitted (Wright 1972, 1975, 1984; Connor 1991, 1992; Crockett 2000; Reher, Bartholomew, and Crago...
FIGURE 25. Detail of William O. Owen’s 1894 Cadastral plat map of Township 42 North, Range 115 West which depicts “warm Sulphur springs” (a.) as well as “Springs” (b.) in Section 2 encircled in white (BLM GLO 2016).


WYSEO records indicate that William S. Kissinger, an early Mormon Row homesteader and founder of the community, filed a water right for Mud Spring(s) Ditch on 24 July 1896 to deliver 0.92 cubic feet per second (cfs) of irrigation water to 65 acres from Mud Spring(s) in the NE¼ NW¼ Section 2. Later, on 22 December 1900, Kissinger filed a second water right to deliver 0.57 cfs to 40 acres. James I. May, James Budge, Joseph W. and Martin W. Henrie, and William Biener helped W. F. King survey for an extension of the Warm Springs Ditch in August 1897 and July 1899 (Figure 26). Permit # 2208—Hot Springs Ditch—was assigned to James
FIGURE 26. Copy of hand-drawn plat map for the Warm Springs Ditch Extension, filed in 1899, indicating the source water warm springs (Map courtesy Grand Teton National Park Archives).

Budge, the Henrie brothers, and James I. May on 31 July 1899. This hand-drawn Plat map places the “Warm Springs” in the SE¼ SE¼ Section 2, T 42, N, R 115 W.

Another historic-era Plat map, this time simply named “Hot Springs Ditch,” is without a date and also depicts the springs originating from the same location (Figure 27). Are Mud Spring(s) and Hot Springs Ditch related? Did Mud Spring(s) supply Hot Springs Ditch or vice versa? The short answer is no. A hand-drawn Plat of the Hot Springs Ditch Enlargement ca. 1908 indicates a stair-stepped irrigation lateral from the Hot Springs Ditch in Section 4 going to James Budge’s Desert Land Claim of 120 acres in the SW¼ SW¼ Section 4 and the E½ SE¼ Section 5.
granted on 27 January 1908. In total, 9.26 cfs in water rights were granted to Mormon Row hay farmers to irrigate 550 acres. The Plat of the Hot Springs Ditch Enlargement, a hand-drawn map in the GTNP Archives, is without a date. This map also depicts springs originating in Section 2.

A 1953 U.S. Department of the Interior engineering map of Hot Springs Ditch indicates a different headgate for Hot Springs Ditch (Figure 28). Mud Springs is also indicated in this map in the same place as “Miracle” Spring also known as Kelly Warm Springs today. This map from 1953 somewhat contradicts what Samantha Ford found (2016a, 2016b). Sean Larmore and Jessica Gabriel of ERO Resources Corporation recorded Hot Spring Ditch in October 2013 as 48TE1945, but did not report permits, dates, or volumes of water allowed. Larmore and Gabriel also did not reference the Owen’s Cadastral map for T 42 N, R 115 W.

The original hot springs that purportedly supplied Hot Springs Ditch (48TE1945 et seq.) was groundtruthed on 23 August 2017 and photodocumented by the author (Figure 29). Due to
FIGURE 28. 1953 USDI engineering map for the enlargement of Hot Springs Ditch (Map courtesy Grand Teton National Park Archives).

FIGURE 29. The original hot springs in Section 1, T 42 N, R 115 W as they appear today (Photo by author 2017).
its precarious location, however; accurate GPS coordinates for the record could not be ascertainable and were therefore estimated based on the best available evidence. Based on the size of the relict geothermal feature, the hot springs themselves could not have produced 9.26 cfs, rather water rights from the Gros Ventre River were combined with warm geothermal water that emanated from the hot springs in the SW¼ SW¼ Section 1, T 42 N, R 115 W (not Section 2 as previously indicated in each of the archival maps). The net result was that Hot Springs Ditch did not freeze over during winter, thus confirming Reed Moulton’s personal account. Without the geothermal water it is doubtful whether the first-wave of Mormon Row settlers and their livestock would have survived their first winters on the northern floodplain terrace of the Lower Gros Ventre River and the Ditch Creek alluvial fan in Jackson’s Hole, Wyoming.

The Kelly Warm Springs archaeological site (48TE449-450) is a combination of two sites that were originally located and recorded by Gary Wright of State University of New York-Albany in 1972 (Wright 1975). The sites were combined in 1999 for management purposes (Figure 30). 48TE449-450 site records do discuss site contents: a variety of prehistoric lithic materials, debitage, flake tools, modified flakes, formal tools, diagnostic projectile points, a broken shaft abrader, and point bases dating back ca. 1,500 years (Wright 1972, 1975, 1984; Connor 1991, 1992; Crockett 2000; Reher, Bartholomew, and Crago 2001; Bartholomew and Crago 2001; Adams 2011; Whitman and Albertson 2012). Archaeological evidence in the Snake River Valley goes back 8,000 to 11,000 years before the present (Walker and Graves 2007).

Several test units were executed across this site and there is a subsurface component. 48TE449-450 has been recommended and found eligible to the NRHP under Criteria A and D. This site is also regarded as a Traditional Cultural Property or Place (TCP) by the consulting Native American tribes of the GYE as well as the
local non-Natives of Jackson Hole, Wyoming. Formal documentation leading to a nomination of Kelly Warm Springs (48TE449-450) as a TCP has not been compiled by GTNP yet.

We know now that what Kreps claims by way of a former Governor of Wyoming that “there was no open water in Mormon Row” (Kreps 2006) is simply not true. There were two geothermal water supplies for fields and livestock before 1927 and three ditches: Hot Springs Ditch (48TE1945 et seq.), Mud Spring(s) Ditch (48TE2077), and Enlarged Mud Spring(s) Ditch (48TE2076). Mormon Row settlers had rights to take supplemental water from a warm Sulphur
spring in 1896 supplemented by the Gros Ventre River, i.e. Hot Springs Ditch. After the Kelly Flood water was withdrawn from the Gros Ventre River via Savage Ditch Enlargement.

Some livestock may have been watered by water from wells, but there is no oral history or archival evidence beyond Kreps’s recounting of Clifford Hansen’s story to prove it despite three new well features—Mahon’s Wells 1 & 2 (48TE2055) and Geck’s Well (48TE2060)—recorded by the author in 2016. A fourth well feature with a sealed cap was located within 48TE400, the former homestead of James Budge and family, also known as Blacktail Butte East, updated to include the well feature as well as a segment of the DIM Trail that passes through the former homestead and other associated features and debris scatters. This well feature could have supplied water to livestock that were kept within the Mormon Row Ranches cattle yard adjacent to and north of Budge’s homestead (Figure 31), but it also could have simply been the family’s personal water supply.

That ‘Ditch Creek regularly iced over and ceased flowing in the vicinity of the present location of the Teton Science School’ (Kreps 2006:117) is not questioned; it did and does so every winter since (personal communication, Holly McKinney, 3 July 2016). It is unlikely that any new water rights were filed on Ditch Creek after the Kelly Flood in 1929 to supplement water from Kelly Warm Springs by Joe Heninger and his neighbors as reported by Ford (2016b) because Joe Pfeiffer and William T. Ireton filed a water right on 8 February 1915 to supply irrigation and domestic use water via Permit No. 13045. Ireton claimed 1.29 cfs to irrigate 90 acres and Pfeiffer claimed 2.28 cfs to irrigate 160 acres. There are two places that served as headgates for the Geck Ditch (48TE2071) that were located and documented on the north bank of Ditch Creek in Section 26, T 43 N, R 115 W by the author in 2016 and 2017.
FIGURE 31. Historic photograph of a billboard sign on Mormon Row Road indicating brands of Mormon Row cattle ranchers (date unknown; Photograph courtesy of Jackson Hole Historical Museum Archives; Accession number 2011.0028.001)
The Geck Ditch (48TE2071) was previously known in the archaeological record as the Pfeiffer Ditch and was recorded as “a typical small, hand and horse dug irrigation ditch that is unlined and has small features (gates and weirs of wood and concrete)” (Mehls 1987:20). Two linen plats from the WYSEO (n.d.) indicating named irrigation ditches and features at the Township scale were georeferenced using ArcGIS software by the author in 2016. The Geck Ditch is drawn crossing Sections 16, 17, 21, 22, 24, and 25, T 43 N, R 115 W. Physical evidence of this ditch was located by the author during pedestrian survey in 2016. It appears that the Geck Ditch was obliterated at some point in the past north of Joe Pfeiffer’s homestead complex, but it is intact between its former headgates and the eastern edge of Joe Pfeiffer’s homestead complex (48TE922). It is easy to see how the ditch was associated with the best available information at the time, yet it is recommended that the Geck Ditch be referred to by its official name due to newly available information from the WYSEO. As a final note, water in the Geck Ditch flowed northwest not southeast or southwest and therefore could not have supplied or supplemented Mormon Row Ditch to the southeast and southwest. Perhaps what Ford meant by the relative clause, ‘which fed into the spring’ is that water from both Ditch Creek and “Miracle” Spring via Mormon Row Ditch supplied the community. When water was unavailable from Ditch Creek, water from and “Miracle” Spring via Mormon Row Ditch was available because it flowed year-round and did not freeze in winter.

Joseph A. May filed a water right for 1.42 cfs to irrigate 100 acres via the Enlarged Mud Spring(s) Ditch on 17 August 1927 (Permit No. 4555E). Joseph A. May also filed a water right for 0.5 cfs from Mud Spring(s) to supplement the May Stock Ditch (48TE1946) on 1 January 1937 (Permit No. 18839). By these accounts from the WYSEO it is clear that Kelly Warm Spring was still known and referred to as Mud Spring(s) until at least 1937. If this is the official
truth, then when exactly was the ‘warm Sulphur spring’ known as Mud Spring(s) also known as “Miracle” Spring? Perhaps the truth lies within the timeline for the construction of Mormon Row Ditch (48TE1444).

Mormon Row Ditch was included as a contributing element to the MRHD (48TE1444) in the Cultural Landscape Inventory (CLI) produced for GTNP in 2006 by J. Cowley and M. Curran, yet not all of the potentially contributing elements were located, e.g. a poured concrete diversion feature and Mud Spring(s) Ditch (48TE2077) or Enlarged Mud Spring(s) Ditch (48TE2076). Richard Adams described the Mormon Row Ditch thus:

A portion of an elaborate irrigation complex consisting of two named ditches, several diversion points and check structures, as well as lateral and return canals occurs within the project area …. Construction took place between 1929 and 1933 (Hubber et al. 1996:51–52), two years after the Gros Ventre Flood of 1927 destroyed the town of Kelly, and wiped out much of the area’s irrigation system (Hubber et al. 1996:51). The catastrophe had a small benefit in that Kelly Warm Springs opened up with a significant output of water. [Adams 2012:3–4]

Additionally, there are 10 relict wooden water control features (turnouts) and one intact combination dropcheck and turnout feature along a lateral in Mae Kafferlin’s (originally Al Gunther’s) homesteaded property connected to a lateral off of the Mormon Row Ditch (48TE1444) originating in Section 34, T 43 N, R 115 W. The May Stock Ditch (48TE1946), too, originates from a turnout feature on the Mormon Row Ditch in Section 3, T 42 N, R 115 W.

There were two water right permits issued for land in Section 33: Permit No. 17937—Supplemental Supply—was issued to Hannes Harthoorn to irrigate 160 acres, and the same permit was issued to Mae Kafferlin to irrigate 131 acres on 15 July 1931. Original supply was
from Gros Ventre River through Enlarged Cedar Tree Ditch, Permit No. 4336E carried through Mormon Row Ditch via Mud (Kelly Warm) Spring(s) and via Permit No. 4975E—Enlarged Savage Ditch—filed by Andrew Chambers, Henry Gunther, Hannes Harthoorn, Joe Heniger, Joseph May, John Moulton, J. W. Moulton, Thomas Alva Moulton, and Mae Kafferlin on 18 June 1934 (Schroeder 2017). Brian Herbel and Matt Mattes of Historical Research Associates found that:

The Woodward property was likely a small-scale irrigated farm. The diversion structures along Mormon Row Ditch … and the southern lateral that heads toward the Woodward Homestead likely represents the “Woodward Ditch,” which the WYSEO lists as having a priority date of July 30, 1928, permit number 17445, issued to John H. [sic. W] Woodward, to irrigate 110 acres with its source as “Mud Spring,” though this resource was never mapped on the WYSEO linen plats for Section 33 (WYSEO n.d.). The water permit was canceled September 17, 1931 (WYSEO 2014). WSEO records indicate that on July 15, 1931, Mae Kafferlin filed a proof (#20296) attached to Permit 17937 to irrigate 131 acres in the northeast quarter of Section 33 (WYSEO 2014), likely as part of a transfer of the Woodward property to Mae Kafferlin. [Herbel and Mattes 2015:4]

Candy Vyvey Moulton recalled that, “Mrs. VanLevin, Mae Kafferlin, and Hadden May distributed aid and kept track of emergency supplies” during the aftermath of the Kelly Flood of 18 May 1927, thus connecting Mae Kafferlin to the Mormon Row community (Moulton 2007:161). It is unclear if Mae Kafferlin was in fact a Mormon, but her participation in the recovery efforts is duly noted.

The site record for 48TE1444—Mormon Row Ditch—was updated by the author in 2017 to include Mae Kafferlin’s Lateral Ditch and appurtenances, poured concrete water control
features, and better images of contributing elements. The site record for 48TE1528—a large refuse concentration—was updated to include more artifacts and loci of refuse and water control features. The site record for 48TE1530 was revisited and updated to include more historic-era refuse concentrated in Mormon Row Ditch than previously mentioned. The site record for 48TE1531 was likewise updated with better images and site boundaries which include vehicle parts, furniture pieces, and temporally diagnostic glass vessels. The site record for 48TE1533—the Mormon Row Knoll Site—was updated to include better images of prehistoric lithics including several tested cobbles and cobble cores. Last but not least, IF-2016-WDS-015 (an isolated find) is a single brown glass beer bottle embedded in the ditch revetment of Mormon Row Ditch (48TE1444). The “K-in-a-keystone” maker’s mark indicates that the bottle dates from 1932 to 1952, but could have been produced as late as 1968 (Lockhart et al. 2008). Based on the color of the glass, the manufacturing date range, and the construction timeline of Mormon Row Ditch, it is believed by the author that the isolated beer bottle was inserted into the ditch revetment in or after 1932 but before 1950 when the Grovont, Wyoming-Mormon Row community had largely desisted and moved away. Once again, the 1959 WYSEO master map of irrigation and water features was instrumental in deciphering how the various ditches and water sources supplied the Grovont, Wyoming-Mormon Row community and when.

Based on the material and digital data available in 2016 one can say by regression and with a degree of certainty that an adequate rate of water must have flowed from the original hot springs in the SW¼ SW¼ of Section 1 before the Gros Ventre Slide event of 23 June 1925 to supply Hot Springs Ditch (48TE1945 et seq.) with year-round warm water. The original hot springs would be lost to obscurity if it were not for archival records kept by the GTNP and the Section 110 pedestrian survey and inventory conducted by the author.
Archaeologically recovered evidence from 48TE449-450 suggests that water emanated from the same source that was known as ‘warm Sulphur springs’ then Mud Spring(s) then “Miracle” Spring then Kelly Warm Springs prior to the Gros Ventre Slide event of 23 June 1925 and the Kelly Flood of 18 May 1927. In other words, the ‘miracle’ of “Miracle” Spring was never a miracle. Based on recovered prehistoric archaeological evidence, the spring was already there and had been for thousands of years. What changed was the hydrology of the landscape after the Gros Ventre Slide event and the Mormon Row community’s perception of the spring (and its name) after the Kelly Flood. It should be noted that no maps with the spring labeled as “Miracle” Springs have been located; only in published accounts of the local legend and in oral histories does “Miracle” Spring appear. Reinterpretation of historical events was and is a distinctive cultural component of Mormon salvation time that facilitated and continues to facilitate their adaptive ecological strategy as well as their relationship with God wherein everything always will have been exactly as it is (Leone 1979:25). This answers the question regarding the true origin of “Miracle” Spring, but it does not answer the question about the truth in the legend.

There is one last clue among the published legends of the origin of “Miracle” Spring that deserves unpacking and there is still a vagueness among the cultural resources reports and records that deserves closer examination. In Candy Vyvey Moulton’s recollection of the collective memory of “Miracle” Spring, ‘For more than twenty years, the families had hauled river water, but a disaster brought a blessing’ (Moulton 2007:121). If, as Leone surmised, Mormonism sacralizes ‘whatever its people touch’ (Leone 1974:730), then hauling water from the Gros Venter River, a mundane task, was a sacred endeavor. That the settlers also ‘gave thanks for their fortune’ implies a subjectivity to God’s will and plan. Their ‘appreciation’ is interpreted here to
mean they accepted their lot. That the ‘disaster brought a blessing’ is interpreted to mean that the
Mormon Row community independently interpreted the trial and tribulation of the Kelly Flood
as a testament that they had been favorably doing God’s work all along. It is implied that the
spring emerged because of Mormon Row settlers’ righteousness and their communal efforts to
redeem the Earth in advance of His return.

The experiences of the Mormon settlers before and during 1925, 1926, 1927, and
thereafter are all part of one continuous event. Perversely then, pure processual archaeology
could support this salvation time paradigm if it were not paralyzed in praxis by its determination
to assign calendrical dates to events and objects and ensure that they are in proper or exact
chronological order. This desire to achieve a methodological perfection has hampered
archaeology’s ability to answer other pertinent research problems and questions (Miller and
Tilley 1984) and leads to woolier thinking than may be necessary to ascertain scientific truths
(Johnson 2012a, 2012b). Sometimes the truth is self-evident and it inspires new theoretical
paradigms to explain its cause.

It should be noted, however, that prior to the telling of the “Miracle” Spring legend
Moulton describes Antelope Flats resident and neighbor to the Mormon Row community Joe
Pfeiffer as “a bachelor homesteader in the area who was a hard worker and experienced to boot.
Pfeiffer had helped many of the others along Mormon Row dig wells” (Moulton 2007:87).
Therefore Grovont, Wyoming residents already had direct access to well water before the Kelly
Flood. It may have been easier to fill tanks or barrels in the river than in the ditches or from a
well and that is why some families sent wagons down to the river to be filled for daily tasks such
as washing clothes or watering livestock which required relatively large amounts of water.
There is a final clue that does not come from the legend of “Miracle” Spring; it comes from the cultural resources reporting that others have performed since the passage of the NHPA. Cowley and Curran also found in their Cultural Landscape Inventory (CLI) reported that:

Field cultivation patterns, as defined by the irrigation laterals, are distinctive in all of the fields within the historic district boundaries. These patterns reflect those visible in the 1945 aerial photos, though the precise location of laterals may have changed since that time, as they are traditionally repaired or rebuilt after a number of harvests. [Cowley and Curran 2006:7–8]

The lateral and sublateral orientation discussed by Cowley and Curran in the CLI applies to surmised changes after the 1945 air photo was taken, but does not acknowledge that laterals and sublaterals have remained in the same location since the farms and homesteads were sold to the Snake River Land Company (SRLC) prior to 1950 and were incorporated into the expanded Grand Teton National Park (Burkes 1972a; 1972b; Righter 1982). It should be noted that the lateral and sublateral patterns today are the laterals and sublaterals used by the last families of the Grovont, Wyoming-Mormon Row community before the community desisted ca. 1950 except for those fields modified by Wyoming Department of Fish and Game (WDFG) between 1952 and 1976. No formal documentation of field modifications by WDFG have been located despite several attempts and inquiries. Cowley and Curran’s supposition is accepted at face value (an a priori hypothesis) until and unless primary documentation is located and can be compared. It is with this proviso in mind that the remainder of this landscape analysis of the origin of “Miracle” Spring continues in this dissertation. The second phase of landscape archaeology landscape analysis involving LiDAR imagery will be discussed below.
All previously recorded resources discussed in site reports including sites not digitized in either the GTNP or WYCRIS databases were manually sketched on 1:9,000-scale grey scale projections of 2014 LiDAR imagery of the Park were printed and examined for anomalies and reference before conducting field reconnaissance and groundtruthing in the summer of 2016. Annotated LiDAR images were used as the base for field maps because it provides the best resolution of the surface. Anomalies and features identified in prefield examination were searched for in field maps and the most efficient path was taken to reach them. To distinguish the irrigation network from other linear features, all irrigation ditches, laterals, and sublaterals were traced on LiDAR imagery in GIS and projected along with digitized site records in their respective GIS databases and layers. Tracing of irrigation features on LiDAR imagery within the Park in GIS was accomplished by a group effort. The GTNP Science and Resources Management Branch—Water Resources Division and GIS Division—hired several seasonal technicians to perform GIS and data analysis of various projects conducted within the Park. An annotated GIS layer begun in 2015 was revised and corrected by the author in 2016 and 2017. Several linear features revealed by LiDAR imagery were in reality paved, gravel, or dirt roads, game trails, utility corridors, and access roads not irrigation features as initially thought. Those lines or segments were deleted. The names of the seasonal technicians who spent unknown hours digitally tracing faint indications of irrigation features within the park are unknown to the author, but their efforts will not go unrecognized here. Kathryn Mellander, retired GTNP GIS Specialist, and Simeon Caskey, Physical Sciences Chief, have given permission to use, edit, and correct the GIS layer. Without this concerted effort, the significance of the Grovont, Wyoming-Mormon Row irrigation network might not be known.

12 The most efficient path was taken because standard survey methods of parallel transects was unnecessary with LiDAR imagery.
Traced irrigation features were checked against a 1958 Wyoming State Engineer’s Office (WYSEO) map of registered water rights. The benefit of this map is the texture schema used to distinguish fields served by different permits. The 1958 WYSEO map indicates ditches, enlargements, extensions, pipe lines, wells, permit numbers, and acres served. This map served as the baseline for much of the Section 110 survey and inventory undertaken by the author in 2016 and 2017. Without this archival map, it is doubtful that the author would have been able to disentangle the complex spider-web-like irrigation network or been able to positively associate irrigation features with specific individuals. Figure 32 is a digital image of this map.

FIGURE 32. 1958 Wyoming State Engineer’s Office master irrigation map (Map courtesy Grand Teton National Park Archives; Accession number GRTE-00474).
Landscape archaeology landscape analysis of archival maps and documents and the archaeological record of Kelly Warm Springs (48TE449-450) revealed a common denominator: water. Four of the five local legends about “Miracle” Spring mentioned irrigation directly or indirectly. The fifth legend, Kreps’s retelling of Hansen’s telling, mentioned wells. Curiously, none mentioned the original hot spring. The original unnamed hot spring supplemented geothermal water to Hot Springs Ditch from 1899 until 1927; Mud Spring(s) supplied and or supplemented geothermal water to Mud Spring(s) Ditch, Enlarged Mud Spring(s) Ditch, and the May Stock Ditch from 1896 until at least 1945; Mud Spring(s) later known as Kelly Warm Spring has supplied and or supplemented geothermal water to Mormon Row Ditch from 1927 until the present (Schroeder 2017).

Landscape archaeology landscape analysis of LiDAR imagery of the Lower Gros Ventre River and the Ditch Creek alluvial fan included tracing in GIS the faint irrigation sublaterals that are etched and stretched across the Mormon Row study area. A pattern was noticed by the author beginning around the mouth of the Gros Ventre River and Kelly Warm Springs (Figure 33). All irrigation sublaterals in the GIS layer of the Park area were painstakingly traced (Figure 34). Taking a virtual step back at the 1:48,000-scale reveals more of the MRHD (48TE1444) than was ever visible or known before. Based on this revelation, the pattern of closely spaced parallel irrigation sublaterals has been provisionally referred to here as a Mormon irrigation pattern or MIP. An MIP may be considered a metapattern (sensu Bateson 1978), an object created by humans in the past that circulated in capitalism and in the archaeological record thus prompting the questions: Is irrigation or the MIP the ideal technology that facilitated Mormon settlement of the Intermontane West? Can the MIP be seen in person? Is irrigation or the MIP the OMIDAR?
The next chapter will discuss and analyze irrigation technology as discussed in Leone’s back catalogue.

FIGURE 33. All known cultural resources near Kelly Warm Springs and all traced irrigation features revealed by 2014 LiDAR imagery in GIS (Map by author 2017).

The integrity and significance of the irrigation system at Mormon Row prompted the author to recommend that the MRHD be expanded and referred to henceforth as the Mormon Row Rural Historic Landscape (MRRHL). “A Modified NHPA Section 110 Class II Inventory Using LiDAR Imagery to Locate Historic-era Homesteads and Irrigation Features of the Lower Gros Ventre River Floodplain Terrace and Ditch Creek Alluvial Fan within Grand Teton
National Park, Teton County, Wyoming, Volumes I and II” (Schroeder 2017; in review) presents the evidence, recommendation, and justification for the reclassification.

![Schematic map of all irrigation features of the MRHD (48TE1444) traced in GIS over 2014 LiDAR imagery (Map by author 2017).](image)

**FIGURE 34.** Schematic map of all irrigation features of the MRHD (48TE1444) traced in GIS over 2014 LiDAR imagery (Map by author 2017).

*Materializations of Worldviews Revisited*

Returning to Patterson’s (2008) concept of materializations of worldviews prompts a quick re-examination of Leone’s understanding of Mormon settlement patterns. Leone found that:
The Mormon settlement pattern, broadly conceived, is directly related to the success of Mormon culture in settling this arid region. The pieces of technology articulated the religious culture with the environment with which it had to cope. The settlement plan was the conscious product of the religion. [Leone 1978:196]

Leone somewhat contradicted himself when he surmised that, “equal subdivisions … combined with the ideological goal of equality and the social device of drawing by lot for rights to land, did promote equality” (Leone 1978:196). This is a contradiction because no City of Zion was built exactly according to the Plat of the City of Zion (Smith 1833); only variations on the Plat were constructed and those that were constructed were never fully realized as a City of Zion proper; they changed, they expanded, and they took on the look and feel of municipalities and cities based on the PLSS more so than the Ideal Plat of the City of Zion. To counteract Leone’s own contradiction, Leone reinforced his soft conclusion with the following:

The utopian planners, on the other hand, offered several types of town plans. The star or circle plan focused on a central place and radiated all streets and lots out from that point. This graduates land in two ways. Lots are inherently unequal in size and are graduated more precisely from the central point. … Grids may well be the logical way to set up instant towns on any frontier, but their properties vary widely and can be geared to accomplishing varied social purposes. [Leone 1978:196]

What is significant and telling about this passage is the work ‘make.’ Leone’s choice of words here is suspect and deserves wider examination. The connotation that ‘make’ has for this passage is one of making the conclusion match the hypothesis; a problem with the hypothetico-deductive method in processual, postprocessual, and postmodern theory (Leone 1972b; Miller and Tilley 1984; Johnson 2012a, 2012b; Bell 2015; Killik 2015), i.e. that which Leone wants to
conclude he constructs his argument to prove (*pace* Martin 1972). To give Leone the benefit of the doubt, it bears repeating that “tentative hypotheses may be deductively formulated to give direction to scientific investigation” (Martin 1972:12).

Leone found that in a “letter from the Church First Presidency to the Freemont Stake in Utah” it specifies “the effects of living in a village cluster” (1978:195). In the village cluster settlement, “[a]ll forms of cooperation are facilitated. Farming, irrigation, exchange or essential scarce goods, schooling, worship, government, and Mormon endogamy were all facilitated through the village plan” (*supra*). Leone derived some of his perspective on Mormon farm village settlements from Feramorz Young Fox. Fox was the President of Latter-day Saints University (later LDS Business College) in Salt Lake City, Utah from 1926 to 1948. Fox wrote in his doctoral dissertation at Northwestern University in 1932 that:

> In all cases in making new settlements the Saints should be advised to gather together in villages, as has been our custom form the time of our earliest settlement in these mountain valleys. The advantages of this plan, instead of carelessly scattering out over a wide extent of country, are many and obvious to all who have a desire to serve the Lord. By this means the people can their ecclesiastical organizations, have regular meetings of the quorums of the priesthood and establish and maintain Sunday schools, Improvement Associations, and Relief Societies. They can also cooperate for the good of all in financial and secular matters in making ditches (for irrigation), fencing fields, building bridges, and other necessary improvements. [Fox 1932:93; Leone 1978:195]

Leone extended Fox’s perspective and added that

> In view of his decision to put his people in a town, as opposed to scattering them over the countryside in homesteads, the town could simply have been allowed to grow around
some central intersection of one or two planned streets, the pattern closest to the early New England heritage Joseph Smith knew. … Main-street towns were a common frontier alternative: one long, central axis along which the principal buildings were erected with homes and secondary buildings scattered in a planless way behind this façade. [Leone 1978:196]

Two words stick out in the last passage: planless and façade. Planless connotes a lack of organization and planning, yet the incorporation of a central axis, a main street is a form of organization and planning just simple. The word façade alludes to Western false front-type (WFF) buildings and structures erected all across the West by Euro-American settlers. The word façade alludes to a mask, and indeed WFF-type buildings were intentionally designed to hide the actual structure behind the main façade.

To address certain deficiencies and breakdowns within society, Joseph Smith advocated a schematic for homogeneous behavior with centralized authority and structures built in the middle of the planned communities. Leone was sure to point out that:

Proximity allowed the continual contact that all village members were to have with each other. Such a system allowed public and neighborly sanctions to operate with greatest effectiveness. Although there was a hierarchy and a system of ecclesiastical courts, neither of these was the chief instrument for keeping social order; proximity was. [Leone 1978:196]

Leone pointed out that,

In Mormon belief the afterlife consists of a series of three kingdoms that encompass all of mankind except those few people who are damned. The kingdoms are telestial, terrestrial, and celestial, differentiated by degree of personal glory that one merits. [Leone 1979:33]
More,

Mormons actively create their own private understanding of [theology], and its meaning is not challenged. This highly idiosyncratic interpretation meshes completely with the personal flexibility adults need to exploit the changeable environment in which they must live and survive. [Leone 1979:193]

Ultimately,

The plat of the City of Zion is therefore considered to be an “invention” of the Mormons; a crystallization resulting from the ideologies of millenialism [sic], communism and nationalism which they derived from the social environment of the early nineteenth century. [Nelson 1952:20]

Donald Henrques Dyal summed up the Mormon materialization of worldview (before it was a concept (sensu Patterson 2008) thus:

Mormons hold a peculiar view of the cosmos and of man’s relationship with God, earth and the animals. Mormons believe that the celestial earth will be the future home of the faithful. Man’s duty then is to redeem his future home form the debilitating effects of the Fall and in so doing, man also subdues himself. Additionally, man serves as guardian of the rest of created life and works out his salvation as did God before him. The essence of Godhood is to have subdued all weakness, overcome all enemies and to eventually be totally perfect. Working in steps towards that goal, man is also to strive for independence, which means, among other things, that he is to be self-sustaining; a powerful impetus for subsistence agriculture. [Dyal 1980:207–208]

As always, whether one is Marxian or Marxist, one must be mindful that resource inequality can lead and most often has led to social inequality. Indeed,
Capitalist nature may be provisionally defined as everything that is not produced as a commodity but that is treated as if it is a commodity. This formulation does as much to Karl Polyani as it does to Karl Marx. Polyani defined “labor” and “land” as make-believe or fictitious commodities. “Man under the name of labor, nature under the name of land, were made available for sale. … There was a market in labor as well as in land, and supply and demand in either was regulated by the height of wages and rents, respectively; the fiction that labor and land were produced for sale was consistently upheld (Polyani 1944:131).” Land and labor are not produced as commodities in accordance with market forces or the law of value. Hence only in make-believe sense can they be regarded as exchange values. In Marxist terms, the statement that land and labor are commodified means that they are treated as if they are a product of labor to which an abstract value can be affixed (Lebowitz 1982). [O’Connor 1998:144; emphasis in original]

In this sense, Mormon homesteaders and ranchers in the arid West had no employer, boss, or supervisor except God. Whereas,

Neoclassical economists today try to attach prices to clean air, attractive views, and other environmental amenities; wilderness areas; and even rainforests. Yet, however much capital is applied to the soil, water tables, coastlines, and mineral deposits, they are produced by God. [O’Connor 1998:147]

Therefore, Mormon labor redeeming the land was their life-work and God’s work simultaneously. In the final analysis, though,

… whether the production conditions are produced by the state, the family or community, or capital itself, the state invariably regulates their production in direct or indirect ways;
the state also regulates access to, use of, and exit from the production conditions on the part of individual capitals. [O’Connor 1998:149]

Unlike Bountiful, an ideal place on the North American continent described in the *Book of Mormon*, ripe fruit and wild honey was not *a priori* plentiful in the Intermontane West. In order to make the Great Basin blossom and produce food and or fodder it had to be worked and watered. To work land and water requires technology; tools, objects, that mediates materially the ideational desire to redeem the earth in advance of His Second Coming.

According to Leone (1973, 1978, 1979), if a Mormon was able to subdue a piece of the earth behind a fence to raise a few head of livestock, horses, some chickens, and grow a summer garden, he or she demonstrated worthiness as a Chosen One, because the earth was redeemed. Mormon homesteaders of Grovont, Wyoming-Mormon Row did not place a monetary value on their view of the Grand Tetons; it was simply a manifestation of God and a sign that they were righteous and chosen to live there and redeem the earth (Moulton 2007). Mormon and non-Mormon settlers to Idaho’s Snake River Valley in the 19th and early 20th centuries believed that,

The earth itself at times seemed like God’s unfinished construction site; its topographical features already carried the outlines of a future landscape that the irrigators would complete. As a manifestation of providential design, the earth seemed to invite the dams and canals that the irrigators would build. [Fiege 1999:17]

In a postmodern view, it is quite possible that Leone intentionally structured his argument so that he could give his research the direction and conclusion he desired. Taking away Martin’s (1972) ‘benefit of the doubt’ returns us to the research problem posed in Chapter I: the identification and location of the OMIDAR.
Chapter VIII.

Testing Mormon Irrigation Technology

Amid trenchant examination of ecological ritual and adaptive strategies using various technologies, Leone made occasional references to irrigation technology (Leone 1968, 1972a, 1974, 1979). By bringing together the disparate mentions of irrigation technology in Leone’s back catalogue, a context coalesces and a new potential OMIDAR emerges.

To begin again at the beginning, Leone made one mention of irrigation amid his one mention of Mormon settlements and land use practices in his Ph.D. dissertation “Economic Autonomy and Social Distance: Archaeological Evidence” (Leone 1968) at the University of Arizona under the watchful eyes of Paul S. Martin and Lewis R. Binford. Leone’s dissertation concerned the cause and effect relationship between dependence on agriculture and social distance between settlements among prehistoric Mogollon cultures in the American Southwest and “a less extensive one in pre-and proto-historic” among the Iroquois of New York State (Leone 1968:1). A single mention of Mormons glosses over the succession of cultures that later occupied or moved through the former Mogollon culture region:

Some Athabascans may have frequented it later, but I know of no archaeological evidence to support that idea. The Spanish and the Mexicans went through the area. The Americans and the Mormons came. Then the sheep. Then the cattle. [Leone 1968:68]

The only mention of irrigation technology in Leone’s dissertation comes in a lengthier and more in depth passage that makes a passing reference the Mormon hamlet of Hay Hollow, Arizona:
The changes in social organization were most sharply demanded by the conditions to which farming had to respond. Some farming adjustments we can hypothesize; some factors we know. Greater amounts of land probably had to be tilled to increase yields to insure against environmental disaster. Swift and violent downpours and run-offs had to be guarded against. Dikes and ditches, play a role here. Rain flattened plants and eroded fields had to be tended to quickly. We know of no water-control devices in the Hay Hollow Valley, but alluviation or erosion can have eliminated very primitive preventive measures. In fact, as a social unit this valley was not an adaptive success, so any water-control measures probably failed, and failure probably involved destruction of the preventive efforts. Positive measures like irrigation never were used here. [Leone 1968:76]

First, let it be said that this was Leone’s dissertation and the argument Leone presented in 1968 concerned Mogollon cultural ecology and not Mormon cultural ecology. Second, the places settled and farmed by the Mogollon culture along the floodplain terraces of the Little Colorado River and Silver Creek in Arizona roughly 1,700 to 500 years BP were the places settled by Mormons in the 19th century—the places where subsistence agriculture was viable on a small scale because there was access to water resources and arable soil. This connection was not specifically stated in Leone’s dissertation; but it is stated here. Beyond this historical footnote, there are parts of Leone’s discussion of Mogollon irrigation practices that deserve closer examination herein as it relates to Mormon settlement and technologies used to settle the same marginally productive environment.

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13 Leone published his doctoral dissertation in 1968. This dissertation was defended in 2018. It is humorous to note that at the time of the writing of this dissertation, Leone’s dissertation became an historic archival document. Were it not for a digitized, scanned copy located on the Internet, Leone’s dissertation, because of its obscurity, might not otherwise have been known to the author of this dissertation. This dissertation was uploaded digitally in January 2019 for anyone and everyone to read. I find all of this a little more than humorous; I find it drôle. Ad acta!
To begin, Leone hypothesized yet did not test or further examine the amount of land Mogollon settlements tilled. That they tilled the land is significant in and of itself because it involved tilling technology. The exact technology used by the Mogollon is not stipulated. A simple plow can be made out of wood. A plow may be pulled by draught animals. This articulation of technology and animals is something that is not specifically identified as having been utilized by the Mogollon people in Leone’s research in large part due to an absence of evidence; draught animals are not known to have been employed in prehistoric times in the North American Southwest. Similar to a plow, a simple hoe can be made entirely out of wood or wood, stone, and binding materials. A simple wood and bound-stone hoe can be employed by one person; several individuals each with a simple hoe can work as a team. In other words, a stone hoe does not require draught animals to operate and a field may be tilled without draught animals. That neither plow nor hoe is identified as the technology used to till land along the floodplain terraces of the Little Colorado River during the period Mogollon people practiced agriculture leaves this author wanting more evidence to support the claim made by Leone that irrigation was not used. That surface water run-off was a contentious factor in early agriculture in arid regions of North America is not in question. What is questioned is the use of dikes and ditches to control surface run-off exclusively.

Dikes and ditches require forethought and planning. Planned construction of dikes and ditches suggests an intimate knowledge of the environment such that Mogollon people knew where water went based on past experiences. Knowing where surface run-off would go and the construction of dikes and ditches to divert that water suggests that surface run-off could have been put to work not simply or merely re-directed. If surface water run-off was directed or re-directed, then it is possible that it was put to work. If surface water was put to work, it could
have been directed or re-directed to tilled fields. This articulation of surface water run-off and water control technology suggests that the Mogollon could have employed flood irrigation or a variant of this technology. That ‘alluviation or erosion can have eliminated very primitive preventive measures’ (Leone 1968:76) suggests there is absence of evidence that dikes and ditches were utilized by the Mogollon people, but it also does not necessarily mean evidence of absence. That ‘any water-control measures probably failed, and failure probably involved destruction of the preventive efforts’ (supra) is a presumption based on a lack of evidence. The posit that, ‘[p]ositive measures like irrigation never were used here’ is a little more than presumptive—it appears specious.

Similar to the technologies employed by the Mogollon people to direct or re-direct surface run-off (Leone 1968), a variety of flood irrigation methods were used by Mormon settlers of the Snake River Valley in Idaho in the 19th and early 20th centuries (Fiege 1999). Prehistoric and historic-era irrigation methods employ much of the same engineering. For example:

To maximize their labor in irrigation, family farmers could choose from several types of ditch and field systems. In border flooding, the farmer laid out fields in narrow, graded strips, 30 to 100 feet wide, that followed the slope of the ground. Dikes\textsuperscript{14}, roughly one foot high, separated each strip. The farmer then fed water into each strip, either through a small headgate or by digging an opening in the supply ditch. The dikes kept the water at a uniform level as it flowed downward through each strip.

In furrow irrigation, also called the corrugation system, the farmer sent shallow streams of water from the supply or feed ditch into the furrows or corrugations that ran between

\textsuperscript{14} I believe that revetment is a more correct term than dike in these examples.
crop rows. … With simple flood irrigation, the farmer dug openings in the supply ditch and directed a sheet of water across a graded, sloped field. [Fiege 1999:130]

There is another supporting link between Leone’s discussion of Mogollon agricultural practices and Mormon agricultural practices. Leone argued that “Mormons found that to build their canals on top of prehistoric ones was invariably less chancy than to rely on their own surveying equipment” (Leone 1979:87). This observation is strikingly similar to an anecdotal reference made by Eva Kaptijn (2009) in the Zerqa Triangle region of Jordan in the Middle East:

It is unlikely that 19th-century farmers developed a large irrigation system which they used only partially. In 1920, inhabitants of the Zerqa Triangle stated that ‘neither they nor their fathers made these channels; they only cleaned existing ones.’ [Kaptijn 2009:47]

Figure 35 is a schematic map of traced irrigation system elements located on unpublished blueprints from a construction project on the East Ghor canal in Jordan after World War II (Kaptijn 2009:307). Kaptijn noted that maintenance and construction of these canals “will have been labour intensive and required a communal effort as a large area was dependent on a single primary channel” (Ertsen 2012:46). The environmental condition of having one main water source in the Zerqa Triangle of Jordan is similar to the environmental condition of Grovont, Wyoming-Mormon Row having the Gros Ventre River as the main source of irrigation water. One difference is that the Grovont, Wyoming-Mormon Row landscape was sub-divided into 1-square-mile Sections based on the PLSS before the area was settled. The Zerqa Triangle was not sub-divided into such Cartesian aliquots; rather it was apportioned irregularly by tribal territory. Note the similarity to the irrigation network built across the Ditch Creek alluvial fan at MRHD in Figure 34. Figure 36 exemplifies ‘the prehistoric ones’ Leone obliquely but not specifically references. It is important to note that Turney’s (1929b) Map of Prehistoric Irrigation Canals
FIGURE 35. 1:10,000-scale schematic map of irrigation system features in the Zerqa Triangle of Jordan traced over an unpublished blueprint of a post-World War II construction project on the East Ghor canal (Kapitijn 2009:307).
FIGURE 36. Dr. Omar A. Turney's Map of Prehistoric Irrigation Canals (Turney 1929b) which depicts Book of Mormon-derived place names.
was printed fifteen years before Leone’s *Roots of Modern Mormonism* (Leone 1979) and concerns the Hohokam culture for which there is ample evidence of prehistoric irrigation features. This leads one to believe that the map was available at the time Leone wrote his Ph.D. dissertation at the University of Arizona in Tucson (and for the next decade thereafter).

*Map of Prehistoric Irrigation Canals* (Turney 1929b) is significant enough to warrant a full landscape-oriented page in this dissertation because it also contains historic Mormon place names that are revealing in and of themselves. Indeed, in the upper right of Turney’s map, south of the Salt River, Pueblo Moroni is indicated. Above the place name, “Many small reservoirs” is annotated and below the place name, ‘and temples’ is annotated. To the north, west, and curving to the southeast Eastern Canal is depicted. Canal Eleven intersects with Eastern Canal to the northeast of Pueblo Moroni. Southwest of Pueblo Moroni along Canal Eleven is Casa de Nephi and the neighboring hamlet of Pueblo de Lehi. Canals Eight and Nine divert from the Salt River and flow southwest of Casa de Nephi and Pueblo de Lehi. To the north of the Salt River “The Land of the Stone Hoe” is annotated north of the Arizona Canal and is depicted by a dashed line. Turney’s map annotation and the accompanying text which posits that the Hohokam used water-rounded diorite cobbles as stone hoes to construct irrigation ditches (1929a:20, 37). Turney does not directly state, as I do, that stone hoes were used to till soil; stone hoes could also have been used to create rills in tilled fields. Curiously Turney mentioned Mormons and Mormon settlement of the same region twice in the text accompanying his map. Turney also made clear that the ‘temples’ annotated near Pueblo Moroni in the “Land of the Stone Hoes” were Hohokam “sun-temples” and not Mormon temples (1929a:12).

When Turney did mention Mormons, he referred only to the Mormon settlement of Mesa, Arizona where an extensive irrigation network was constructed out of the local indurated tuff and

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15 There are five known editions of Turney’s *Map of Prehistoric Irrigation Canals*; the first edition was in 1922.
Several years ago, when the Mormons first settled at Mesa and began the irrigation and cultivation of the fertile plain about them, they utilized this ancient canal bed for a considerable distance, including that portion encircling the knoll of volcanic tuff mentioned. The writer [Turney] has been informed by one of the founders of this settlement and builders of the Mesa canal, which is nine miles in length, that the saving to them by using the ancient canal was about $25,000.00. [Turney 1929a:37]

This passage demonstrates that irrigation networks and their features participated in capitalism.

The place names Pueblo Moroni, Casa de Nephi, and Pueblo Lehi were derived from *The Book of Mormon: An Account Written by the Hand of Mormon upon Plates Taken from the Plates of Nephi* (Smith 1830) and are mixed Spanish and English and not in a Mexican Spanish dialect or traditional O’odham, the language from which contemporary Native Americans of the American Southwest identify the people who have gone or were there before. *Book-of-Mormon*-derived place names are no accident; they simply have no explanation in Turney’s text. Once again there is a curious aporia. Based on the logic presented above, I believe, contrary to Leone, that the Mogollon employed dikes (revetments) and ditches to make water work as part of flood irrigation practices, though direct evidence is lacking in the present. I believe also, based on Turney (1928a) and Leone (1968), that Mormon settlers superseded the Mogollon and Hohokam ditch features and made them their own. In other words, archaeological evidence of Mogollon-made ditches in Leone’s original study area may not be available if pre-existing Mogollon ditches were co-opted by the Mormon settlers who changed them to make them work for their needs either by extending them or filling them in to maximize arable acreage.

In *The Evolution of Mormon Culture in Eastern Arizona*, Leone (1972a) lithely discussed the articulation of tithing, communalism, and social stratification among Arizona Mormons from
a cultural history perspective as “a utopian group seeking to remove its population from the
iniquities of the larger world … organized around the notion of self-sufficiency within a
framework of cooperation” (Leone 1972a:123). Unequal distribution of natural resources such as
arable soil and unpredictable weather necessitated centralized management for subsistence
survival of the larger community. This suggests that material conditions preceded ideology. It
can be argued conversely that Mormon ideological desire preceded the material conditions the
Mormons encountered. Indeed, when the Mormon Pioneer Company or Camp of Israel reached
the Great Basin and the Great Salt Lake in 1847, the first tasks were to plow arable land,
stockpile plows and related machinery, and cut a ditch to irrigate their new homeland
(Francaviglia 2015:78). William Abruzzi’s human geographical analysis of the Little Colorado
River Mormon settlement and colonization project found that upon arrival in 1876 to the place
that became Joseph City, Arizona, “plowing was begun on March 25th, only two days after the
first settlers had arrived. Surveying for the irrigation ditch began within two days and the first
logs to be used in constructing the dam were cut on the third day” (Abruzzi 1987:319). In other
words, material conditions were met with technologies already at hand as well as an ideological
desire to transform natural environments into agricultural landscapes.

Leone’s (1979) summary of Mormon common pool resource use and ‘hierarchical
control’ does not veer far from Julian Steward’s Hydraulic Hypothesis (1955; Steward et al.
1981) wherein large-scale irrigation networks caused “the emergence of centralized political
authority and supra-community political organizations” that characterize the rise of the state in
antiquity (Mitchell 1973:532). Essentially, Steward’s thesis is that the rise of state polities in
antiquity was a direct result of irrigation practices and irrigation practices promoted the
development of centralized state authority that controlled water resources and adjudicated water
usage. William Mitchell’s “The Hydraulic Hypothesis: A Reappraisal” (Mitchell 1973) was quick to remind us that Steward revised this hypothesis a number of times during his career and others have raised issues with its totalizing cause-effect positivism. Mitchell would rather that we reformulate Steward’s dictum thus:

[I]t is not irrigation itself, but the centralized coordination of irrigation activities that has important social consequences. It is the synergistic action of irrigation and its centralized coordination that results in greater political integration. The development of such centralized direction gives the political system a vital economic sanction: individuals can be denied access to irrigation water. Moreover, centralized direction permits expansion of irrigation activity, which in turn results in expansion of political activity. [Mitchell 1973:533]

Mitchell’s reflexive re-interpretation presages postprocessual and postmodern critiques of prehistoric, premodern, modern, and postmodern irrigation practices. Indeed, without mentioning Mitchell when describing ancient Middle East irrigation systems in the Zerqa Triangle of Jordan, Maurits Ertsen summed up Steward’s *Hydraulic Hypothesis* thus:

Irrigation systems, spatial conglomerates of artefacts, are supposed to supply crops with water. This requires both physical distribution facilities to transport water and socio-political arrangements to coordinate between actors in dealing with water flows. User strategies have an impact on the system and the system constrains user actions. Hydraulic behavior of irrigation systems resulting from human action is partly constraining and partly enabling human actions. Irrigation systems have structuring properties …. [Ertsen 2012:46]
Australian archaeologist Ian S. Farrington drew attention to the need for more nuanced analysis of irrigation practices in the past:

Much of the archaeological literature on irrigation canals merely notes their presence at a certain period(s) and records their association with sites. It may describe or even classify the main features of an irrigation system … but does not fully elucidate the technology, hydraulics or hydrology of the canals. Even where excavations into canals have been carried out, the researchers have not used their data to its full potential …. [Farrington 1980:289]

A similar preliminary conclusion can be drawn for Leone’s work: Leone’s investigation into the importance of irrigation network features was not carried out as fully as his investigations into fences, settlement plans, temples, and dam re/construction and their articulation with ecological ritual. The full potential of irrigation network features is available if one structures one’s research around said networks and the ideological contexts in which they were constructed and operated, here Mormonism and Capitalism.

Richard White (1991:401) observed how in the historic period under English common law, the Doctrine of Riparian Rights, as applied in the United States, reserved rights to water that “accompanied rights to the land along a riverbank: all landowners who bordered a stream had a right to use water flowing past their lands” (Freeman 2008:54–57). As in prehistoric times, floodplain terraces with direct access to water resources had and continue to have advantages over arable lands without direct access to water resources.

Returning to the historic period and the Intermontane West, Colorado was the first U.S. state to adopt a prior appropriation doctrine in its constitution in 1876. The Wyoming Territorial Legislature adopted a doctrine of prior appropriation, drafted by Elwood Mead, as Article 8 of
the Wyoming Constitution in November 1889 (Freeman 2008:59). A centralized legal and water authority was established in the Wyoming capitol, Cheyenne, between 1886 and 1890. The Carey Act of 1894 (28 Stat. 422; 43 U.S.C. 641 et seq.), also known as the Federal Desert Land Act, established the General Land Office (GLO) and permitted private companies to create irrigation networks and sell water rights in arid lands of the American West. States created and maintained centralized water authorities, such as the Wyoming State Engineer’s Office (WYSEO).

Born of this historical context, the Reclamation Act of 1902 (32 Stat. 388) established the United States Reclamation Service (later known as the United States Bureau of Reclamation—the agency Elwood Mead headed from 1924 to 1936), to administer lands and construct irrigation systems in the American West. After the establishment of the Reclamation Service, the Federal Irrigation District Act of 1916 (43 U.S.C. 13), sometimes referred to as the Irrigation Smith Act, placed the federal government as the principle guarantor of debt for the construction and operation of large-scale irrigation systems in the American West. Curiously, Mormons managed to self-manage water resources within the federal and state water management structure in part due to their adaptive strategy (Leone 1979). By the time of the first Mormon settlers to Jackson’s Hole in 1896 the WYSEO had already been established, yet solutions to water problems were handled by High Councils, Bishops, and ward Counselors locally. Moreover,

Among nineteenth-century Mormons on the Little Colorado River in Arizona ritual affected the critical relationship between (1) the population and the products of the annual agricultural cycle and (2) the population and the irrigation system that enabled agriculture to work. I will consider only the critical relationship between ritual and the
irrigation network here for lack of space. … Through ritual the following aspects of the irrigation system were affected:

1. Dams and canals were built or rebuilt. The technical advice, labor, and capital needed to construct or reconstruct this essential piece of technology were directly regulated by rituals.

2. Food distribution to a town stricken with a washout and to laborers on a dam was provided.

3. The presence of high level ritual functionaries, Church General Authorities who organized local and central Church aid, and who set up a plan of action in the field, was assured.

4. Ritual organized areal cooperation during a dam disaster and unified the Little Colorado area through reciprocity between towns when disasters hit.

5. Rituals communicated the interpretation of the disaster as a trial of the Saints, an effort on God’s part to test the endurance of his latter-day chosen. The notion of the trial, or continual testing, geared the population for coping with repeated disasters.

6. Dams brought into existence by religious beliefs organized through ritual operated (1) to raise a pool of water for gravity flow through canals, (2) to store some water, and (3) to for a settling pond for silt before water flowed through the canals and onto the fields. [Leone 1974:724]

Returning to Leone’s discussion of Mormon irrigation practices as it relates (or not) to Maring ecological ritual (sensu Rappaport 1967):

The Mormon irrigation system is a variant of this classic description in that there are two timing devices in the system instead of one. Whereas various kinds of overpopulation in
New Guinea have little or no inherent value, the collapse of a dam on the Little Colorado was essential to the system’s maintenance. Collapse of a dam, in addition to maintaining part of the irrigation in functioning form, was periodic. Dam washouts tripped the ritual cycle into operation on behalf of the stricken town, just as overpopulation of pigs and people seems to in New Guinea, but in addition dam bursts themselves regulated a portion of the irrigation system, as pig and human overpopulation in New Guinea did not seem to. [Leone 1974:725]

Here Leone obliquely admitted that the two scenarios were not exactly analogous yet proceeded anyway to outline the ecological ritual triggered by dam failure:

1. The silt and sand aggraded and settled behind a dam are flushed out, thus both recreating the settling pond and, more extensively, maintaining the elevation of the river bed constant. The more a stream bed aggrades or raises, the higher above a town a canal has to begin to take out water to maintain flow by gravity;

2. The unusual flood of water stays in the river channel instead of flooding the town, rushing through the canals eroding them, and depositing silt over the fields and damaging crops;

The aggrading of silt behind a dam is regular. … Aggradation makes a dam both progressively more useless to the irrigation system and progressively more susceptible to washouts. This outline needs some qualification and certainly does not mean that every dam disaster served these positive functions.

We are dealing, then, with a system in which the initial upsetting event is itself crucial to the survival of the whole system. [Leone 1974:725]
Leone then reached the conclusion that “ritual is embedded in ecology, and facilitated the distribution of resources critical to survival” in both New Guinea and Mormon Arizona (Leone 1974:726). While this analogy can be accepted on logical terms, Leone followed with the observation that:

Not all Mormon towns in the Little Colorado area depended equally heavily on dam-controlled irrigation” and there was no regularity to the washout events nor an equal distribution of dam reconstruction episodes per town.” and “[r]oughly half depended on irrigated farming and so had dams.” [Leone 1974:727].

It is presumed that not all Maring villages experienced pig and human overpopulation problems at the same time, thus Leone’s argument holds if the presumption is true. But are overpopulation problems and dam washouts analogous as ecological ritual? Or are they made to be equivalent in the void created by the failure of the hypothetico-deductive method to result in positivist conclusions in the social sciences regarding nomothetics, as in a “cultural-materialist research strategy that can deal with the questions of causality and origins and laws” (Martin 1972:7)?

For the Maring of New Guinea, ecological ritual responses to pig and human overpopulations have a nomothetic response that forms part of the lattice of the Structure (sensu Lévi-Strauss 1963) or “the big Other” (sensu Žižek 2008) that in a feedback loop simultaneously forms and informs their ideology and their lifeways (culture). If not all Mormon settlements in the Intermontane West were directly dependent on dams for irrigation, can it be said with the same degree of certainty that Mormon ideology was or is nomothetic; did or do dams simultaneously create and maintain Mormon ecological ritual? The short answer is, maybe.
Leone averred: “What I would like to show is not so much how the ritual system of Mormonism is geared to an aspect of its economic-ecological base but how those two sub-systems are completely embedded in each other” (Leone 1974:730). More,

Part of the system of [Mormon] governance which communicated the centralized opinions and solutions, as well as discovered grass roots needs, was a set of visiting officials working out of Salt Lake. Visiting General Authorities served as a base for part of the ritual system. The visits from hierarchs coincided with the various events in the ritual calendar, principally Quarterly State Conferences. Visits were tied to the Church calendar. The calendar governed the ritual cycle. And this cycle happened to mesh with two major ecological processes: agricultural redistribution and repair of the irrigation network. [Leone 1974:731]

If this calendrical synchronicity was and is pragmatic, this aspect or quality is not under scrutiny here. What is under scrutiny is the origin and the evolution of this synchronicity over time. It appears from a removed perspective that dam re\construction was 1.) not fundamental to the religion or ideology from the beginning; and 2) not universally employed if not every Mormon settlement had a dam and an irrigation network that required periodic rebuilding due to washouts. Therefore, while the Mormon ecological ritual of dam re\construction did evolve over time from an original need, it was only in or for those areas dependent on dams for irrigation; other areas not dependent on dams yet dependent on irrigation from other water sources like rivers, streams, creeks or springs would not have had a nomothetic relationship with dams but may have had a nomothetic relationship with water resources in general and irrigation practices in specific.
Andrew Vayda’s (2000) *Foreword, 1968* in the 2nd edition of *Pigs for the Ancestors*, contained an insight to Rappaport’s method of functional analysis (not to be confused with Leone’s structural analysis method in 1977 that may explain the confusion:

Functional analysis in the social sciences has been widely criticized in a number of ways. Among the most common criticism are three that are appropriate for our consideration:

1. that functional analysis is inadequate for the explanation of the presence or origins of cultural traits and institutions;
2. that functional analysis is one-sided and almost “panglossian” in its focus on utility, harmony, integration, coherence, etc. in the status quo; and
3. that there can be no objective testing of hypotheses in functional analysis because of the lack of clear empirical import for crucial terms and concepts. [Vayda 2000:vii]

It is clear from Vayda’s critique of Rappaport’s functional analysis method that social science is indeed woolly (*sensu* Johnson 2012a); social science, including landscape archaeology and historical geography, does not lend itself wholly to positivist scientific hypothesis testing.

When Leone interrogated Mormon ecological ritual and dam re-construction on the Little Colorado River in Arizona again in *Roots of Modern Mormonism*, he made a connection with the natural environment. Concerning hierarchical control, Leone found that Mormon settlers to the Great Basin:

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16 It is curious to note the date of the publication of Rappaport’s *Pigs for the Ancestors*; Zaretsky and Leone’s edited volume, *Religious Movements in Contemporary America* (1974) has Rappaport’s *Pigs for the Ancestors* cited in the Bibliography as published in 1967 not 1968 as it is cited in the paper by Leone (1974). This critique can be easily forgiven because *Pigs for the Ancestors* (Rappaport 1967) was reprinted in 1968. This is not the first or only time that Leone incorrectly cited a bibliographic entry; Leone cited his own work, the first publication of “Archaeology as the Science of Technology: Mormon Town Plans and Fences” in *Research and Theory in Current Archaeology* in his 1977 essay *The New Mormon Temple in Washington, D.C.* in *Historical Archaeology and the Importance of Material Things* as having been published in 1972 when it was actually 1973. This curious pattern of incorrect citations lends a degree of skepticism to the solidity of Leone’s overall argument. It is almost as if Leone intentionally left a “breadcrumb” trail of clues for someone to follow in the future.
… tied the whole of the kingdom together in a well-designed administrative structure in which all functions were filled by churchmen and all churchmen had to be either farmers or workers. In the trackless Great Basin, Mormons established an entire social environment, complete with schools, courts, irrigation systems, exchange networks, price controls, systems of weights and measures, a monetary system including specie, a network of roads, maps, an exploration plan, land, timber and water rights management, and printing facilities. Everything from the founding of basic agrarian industries to the invention of a new alphabet sprang into existence as much from necessity as from conscious forethought, and it all spread quickly over the vast territory which was to become Mormondom or the Mormon theocratic state. [Leone 1979:18]

This passage deserves deeper examination.

The initial founders of a new town or group of towns were often selected so as to include the appropriate complement of agrarian skills. This was especially true in areas requiring water control. [Leone 1979:21]

Fences transformed the ‘trackless Great Basin’ into a tracked landscape (Church 2002), yet somehow, just a year after he republished “Archaeology as the Science of Technology: Mormon Town Plans and Fences” (Leone 1978), fences are not included in Leone’s list of Mormon accomplishments. Because fences are not specifically indexed, it prompts investigating whether fence technology really was and is the technology responsible for all of the advances Leone listed or if there was or is another technology or combination of technologies that facilitated or facilitate Mormondom in the American West.

Leone found that “the Mormons perfected a number of institutions” and
Some were the direct heritage of Smith, like centralized church control of government finances; others like irrigation systems, agricultural and industrial experimentation, immigration management and church courts, had only the merest of antecedents before Utah. [Leone 1979:20]

It was essential for community survival and self-sufficiency that “the right set of skills and tools [were] available to complement farming” (Leone 1979:21). That meant that before a new settlement was planned, a “miller, carpenter, brickmaker, blacksmith, tanner, surveyor, and dam or canal builder” from among the community of believers was enlisted. From the storehouses and stockpiles, successive waves of pioneering Mormon settlers were “equipped with appropriate machines and tools” (supra) necessary to meet the material conditions of frontier environments.

It is clear from this passage that a combination of technologies and technicians (though these words are not used) was necessary to facilitate the settlement of the Intermontane West and the creation of the Mormon theocratic state, and that water resources—and especially those who knew how to make water work—were integral to community survival and self-sufficiency in new places. Indeed,

Almost all Mormon towns held water and timber resources in common. Access to both was guaranteed to all and limited alike for all. Beyond this egalitarianism, however, irrigation demanded dams, canals, and systematic, controlled access to water. The paramount necessity for irrigation intensified the type of hierarchical control that had characterized Mormonism from its start. Balanced against equal access to resources was therefore the hierarchy necessary to ensure continued equality. [Leone 1979:21]

Moreover,
By coupling cooperative economics and hierarchical leadership, the Mormons were able to build and maintain a complex irrigation network involving fickle streams, frail dams, easily washed-out canals, periodic floods, and the huge labor force needed to operate the whole system successfully. In addition, the exchange system, roads, public buildings, schools, and hundreds of other operations needed to ensure subsistence success were maintained by means of cooperative labor and funds. [Leone 1979:24]

The practice of tithing predated the settlement of the Great Basin; tithing was (and still is) a way to alleviate inequality. Indeed, “[t]he community storehouses that provided for both surplus and relief were handled by a lay clergy as were irrigation and land management” (Leone 1972a:135). Combined with the practice of tithing, “irrigation, and the judicial system … reveal critical aspects of how the Mormon adaptive strategy worked” (Leone 1979:25). This combination “built stability out of instability, not by denying it, but by maximizing it” (supra). In the chapter entitled “Water Control: The Origins of Dynamic Adjustment,” Leone posited,

The irrigation system was operated and regulated through the use of religious rituals.

Rituals and beliefs thereby combined to aid in the continual improvement of, and hence effective control over, the environment. Effective control constituted the first phase of the church’s success. [Leone 1979:88]

Based on the earlier parts of Leone’s argument, Leone’s point is valid only if dam reconstruction is part of the religious ecological ritual, and for Leone it is even if it was or is not a nomothetic ecological ritual or response to material conditions. Neither Francaviglia (1978, 2015) nor Abruzzi (1987) made mention of ecological ritual, but they did comment on the importance of irrigation in the arid region of North America settled by Mormons. Case in point,
Further complicating these issues [of independence from the U.S. federal government and mutual protection from hostile others; Gentiles and Native Americans], the Mormons considered irrigation projects rather than individual homesteads to be key in claiming land. [Francaviglia 2015:119]

Regarding the original planning and building of Salt Lake City, Francaviglia found:

In addition to the large scale of the city, many observers commented that the city featured an irrigation system of ditches through which clear water gurgled. This city was, in a word, an oasis. At its center, the Temple Square was, and remains the city’s premier landmark. … In fact, the design of Salt Lake City [reveals] a complex dialogue between faith and pragmatism. … Moreover, the city’s character also reflected the realities of coping with the semi-arid climate of the Interior West. [Francaviglia 2015:79]

Still, the Mormon ecological ritual as outlined by Leone and the Manifest Destiny ethos as outlined by Tuveson—both of which sought dominion and control over the environment—are predicated on labor and water. That Mormons sought to redeem the earth in advance of The Rapture placed an urgency on their efforts; those laboring under the Manifest Destiny ethos may or may not have felt the same type of urgency, yet arduous labor was expended nonetheless. At this juncture it is necessary to distinguish the terms millennial and millenarian. The term millennial must be understood in a Western chronological context “before its immense ramifications can be appreciated in their entirety” (Tuveson 1968:xii). More,

To the earlier opinion—which expects the physical return of Christ—I have given the name “millenarian.” To the belief that history, under divine guidance, will bring about the triumph of Christian principles, and that a holy utopia will come into being, I have
assigned the name “millennialist.” (“Progressive-millennialist” would be more accurate, but it is too cumbersome.) [Tuveson 1968:34]

Mormons are thus millenarians as opposed to millennialists in Tuveson’s lexicon, and

As God desires to work with and through human nature to transform the individual soul so he works with and through men and their institutions to regenerate the kingdoms of this world. To say his ways with the individual soul and those with society must be different is out of keeping with the tenor of the Word. It is wrong, then, to say that there can never be a triumph of Christian principles in the human community … it would be natural to think that the secular idea of progress, together with the scientific revolution, had exerted an effect on theology, and that millennialism was a way of adapting religion to the new secular optimism. [Tuveson 1968:38]

Tuveson was quick to point out the importance “to understand the ideological basis of the connection between religion and ‘liberty’” (Tuveson 1968:23). In this view, the Bible must be brought to every living soul that has a potential for redemption; everyone has the possibility of reforming and accepting Jesus Christ. Moreover, “[w]hen a whole community is impregnated with this redeeming grace, a new state of affairs arises, one in which justice, charity, and truth are the common motives of conduct” (supra). This progressive view found in Christian eschatology is echoed in Marxist dialectics, too, “both set forth predictions and general guides, both call for the most strenuous efforts to destroy the opposition and to progress toward the happy time sure to come, but a path marked out in advance” (Tuveson 1968:47–48). Thus, “[i]t is no accident, perhaps, that Marx was writing when millennialism was particularly strong in both Britain and the United States” (Tuveson 1968:51).
Tuveson went on to say that, “[e]specially in the United States, the millennialist interpretation of God’s Word did much to shape attitudes toward contemporary problems,” (read Capitalism; Tuveson 1968:53). Yet,

[m]ore than anything else, the end of history is not the establishment of things new, but the restoration of the very oldest—the primeval heritage of mankind, of which man has been defrauded by a superhuman Enemy. [Tuveson 1968:78]

That Tuveson capitalized, yet did not specify, the word ‘enemy’ suggests that he was referring to the Devil and not the Antichrist who is expected to appear as a false prophet prior to Christ’s return. The Devil is evil incarnate and therefore an enemy of all that is righteous and good.

Returning to Mormon salvation time (Leone 1979:vi, 29), Tuveson found that:

… the apocalyptic time does not begin only with the Redemption. The fact that the images are largely taken from the historical and prophetic books of the Old Testament makes us see that all history finally is apocalyptic. The events in which we ourselves participate are parts of the pattern; we find ourselves in the Apocalypse. [Tuveson 1968:6; emphasis in original]

That the Second Coming did not happen in the Prophet Joseph Smith’s lifetime is not a cataclysm; Mormons are in continual readiness for the eventuality (Leone 1977). In the meantime, as the Apocalypse unfolds, Mormons can commune and communicate directly with God in Mormon temples as well as actively pursue God’s work through earthly redemptive ecological rituals and praxis. In this light, Latter-day Saints are “by no means mere spectators of the great final events; their part is not only to prepare spiritually for the kingdom, but to play a part in bringing about the defeat of evil” (Tuveson 1968:6).
It would be remiss not to return to Margaret Purser’s discussion of Basque settlers to Paradise Valley, Nevada as presented in Leone and Potter’s *Historical Archaeologies of Capitalism* (1999) as it relates to Manifest Destiny and irrigation practices. Basque settlement of Paradise Valley is not dissimilar to the Mormon settlement of the Great Basin at the roughly same time. Basque settlers “employed a wide range of strategies designed to generate household income and maintain financial and social support along kinship lines that extended throughout the rest of Nevada and into Utah, Idaho, and California, as well as back to the old country” (Purser 1999:125). Ultimately, according to Purser, it is “into this analytical locus between various scales of space and time that material cultural of later capitalism fits” (Purser 1999:124–125).

Arid arable lands of the Intermontane West of North America could only have been redeemed or reclaimed by making water work to grow vegetables, grains, and fodder crops; placer mining is not an example of redemption, it is quite simply a taking, a raping of the environment. Indeed, lands that had always been marginal became overtly hostile to permanent human settlement unless massively irrigated. Water, always a valuable commodity in the arid west, became a fundamentally political element (Blouet and Luebke 1977). Similarly, “[t]here have always been flows and currents of one kind or another in human life, and physical traces of these are manifested in artefact assemblages, landscapes and townscapes at different scales of analysis” (Edgeworth 2011:108). Purser promoted the idea that, “[t]hese patterns can only be identified by archaeologists working back and forth across the range of scales at which capitalism was, and is, relevant” (Purser 1999:117).

Professor of Historical Archaeology at the University of Montana Kelly Dixon found a paradox in the capitalist materialization of worldview in the historic American West wherein,
“[w]hat was sacred to some became a source of profit for industrialists and new homes for many settlers for whom the land also became sacred” (2014:189). Can such land be both profitable and sacred? This question deserves further inquiry because Mormons also occupied ancient landscapes in the Intermontane West previously occupied by Native Americans and profited; did they make them holy anew? According to Leone, yes:

Leone set out to be explicit about his research agenda (1973, 1978) and his methods for achieving his goals (1977, 1979), but it becomes increasingly clear that Leone was beset with the same problems Rappaport faced while researching Maring cultural ritual. This disparity must be acknowledged before proceeding with an experimental phenomenological (as in supranatural) historical landscape archaeology investigation seeking to locate and identify an OMIDAR at multiple scales of analysis at which ideology and capitalism are relevant, i.e. this dissertation, one that admittedly disavows the hypothetico-deductive method yet proceeds with it anyway.

Can irrigation practice as a technological object that facilitated Mormon ideological belief be materially quantified (reified; empirically seen) not just qualified in words? If everything Mormons touched was sacralized, then there is no doubt that dams and their re\construction were sacralized. If dams were so central to the Mormon ecological ritual and calendrical cycle, what about the distributary network? The distributary network would also have been sacralized. Perhaps Leone left clues in his other texts that can answer this question.

Dams and irrigation canals are intimately integrated; this is nothing new. What is new is the perspective from which they are capable of being viewed. Tourney’s 1929 map depicts ancient irrigation ditches at a landscape scale (Figure 36). Nowadays one can easily view the dams Leone discussed in 1974 and again in 1979 by visiting Google Earth (a piece of technology unavailable to Leone at the time of his writing but is available to him in the present). Figure 37 is
a 1:12,000-scale orthographic image of the Woodruff Dam on the Little Colorado River in Leone’s original study area that reveals evidence of the kind of dam failure Leone describes.

Indeed, Leone shared a particularly poignant block quote (among many) concerning the Woodruff Dam from “Minutes of Quarterly Conference of Eastern Arizona and Snowflake Stakes” (Historical Department of the Church of Jesus Christ of Latter-day Saints [1878–1906]:271–272) in *Roots of Modern Mormonism*:

About 10 o’clock at night, August 27, 1904, the ninth Woodruff Dam was swept away. This is regarded as a great calamity especially to the people of Woodruff and at President Udall’s place in the St. Johns Stake. … Mormon dams got stronger with each succeeding attempt to erect a permanent structure. But at the same time that Mormon technological skill in impounding water increased, flood conditions actually worsened, owing to the
heavy overgrazing in an area delicately balanced as a succulent desert. … All the early diversion dams leaked as a result of the way they were constructed. … All had spillways, which were supposed to keep floods from piling up behind a dam and spilling over the top in an unselective fashion, but the spillways were never adequate, and when a flood came, the dams were too limited for the volume they were forced to handle. Moreover, dams often were not provided with adequate foundations. This factor, coupled with inadequate spillways, meant that dams frequently gave way in a flood. [Leone 1979:89–90]

The Google Earth image in Figure 37 shows the Little Colorado River “reaching around” the stone and concrete (and now relict) Woodruff Dam (Leone 1979:90). Thus the Mormon adaptive strategy was not only intimately entwined with historical ecology, it was, is, and always will be in an antagonistic and subordinate relationship with and to Nature.

If the diversion and or spillway features are functionally and technologically related, then other dam appurtenances such as irrigation canals or ditches may be considered part and parcel of dam technology. It must be noted that canals and ditches need not be connected or associated with dams to perform their function; they can be independent features while fundamentally dependent on a water source of some kind. Furthermore,

The pattern of material objects that is a dam and its connected irrigation system is both passive and active. It is produced by Mormonism and produces parts of it. … The irrigation system can be seen as one of the prime factors causing a certain level of population, stratification, social control, and regional cooperation. It has certain deterministic properties and is an apt case of technological determinism. [Leone 1974:742]
In this passage, the modal passive, ‘can be seen,’ is interpreted here to connote the vernacular and abstract notion of evidence presented except no edificial or material evidence beyond dams and the occasional mention of canals is presented in Leone’s argument surrounding the importance of irrigation to the perpetuation of Mormondom or their historical ecological ritual praxis. For something to be seen there must be an audience, at least one Subject who witnesses the phenomenon; it is preferable to have more than one witness. The modal passive voice weakens the specific gravity of the material evidence presented and it, like the dams the argument attempts to buttress, fails, washes out, or is otherwise circumvented. Out of this antagonistic articulation emerges another technology that can be empirically observed, measured, described, and situated within an historical as well as ideological context: irrigation network features.

American historian Mark Fiege was fascinated with the ditches and laterals of Mormon Idaho and took an almost historical landscape archaeology approach in his *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Fiege 1999), but really it was an historical ecology narrative approach without mentioning Karl Marx, not even once. Fiege’s narrative investigated Manifest Destiny capitalist materialism and idealism, meanings and values, myth and metaphor. Fiege inspected ideation but shied away from fully inspecting ideology for some unstipulated reason.

According to Fiege, early Idaho irrigators were regarded as water masters by others who depended on their skill, labor, and the water they helped to bring to faraway fields. The Manifest Destiny ethos of the times held that
… the Snake River [was] a creature that must be “tamed,” “harnessed,” and “made to do duty” for man’s benefit. Water was, in their view, a useful but obstreperous form of nature that awaited their steadying and constructive hand. [Fiege 1999:22].

More, E. B. Darlington, chief engineer for the Twin Falls North Side Land and Water Company, wrote in 1920 that irrigation engineers were “understudies of the Creator,” men charged with the task of making the earth a better place, [Fiege 1999:23] and “Housekeeping” was his attempt to explain accurately a complex world in which humans constantly altered nature, “reclaimed” it, and then responded again and again to its unpredictable, uncontrollable changes. [Fiege 1999:41]

These two passages presage the conclusion Matt Edgeworth arrived at in Fluid Pasts: Archaeology of Flow (2011): environments geomorphologically altered by humans respond like ‘agents.’ Edgeworth’s provisional ascription of agency to altered landscapes at the hand of humans provides another potential pathway by which we may be able to identify and locate the OMIDAR. If a landscape geomorphologically altered by man behaves as an ‘agent’ in response to the unnatural changes imposed on it by humans, then perhaps the altered landscape itself can be considered an ‘object’—or something that functions as an object (sensu Žižek 2008)—and thereby enter in the realm of historical materialism (hismat). In archaeological terms, the landscape ‘object’ is a feature. Hypothetically the OMIDAR could be a historic landscape feature. Actually, what Edgeworth posited was this:

Artefacts of flow can be said to have one thing in common: a fundamental orientation in their design, affordances and operational capacities to flowing water, as well as to human
agency and to networks of other artefacts. Because of that orientation, it is only by placing them within interpretive frames of reference which take flow into account (as part of the dynamic past assemblages of human and non-human materials and agencies in the context of which such objects were used) … that archaeologists can make much sense of them. [Edgeworth 2011:61–62]

By placing irrigation technology and features in a phenomenological landscape archaeology theoretical paradigm, the ‘dynamic past assemblages of … non-human materials’ can be attributed an ‘agency’ by the humans who observe them in the present (Edgeworth 2011). In this articulation, irrigation ditches named after the person or people who filed for water rights, built them, and maintained them takes on not only a symbolic immortality, it is possible to regard such landscape features as extensions of the egos and identities of the people responsible for their creation. For example, the Johnston & Eggleston Ditch (48TE1178) still delivers water from Kelly Warm Springs via a lateral off of the Mormon Row Ditch and contributes to a bucolic feeling and association within the MRHD (48TE1444) experienced by Park visitors in the present and, in a sense, keeps the look and feel of the historic community in its period of significance ‘alive.’ This is an esoteric and phenomenological perspective that is also rather profound when considered in context with Edgeworth’s (2011) concept of geomorphological ‘agency.’

Fiege (1999) devoted an entire chapter to the telling and re-telling of a one-sentence story: One July morning in 1919 William Grover, Jr. struck Joe Koury in the head with a shovel while both stood near their irrigation laterals waiting to take their turn and Koury died (Fiege 1999:81–116). Grover and Koury had been amicable neighbors, but the pressures of climate, the commodities market, and the U.S. economy of the time drove one man to take matters into his
own hands with fatal results. This example points up that cooperative management of irrigation water is a type of communitarian ideology in and of itself, yet the ideological principles of Capitalism encourage “private gain and the economically independent man” (Feige 1999:83).

Fiege’s cautionary true story echoed Richard Lindsay (1932) who found that for the Mormon settlers to the Big Horn Basin, “it was each man for himself until he got there; then there was some co-operation. No arrangements had been made for either land titles or water rights prior to their reaching the Basin” (Lindsay 1932:164). A weak centralized authority that regulates a common pool resource such as irrigation water can result in a breakdown of community cooperation when human emotions such as greed and avarice are triggered. Fiege recommends that:

We need to move beyond this conventional view and appraise our landscape from the perspective of Lateral L. Like Lateral L, or the Low Line Canal, or the Snake River itself for that matter, nearly all environments are both human and natural creations. Humans alter land and water, often destroying much of what is natural and turning the land into an artifact. But nature is seldom if ever completely eliminated; often, as in the case of Lateral L., people only modify something in the biophysical environment that was already there. In turn, nature changes what humans build, often in unanticipated ways; sometimes nature comes back more powerful than before. Mayflies inhabit the canal; the Snake’s hydrology fluctuates and upsets the control that the irrigators attempted to assert over the river. Again we try to arrange land and water to suit our objectives. And again nature circumvents our plans. Back and forth it goes, a process of alteration, intermingling, and layering, the result of which is landscape. Thus we should view each place that we inhabit, Idaho’s irrigated farmland or any other, not simply as a departure
or degradation but as a new environment, a new ecological system, that has been created and formed. An older, perhaps more natural environment was eliminated, but in its place stands a new, hybrid landscape that should be understood on its own terms. [Fiege 1999:9]

Fiege believed that the settlers of Idaho’s Snake River Valley believed that, “irrigation offered a method for transcending the limits that nature imposed. Most fundamentally, they said, it promised to liberate farmers from their dependence on precipitation” (Fiege 1999:11), the same motivation Ertsen presumptively identified among the ancient settlers of the Zerqa Triangle in Jordan (Ertsen 2012:46). Fiege located the irrigated landscape of Mormon Idaho and found that:

 Idaho’s irrigated landscape was a world made from many things: water, earth, and concrete, plants and animals, laws, policies, and social institutions, sweat, and economic relationships. But it was also a world that was inseparable from the activity of the mind, a world made from the imagination. It was here, in thought, that the inhabitants of the irrigated landscape made sense of the material reality that surrounded them; it was here that they envisioned the future and its possibilities, struggled to comprehend the present, and dreamed of the past. [Fiege 1999:171]

The earliest irrigators to Idaho’s Snake River Valley and Wyoming’s Jackson’s Hole (also on the Snake River) capitalized on pre-existing Pleistocene paleochannels and watercourses carved millennia before by the preceding ice ages and catastrophic floods that scoured and unroofed native bedrock. Irrigators took advantage of “low-lying swales, meander bends, and creeks” (Fiege 1999:21). In ironic contrast, the settlers of Mormon Row withdrew not from the Snake but the Gros Ventre River and another natural stream, Ditch Creek. The first irrigation ditch of the Mormon Row community with a water right established in 1896 was the Trail Ditch
(48TE1947), a modified distributary channel of Ditch Creek. It should also be noted that the homesteaders and irrigators of the northern floodplain terrace of the Lower Gros Ventre River and the Ditch Creek alluvial fan known as Mormon Row did not receive water from the Snake River but the Mormon settlers of the Snake River Valley in Idaho over 40 miles away did and continue to receive irrigation water via a canal roughly 15 miles north of Mormon Row that turns out from Jackson Lake Dam.

Grovont, Wyoming-Mormon Row settlers carved contour-conforming main irrigation ditches and laterals that delivered water via parallel linear sub-laterals within their rectilinear hay and oat fields that themselves were byproducts of the PLSS (Church 2002; Nelson 1930; 1952). The cumulative effects of human manipulations of environments alter the water table, the wildlife, and the future productivity of the soil.

“Individual capitals are simply unable to transform in unproblematic ways the conditions of production, which are first and foremost specific or particular use values, into exchange values” (O’Connor 1998:155). Is this antagonistic relationship true? Or were the Mormon settlers of Grovont, Wyoming-Mormon Row able to transform private property (homesteads and desert land entries), water rights, and manual labor into irrigated fields and working farms into capital? Did the tangible material technology of intensive parallel irrigation sub-laterals facilitate and mediate? I think it did. This dissertation will demonstrate that there is material evidence that irrigation networks and their associated features are the OMIDAR.

A re-examination of Leone’s back catalogue has revealed that Leone did identify irrigation’s importance as a ‘prime factor’ in “causing a certain level of population, stratification, social control, and regional cooperation,” and irrigation “has certain deterministic properties” that make it “an apt case of technological determinism” (Leone 1974:742). Leone articulated
well how the Washington Temple atomizes the *inter item* Mormon Subject, but Leone himself is not a Mormon (nor is the author of this dissertation) and did not participate in the secret ceremony and rite of passage, the program within a Mormon temple is estimated. Leone did describe in great detail the architecture and plan, which is empirical and material evidence (Leone 1977, 2010).

Leone went to great lengths to situate dams within historical Mormon ecological ritual by describing, detailing, or including the technology as an integral element of Mormon ideology. When Leone discussed dam reconstruction on the Little Colorado River in Arizona, he did not interrogate in the same trenchant manner the humanmade distributary features that physically comprise a large proportion of an irrigation system’s physical footprint (for which impounded water behind dams was and is intended). Indeed less is said about the canals, ditches, headgates, turnouts, checkdams, diversions, laterals, sublaterals, and rills or other appurtenances of irrigation systems than any other technology investigated by Leone. Why? Perhaps because, unlike actual fences, actual plats and actual settlements, actual temples, and actual dams, the whole object could not be seen in person on the ground.

If the pattern evident at Mormon Row is an MIP, then it should be evident among other Mormons in Jackson’s Hole at or about the same time. Is the pattern evident at Mormon Row evident elsewhere in the Park? After tracing all the irrigation features in the Park, the short answer is a qualified, yes. Figure 38 is a 1:250,000 topographic and hillshaded projection of the traced irrigation feature layer co-created by the GTNP and the author. Four areas of closely spaced irrigation sublaterals were identified. GLO records indicate the names of the first claimants to grants in the respective areas; claimants to the grants around Mormon Row were
already known through previous archival research by the author (Schroeder 2017) and others who performed cultural resource management in the study area.

In *Survey Report of Selected Historical Cultural Properties Located within Grand Teton National Park, Wyoming*, authors Ann Hubber and Janene Caywood found that:

Winter approached, and the Idaho contingent sought refuge with neighbors from adjacent communities before constructing cabins in the spring of 1897. The McBrides chose to settle on Flat Creek, south near Jackson; the Allens chose land to the north, near Moran; and the May and Budge families filed on homesteads at the south end of Blacktail Butte, near water and well-sheltered from wind and winter storms. [Hubber and Caywood 1997:14]

Bureau of Land Management (BLM) General Land Office (GLO) records confirm what Hubber and Caywood (1997) reported about the Allen family in the vicinity of Moran, Wyoming. Unfortunately, no information about James Manges’s faith has been located to corroborate or contradict the argument presented here—that wherever the MIP is found there were or still are Mormons, i.e. a metapattern (*sensu* Bateson 1978). More research is therefore warranted.

Moreover, it is necessary to determine whether or not non-Mormons employed parallel sublaterals and flood irrigation the same manner.
FIGURE 38. All traced irrigation features within Grand Teton National Park (Map by author 2017).
Another test of Leone’s historically Mormon Little Colorado River settlements is necessary to determine if the irrigation pattern evident in the Mormon Row study area is or was employed elsewhere in the Intermontane West. If the same or a similar irrigation pattern exists among Little Colorado River settlements, then an argument can be made that there is a Mormon metapattern (sensu Bateson 1978) identifiable and locatable in the archaeological record that represents historic Mormon attempts to create New Zion anywhere and everywhere practicable in the Intermontane West (Leone 1979:28). A test for presence or absence is therefore necessary.

Unfortunately, there is not a publicly available LiDAR data set available for the area Leone investigated in the 1970s; there is publicly available orthoimagery. Landscape archaeology landscape analysis was performed on a 2016 National Agriculture Imagery Program (NAIP) orthoimage in ArcGIS by the author in 2018 in and around each known historically Mormon settlement along the Little Colorado River and Silver Creek in Leone’s original study area. The parallel sublateral pattern, the provisional MIP, was searched for in each Mormon community in Leone’s original study area, and if present, the pattern was traced in ArcGIS. The pattern is evident in Figure 39, a 1:10,000-scale orthographic projection of the hamlet Hay Hollow, Arizona—the only Mormon settlement mentioned in Leone’s doctoral dissertation (Leone 1968). Taking a virtual step back to look at more than one Mormon settlement along the Little Colorado River at one time at the 1:63,630 scale further illuminates the pattern (Figure 40). 1:500,000-scale orthographic projection of the entirety of Leone’s original study area in Arizona reveals there is material evidence that the same type of closely spaced parallel irrigation sublaterals seen at Mormon Row in Wyoming are evident in Mormon Arizona (Figure 41). Each of the Mormon settlements in Leone’s study area contains at least one representative field with the MIP present; many more are extant but were not traced.
FIGURE 39. 1:10,000-scale orthographic projection of representative Mormon irrigation pattern (MIP) examples in the hamlet of Hay Hollow in Leone’s original study area in Arizona (Map by author 2017).
Irrigation features played a critical role in the history of the Grovont, Wyoming-Mormon Row settlement. The overall character of the rural historic landscape is a direct by-product of the 17 irrigation ditches that lace the landscape (Hubber et al. 1996; Hubber and Caywood 1997) and it is doubtful that the founders of Grovont, Wyoming would have survived the first few winters had they not created ditches that were supplemented by geothermal water, e.g. Hot Springs Ditch (48TE1945 et seq.) and Mud Spring(s) Ditch (48TE2077). The presence of the MIP in both study areas demonstrates that the MIP existed and still exists in relict and active fields. Irrigation was and is a technology that facilitated agricultural subsistence in marginally productive arid
FIGURE 41. 1:500,000-scale orthographic projection of representative Mormon irrigation pattern (MIP) examples in or near known historically Mormon settlements on the Little Colorado River in Leone’s original study area in Arizona (Map by author 2017).

landscapes in the Intermontane West of North America. With this revelation, one can say with an increased degree of certainty that the historic Mormon creation of New Zion anywhere and everywhere practicable in the arid Intermontane West (Leone 1979:28) was and is predicated on irrigation technology embodied in the MIP. It should be noted that the MIP and a circular pattern of irrigation are both present in Figure 39. At some point after 1950 center-pivot irrigation machinery was installed and used in Hay Hollow, Arizona as evidenced by the bulls-eye pattern of concentric rings superseding the parallel sublaterals which are faint and not traced in GIS.

Metaphorically speaking, if homesteads and land grant allotments are charm quilt blocks and irrigation network ditches are “stitching in the ditch” linear patterns, then the cultural
resources of the two study areas are contextually connected to one another like patchwork quilts that blanket each study area and tell us in the present about each community’s history much like charm quilts tell family and or community histories. By combining and projecting historic and modern maps, land grant patents, traced irrigation network patterns on LiDAR imagery along with the complete archaeological record, one can generate maps to hang like tapestries that tell the story of a landscape. Analysis of previously and newly identified cultural resources back and forth across multiple scales results in a holistic interpretation that reveals heretofore unexplored connections and intersections of the Grovont, Wyoming-Mormon Row and Little Colorado River Mormon communities within larger local, regional, state, and national contexts of capitalism. The next chapter will discuss and analyze irrigation technology as it relates to the AHDs of the states of Washington, Wyoming, and the United States.
Chapter IX.

Rills? Really? Re-Examining the Authorizing Heritage Discourse Concerning Irrigation Features

An overarching objective of the National Park Service (NPS) is to preserve natural and historic resources within Park boundaries for present and future generations of Park visitors and researchers to interact with and enjoy. Natural and historic resources must first be identified before they can be managed with this and other objectives in mind. Thus the “problem” in this scenario is methodological: the location and identification of previously unidentified cultural resources that may be significant. In the National Historic Preservation Act (NHPA; Public Law 89-665; 16 U.S.C. 470 of 1966 et seq.) and the Section 106 or 110 process, cultural resources are defined as “physical evidence or place of past human activity: site, object, landscape, structure; or a site, structure, landscape, object or natural feature of significance to a group of people traditionally associated with it” 50 years old or older (NPS 2016) eligible to or listed on the NRHP with a few exceptions (National Register Bulletin No. 15 [NRB15]; United States 1991).

Cultural resources commonly located within National Parks include:

- Archeological resources: The remains of past human activity and records documenting the scientific analysis of these remains;
- Historic structures: Material assemblies that extend the limits of human capability;
- Cultural landscapes: Settings we have created in the natural world;
- Ethnographic resources: Sites, structures, landscapes, objects or natural features of significance to a traditionally associated group of people; [and]
- Museum objects: Manifestations of human behavior and ideas. [NPS 2016.]
A cultural landscape is ‘a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values’ (Birnbaum 1994:1). A historic landscape is “a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features” (McClelland et al. 1989:1–2). An historic vernacular landscape is “a landscape that evolved through use by the people whose activities or occupancy shaped that landscape. Through social or cultural attitudes of an individual, family or a community, the landscape reflects the physical, biological, and cultural character of those everyday lives” (Birnbaum 1994:2).

Periodic reconnaissance surveys and inventories keep the NPS or any federal land management agency abreast of ‘new’ cultural resources under its purview. Improved technology and methods previously unavailable to cultural resources investigators in the past that can facilitate the location of cultural resources may also have emerged since the last survey or inventory. Prior to 2016, the entirety of the Grovont, Wyoming-Mormon Row community’s irrigation network had not been systematically inventoried for water control features or other appurtenances that may be significant to the overall historicity of the network and the historic community.

Donald Hardesty and Barbara Little admitted readily that linear sites “present special problems in significance evaluation,” and “[i]t is not necessary to justify the individual importance of each component, because the significance of the district is based on the combined
contribution of the individual elements” (Hardesty and Little 2009:99). Hubber et al.’s (1996) National Register nomination form for the MRHD (48TE1444) made the case and point that:

Individual resources … lateral ditches, headgates, culverts associated with primary distribution canals, [were] not counted as individual resources. However, unless otherwise indicated, these minor resources contribute to the significance of the Mormon Row Historic District. [Hubber et al. 1996:8]

Curiously, the authors did not inventory, assess, or evaluate said resources. This seeming omission was the impetus for the internship and the results of the internship became the impetus for this dissertation. Results and recommendations based on the re-examination of the irrigation features of the MHRD through the AHDs of the states of Washington and Wyoming are presented here with accompanying recommendations for future CRM praxis in the Intermontane West of North America.

Authorizing Heritage Discourses

If heritage is defined as a “property that is or may be inherited, …valued things such as historic buildings that have been passed down from the previous generations, and relating to things of historic or cultural value that are worthy of preservation and … conservation,” (Harrison 2010:9), and

Heritage largely exists within a historical context that has been created by various influences that reached their zenith throughout Westernised societies with the increasing professionalizing of cultural heritage practice in the late twentieth century. [Harrison, et al. 2008:1]
then

… those working for heritage agencies and organisations don’t (at least shouldn’t) simply observe and comment upon heritage; rather, they [should] actively engage with it, creating heritage (the archaeological resources of the future), and altering and renewing (often through particular heritage management practices) that which was inherited from the past. [supra]

American Archaeologist Terry Klein espoused that:

… the most important issue facing American archaeology is that of site significance. … Archaeological significance is generally defined under provisions of federal law and regulation as the quality of having yielded, or being likely to yield, ‘information important to prehistory or history’ (36 CFR §60). [Klein 1999:n.p.]

Further, when referring to the dominant Western AHD regarding heritage:

The AHD is integrally bound up in the creation of lists that represent the canon of heritage. It is a set of ideas that works to normalise a range of assumptions about the nature and meaning of heritage and to privilege particular practices, especially those of heritage professionals and the state. Conversely, the AHD can also be seen to exclude a whole range of popular ideas and practices relating to heritage … at a local or regional level through the documents, protocols, laws, and charters that govern the way heritage is assessed, nominated, and protected. [Smith 2006:27]

Moreover, Harrison et al. (2008) and Smith (2006) promoted the idea that

The official discourse of heritage [is] focused largely on material objects and places [and] that the documents and charters that govern heritage designate particular professionals as experts and hence as the legitimate spokespeople for the past … and the idea that heritage
is “bounded” and contained within objects and sites that are able to be delineated so that they can be managed. [supra].

UK Anthropologist and Fellow of the British Academy Robert Layton recommended that, “any theory that has a bearing on the real world may have political implications, if it is used to formulate or justify policy, even though this consequence may be unintended by the analyst” (Layton 2008:258). In turn

Anything that an authority (such as the state) designates as worthy of conservation subsequently enters the political arena. Alongside any thought or feeling we might have as individuals about an object, place, or practice there will be a powerful and influential set of judgements from this authority which impacts on us. [Harrison 2010:26–27]

While these admonitions are true for what are defined as “archaeological sites,” Hardesty and Little (2009) cautioned that the significance of historic-era structures and linear features such as railroads, bridges, irrigation networks, power transmission lines, oil and gas pipelines, and seawalls (among other linear features) is open to wider interpretations as to significance to living culture(s) who either do or do not value such resources in the present-day, or have the potential to value these resources in future contexts. Philosophically speaking, and as the NRB15 explains, through significant archaeological sites, archaeologists and anthropologists

…have the ability to ‘test hypotheses about events, groups, or processes in the past that bear on important research questions in the social or natural sciences or the humanities; or corroborate or amplify currently available information suggesting that a hypothesis is either true or false.’ [United States 1991:21]

Still the concept of “significance” concerning linear resources such as irrigation networks is not easily applied in CRM praxis. Likewise, as has been demonstrated in this dissertation, culture
and ideology are woolly (sensu Johnson 2012a, 2012b) and resist positivist attempts to explain cause and effect through the employment of the hypothetico-deductive method. Therefore experimental methods may be necessary to ascertain the truth that is sought. Experimental methods include using a nomothetic or a phenomenological landscape archaeology (qua Johnson 2012a, 2012b) that can afford natural environments an ‘agency’ (sensu Edgeworth 2011 qua Latour 1993).

Paradigmatic Perspectives on Cultural Resource Evaluation

Paradigmatic approaches to heritage as they pertain to linear cultural resources such as irrigation laterals and their appurtenances come directly from the U.S. Department of the Interior, National Park Service, Interagency Resources Division’s NRB15 (United States 1991). Other guidance documents written by other States and Federal agencies promote fundamentally equivalent methodological praxis (BLM 2012, California 1995, Bureau of Land Management, Nevada and Nevada State Historic Preservation Office 2012; Oregon State Historic Preservation Office 2013). Hunt and Hunt discussed the great theoretical importance of studying irrigation and cultivation practices’ systematic relationships even if “irrigated agriculture is a very unusual social resource” (Hunt and Hunt 1976:389). For the purposes of this discussion, the methodological focus is on ways to evaluate the irrigation structures for their potential eligibility to the NRHP and not their social function per se.

An AHD can be found in Harvests of Plenty (Pfaff and United States 2002), a book written by the United States Bureau of Reclamation (USBR) about USBR-built irrigation projects in Central Washington, specifically the Yakima and Kittitas projects. Pfaff and United
States used NRHP Criteria to advocate a weighted-tier schema for addressing the various levels and elements of these large, landscape structures, wherein the author delimits the quality and type of resources eligible to the NRHP.

Pfaff and United States (2002) pointed out that laterals are frequently dredged, widened, and sections realigned, and therefore do not possess high enough physical integrity in terms of location or design to be eligible, thus laterals will rarely, if ever, be more than second-tier contributing elements. Yet charismatic structures such as check dams, pump houses, and electrical plants could elevate a resource because they possess high enough physical integrity in and of themselves, and are visually interconnected to the main system.

The position taken *Harvests of Plenty* (Pfaff and United States 2002) set the standard for how irrigation laterals and canals along with their appurtenances are evaluated from in the State of Washington. In recent years, there has been a shift in recommendations made for 2nd- and 3rd-tier irrigation structures, and a possible selective pressure put on CRM professionals to find such resources eligible in part because of the rate at which they have been disappearing from the landscape when determined ineligible, and in part because the argument for inclusion has become more substantiated.

Pfaff and United States (2002) provided descriptions of property types related to USBR-built irrigation dams, reservoirs, and canals of the Yakima Project as an appendix that were and are meant to supply CRM contractors in the State of Washington with NRHP Criteria considerations and contexts for future evaluation and assessment projects. The property types were arranged from largest and most charismatic to the smallest. Under *II. Property Type: Canals*, a *Significance* statement reads:
In conjunction with storage and diversion dams, canals form the backbone of the Yakima Project. They provide the means to transport and deliver water throughout the system and ultimately, to the water users. These linear components, along with associated features such as tunnels and siphons, are the connectors between the complex array of structures that form the Yakima Project. Piping of sections of canal and laterals has been undertaken to increase efficiency and reduce maintenance. On the Tieton Division, replacement of the entire 320-mile distribution system with a closed pressurized pipe system was completed in 1986 under a Reclamation Rehabilitation and Betterment Project. [Pfaff and United States 2002:B-4]

Canals located and observed “with sufficient integrity” may be recommended “individually eligible” for the NRHP under Criteria A, B, and C (Pfaff and United States 2002:B-5). In III, *Property Type: Appurtenant Canal Structures*, siphons, tunnels, flumes, drop structures, wasteways, culverts, water measurement features, regulating structures, headworks, turnouts, and checks, by and large “derive significance as contributing elements to the operation of the canal. In some unusual cases, however, they merit individual consideration due to significant design, engineering characteristics, or historical association” (Pfaff and United States 2002:B-5–B-6), and

Located at various points along canals, the above-described appurtenant features are integral to the operation of the water delivery system. Although most are small in scale and were constructed from standard designs, they are instrumental to the functioning of the canals. Due to the constant ongoing maintenance required of canals and associated structures, many of the original features are upgraded, altered, or even replaced over time. As a result, those that remain with integrity are significant contributing elements.
In some cases, these features may be rare surviving examples, or of unique or innovative engineering design, and have individual significance. [Pfaff and United States 2002:B-9] Pfaff and United States (2002) recommended appurtenances that retain their integrity be found eligible to the NRHP under Criterion C, and if associable with a significant event or person, also eligible under Criteria A and B. The authors did not define the term ditch and this is a curious omission.

To complicate matters, early lined canals were sometimes lined with clay tile, stone or brick. Concrete was a common lining in the early part of the 20th Century. Many open canals were later piped in sections or in entirety, although many open canals or canal sections have continued in use as open ditches or are concrete lined. The Bureau of Reclamation, Office of Chief Engineer’s Design Standards No.3 – Canals and Related Structures contains a brief mention of a ditch that can be approximated as a definition under the heading Turnouts:

Turnouts divert water from a main water supply channel to a smaller channel or a farm irrigation ditch. The large turnouts are usually designed as open channels with a bridge, while the smaller structures usually have a covered conduit. [United States and Bureau of Reclamation 1967:174]

In general, when a ditch was mentioned, it was in relation to a farmer’s field and was considered “open” (United States and Bureau of Reclamation 1967:277; 291–292). A definition and context for a ditch might look something like this:

Ditch: Open-air, unlined, earthen canals are commonly referred to as ditches. Wasteways alongside roads are also referred to as ditches. Ditches or earthen canals are periodically dredged of sediment, straightened, and otherwise modified to deliver water to users; they are rarely unaltered from their original plan or profile;
Open canals, ditches, and flumes are primary features and the primary conveyance source of delivering water for irrigation systems. The period of significance for primary conveyance structures ends in 1962 when the Food and Agriculture Act signaled a shift in federal policy away from water resource development.

A sublateral or a rill may be defined as:

A narrow, shallow, intermittent watercourse with steep sides, usually only a few inches deep; a technology to apply water to row crops in small ditches or channels between the rows made by tillage implements such as a hoe, shovel, ditch plow or a harrow.

Rills are not really the focus of this argument, sublaterals are, but that should not preclude the possibility of encountering extant historic-era rills; integrity will still be a matter of debate.

Figure 42 is an undated historic-era photograph of a Central Washington farmer performing maintenance on a rill-irrigated field with the caption that reads, “Irrigation water flows down rills of a new field ready to transform from brown earth into green cover” presumably a fodder crop such as hay, alfalfa, clover, or another commodity, wheat (image courtesy of the Quincy Valley Historical Society and Museum and Initiative for Rural Innovation & Stewardship).
In-field features such as rills are not readily defined much less advocated as resources or properties due in part to their temporary or ephemeral use. Moreover, there is no indication that in-field features are considered in Pfaff and United States’ (2002) rubric as being potentially contributing elements. This may be due in large part to periodic improvements and re-digging of in-field features such as rills to the extent that one may presume that they are not in their original locations or did not survive the 50-year threshold unchanged. That federal irrigation network engineering guidance documents do not include a definition for rills or rill irrigation (Aisenbrey et al. 1978; United States et al. 1967) suggests that rills or rill irrigation practices are less important even insignificant, and this position has become a subtextual component of the AHD on irrigation features.
Teresa Trost (2009, 2010, 2011) also developed an approach for assessing the degree to which irrigation features potentially contribute to the historicity of historic-era agricultural landscapes and other gravity-fed water delivery systems on a landscape in Washington State. According to Trost, it is logical to consider how each smaller distribution system, i.e. main canal (or ditch)-lateral-field delivery system visually and materially conveys the significance of early irrigation practices, and contributes to the historicity of a canal or ditch irrigation system as a whole. Trost’s rubric incorporated a four-tiered schema following the NR examples given in the NRB15—an Authorizing Heritage Discourse text—regarding the significance of the contribution of an element, to wit:

First-tier contributing elements are cultural resources eligible to the National Register (NR) on their own merit;

Second-tier contributing resources are ineligible on their own merit, yet maintain enough physical integrity to evoke an image of the historic irrigation system during its period of significance and are visibly interconnected directly with other historic elements of the system, i.e., they are easily perceived as a part of an irrigation system on the landscape even if relict. If a visual aspect of the past can be seen in the lateral, and a relationship with the canal can be made, it may evoke historicity and an argument for first tier consideration;

Third tier contributing resources have been modified to the extent that they are comprised of more modern elements than historic elements, but are still visibly part of the irrigation system and are interconnected with other historic elements of the system;

Fourth-tier resources are constructed within the past 50 years and may be located in the same place and serve the same purpose as a prior historic structure. [Trost 2009:23]
The problem with cultural resource evaluation is that within an Area of Potential Effect (APE) there are competing opinions and perspectives on what is valued—between land owners or managers, agencies, state and federal offices and office holders, tribes, special interest groups, cultural resources managers and archaeologists, and the many publics. Each has the capacity to view the same landscape through one or more lenses, and ascribe tangible or intangible values based on their individual and institutional perspective(s), further complicating the matter—a proposed action that might impact a resource. Indeed, Schroeder and Landreau (2015b) have pointed out to state and federal land managers that there are two competing perspectives or paradigms that confound the evaluation process concerning the integrity of most cultural resources: essentialism and exemplarism.

Essentialism is the view that every entity has a set of attributes that are necessary to its identity and function. So long as enough attributes are present that something can be identified as a specific entity, its identity is substantiated. How much is ‘enough’ becomes the issue at hand.

Exemplarism is the condition of being exemplary; the belief that something is beyond the ordinary, unique, outstanding, exotic, and or exceptional. Although exceptionalism or exceptionalist might be better terms to describe outstanding resources, the word has been associated with National Register Criteria exceptions per the NRB15, and should only be used in cases or regarding resources that fit the criteria of exception (a.) through (g.). Phrases, passages, and text in the NRB15 contain either essentialist, exemplarist, or a combination of both paradigmatic approaches and result in a confounding of the evaluation process when one or more consulting parties holds an opposing viewpoint on a resource or set of resources, here irrigation
features and or appurtenances. The debate may boil down to a more basic conflict wherein in an essentialist perspective, any and all identifiable object 50 years old or older is eligible (unless proven otherwise) versus an exemplarist perspective in which not everything is automatically eligible—an object must be justified as eligible; said object must be a ‘good’ example, an exemplar of the past. It may be possible to discern and distinguish between essential and exemplary cultural resources if landscape is held as a constant; similarly if capitalism is held as a constant or common denominator (Purser 1999), distinctions among other variables can be compared and discussed at various scales of analysis. In this context, Hegel’s “unary feature” formulation intersects with present-day debates over essentialism and exemplarism (Schroeder and Landreau 2015) in the archaeological record under NHPA evaluation and assessment guidelines. How do we evaluate real, tangible, material objects and features with an abstract notion? How does an abstract notion such as ideology intersect with real, tangible, material objects and features of the archaeological record?

Assessing Integrity of Historic Properties

To qualify for the NRHP, a property must be significant; that is, it must represent a significant part of the history, architecture, archaeology, engineering, or culture of an area, and it must have the characteristics that make it a good representative of properties associated with that aspect of the past—an exemplarist notion (United States 1991:7). Ultimately, the question of integrity is answered by whether or not the property retains the identity for which it is significant (United States 1991:45). The answers to the following questions concerning an historic-era irrigation feature are useful when substantiating or providing a basis for significance:
• Can the feature be located on a current or historic map?
• Are there any historic-era photographs or images of the feature?
• Can the feature be located in a book or historic newspaper reference?
• Has the feature been recorded before either in the same place or a different place?
• Can you determine the feature’s construction date(s) or date(s) of use?
• Does the feature have ties to any other known resources, e.g. a dam, canal, lake, or river?
• Does the feature appear to contribute to a broad pattern of history, such as a federal irrigation project—or did it serve just one farmer’s fields?
• Is the feature named after the land owner who created it? Does the resource have a proper name or number? (Schroeder and Landreau 2015a, 2015b)

A follow-up question has import in the evaluation process: Is the historic-era irrigation feature in use or capable of being reused? If the answers to some or all of these questions are, yes, then the resource has significance and more often than not retains several Aspects of integrity.

Integrity is based on significance, i.e. why, where, and when a property is important. Only after significance is fully established can one proceed to the issue of integrity. The evaluation of integrity is oftentimes a subjective judgment, but it must always be grounded in an understanding of a property’s physical features and how they relate to its significance. Historic properties either retain integrity (that is, they convey their significance) or they do not. To retain historic integrity a property will always possess several, and usually most, of the aspects. The retention of specific aspects of integrity is paramount for a property to convey its significance—an essentialist notion (United States 1991: 44). The seven Aspects of integrity are: Location, Design, Setting, Materials, Workmanship, Feeling, and Association (United States 1991:44–49). The seven aspects are fairly straightforward in definition, yet “integrity is very much in the eye
of the beholder, and it is possible to get into some pretty esoteric arguments about whether a place has it or doesn’t” (King 1998:67), particularly when justifying or refuting such subjective Aspects as Feeling or Association. Significance and integrity may be and often are more in the eye of the beholder. Ample documentation, substantiation, and justification is necessary; purely personal feelings or opinions are not valid on their own merit or as a priori proof of significance.

A philosophical problem arises wherein a CRM consultant or sub-contractor finds a property or resource to be lacking in integrity and a state, federal, or tribal agency concurs with this finding. It is very likely that the property or resource will be found ineligible to the NRHP, and a ground-disturbing activity may proceed without having to go through mitigation of adverse effects or endure a lengthy National Environmental Policy Act (NEPA) environmental impact study. Many see this is a shortcut to project approval and as a result (or as a precursor) evaluation and assessment of significance is only superficially performed and is biased towards insignificance. Irrigation systems have fallen prey to shortcuts and fast-tracking for decades.

Out of the integrity continuum a conundrum develops: when there are numerous cultural resources of a certain type, some of them can be removed and there is not a significant loss to history or culture; there are still plenty of examples including the best surviving examples. As time progresses and more resources are removed, the preservation community begins to rumble with concerns about impending threats to valuable cultural resources, history, and cultural identity. Soon thereafter integrity becomes a pivotal aspect, and resources that had marginal integrity gain more currency and value because they retain the essence of the past and cultural identity vocal participants in the present wish to see retained for future generations. When there are only a few surviving examples of a certain type of cultural resource, attention towards the identity, integrity, and ideology the resource exemplifies becomes increasingly important.
Depicted another way, the significance continuum looks something like Figure 43. This diagram has the continuum on a vertical not a horizontal axis. This is intentional.

FIGURE 43. Diagram of competing paradigmatic approaches to NRHP eligibility (Schroeder and Landreau 2015b).

Exemplary cultural resources are by their very nature valued more than ubiquitous, common, or mundane resources. The NRB15 purports to evaluate all resources equally, but a resource will always be in an antagonistic position somewhere between the exemplarist and essentialist poles.

This brings up a pertinent research question: Can appurtenances and features be evaluated quantitatively and qualitatively so as to arrive at a more empirical and less subjective recommendation regarding a resource’s eligibility for listing on the NRHP? The short answer is a qualified, yes; there will always be a degree of subjectivity in the assessment and evaluation
process; it is inherent. In order to address irrigation network features fairly based on each individual ditch’s features’ characteristics, one ought to consider how each individual feature or appurtenance meets or does not meet NRB15 standards of integrity and inclusion even though the AHD directs us to consider the whole before the sum of its parts. One may (and potentially should) evaluate each individual feature or appurtenance of a water delivery system based on its exhibition or demonstration of any or several of the seven Aspects of integrity and thereby assess them according to Trost’s four-tiered rubric (Trost 2011:23).

Schroeder and Landreau (2015a; 2015b) have attempted to influence proactively the evaluation and assessment components of the Section 106 process in the State of Washington regarding federally built irrigation networks by addressing the individual features and appurtenances before addressing the whole of each network (contra Hardesty and Little 2009:99; Hubber et al. 1996:8). The authors have incorporated a qualitative-quantitative schema to address material or physical integrity of irrigation network features and appurtenances. Schroeder and Landreau (2015a, 2015b) converted the language of Trost’s (2011) four-tier rubric and schema to numbers: first-tier contributing elements are unequivocal cultural resources eligible to the NRHP on their own merit, i.e. completely or nearly completely original and intact, and typically include large-scale structures such as dams, powerhouses, spillways or wasteways, and pumphouses; second-tier contributing elements including laterals, ditches, medium- and small-scale turnouts and diversions that retain 50% or more of their original materials and workmanship whereby they are easily perceived as part of a historic irrigation network even if relict; third-tier elements may be medium- or small-scale features that retain less than 50% original materials or workmanship and yet still evoke a look and feel of the historic irrigation network; fourth-tier
elements are features of large-, medium-, or small-scale composed of modern materials too recent to be considered historic unless exceptional criteria are met (United States 1991).

A critique of this schema could be the arbitrariness of the 50% threshold. Could the threshold be 80% or 25%? Any threshold is arbitrary. Given the AHD guidelines already in effect, it seems appropriate to translate words into percentages that are equivalent as much as possible. This ambiguity begs clarification and guidance for best practices. The 50% threshold is useful. If an historic resource, i.e. an irrigation network, is composed of multiple parts (elements) and each element retains more than 50% original materials, is in use or has the capacity for reuse, then the resource embodies exemplary aspects and qualities of integrity. Alternatively, if an historic resource, i.e. an irrigation network, is composed of multiple parts (elements) and each element retains less than 50% original materials, is in use or has the capacity for reuse, then the resource essentially embodies the look and feel of an historic-era resource, but does not retain or embody exemplary aspects and qualities of integrity. Simply put, if 50% or more of elements of a resource embody 50% or more exemplary aspects and qualities of integrity, that resource should be recommended eligible to the NRHP; if 50% or less of elements of a resource embody 50% or more exemplary aspects and qualities of integrity, that resource embodies essential characteristics and may be recommended eligible; if 50% or less of elements of a resource embody 50% or less exemplary aspects and qualities of integrity, that resource would not be recommended eligible to the NRHP. This schema is not a perfect science, but it has been efficacious in experimental application. To date, Schroeder and Landreau have been successful in assessing and evaluating six large-scale federally built pumped irrigation lateral systems in Central Washington (Schroeder and Landreau 2015a) with plans to assess and evaluate more in the near future. But what about non-federally built irrigation features and networks?
What if an irrigation system or network was privately (or cooperatively) built on a parcel or parcels of a historic-era farm, field, orchard, or vineyard? What if the network or system was abandoned in the historic period and the irrigation features were left in place and unchanged for at least 50 years? A “vernacular” water delivery system may have many of the same features and appurtenances of a federal water delivery system, but the main water conveyance feature is unlined, earthen, and open-air (i.e. a ditch). The same schema can apply.

The State of Wyoming follows a protocol between the state and the Bureau of Land Management (BLM) in which certain resource types are considered non-contributing. Indeed, utility lines, pipelines, stock dams, troughs, and associated windmills, elevation/bench/section markers, rip-rap, isolated motorized vehicles, appliances, and mobile homes, fences and enclosures, unnamed two-track roads, water/gas wells, and water control channels, laterals, spreaders, canals, and ditches that are not designated by name on the USGS Topographic maps. Appendix B of the Historic Context Development Plan for Wyoming (HCDPW; Wyoming 2006; Appendix B) contains summaries of historic contexts not yet developed. Appendix B of the HCDPW lists irrigation networks that the state had already prioritized as significant including federally-constructed irrigation networks. In 2006, water development and irrigation were ranked fourth in priority below contexts such as the Southern Wyoming Transportation Corridor, Hunter-Gatherer archaeological sites, hardrock and softrock mining, and historic schools among other topics (Wyoming and BLM 2004:5–6). In 2016 the list was revised in cooperation with the Historic Context Development Advisory Committee and now has five priorities. In the revised list, irrigation and water development were listed under Priority 4 (Wyoming 2018).

One may presume that irrigation networks not listed were and are still not considered priorities or “as significant” as those listed. In either scenario, it is clear that irrigation is a lower
priority in the state of Wyoming than other cultural resources and federally-constructed irrigation networks appear to have a higher priority or ranking over vernacular or farmer-built irrigation networks. As a result most vernacular irrigation networks will go undocumented, unevaluated, and unassessed because they are considered non-sites unless the AHD is challenged and significance is re-evaluated. This dissertation chapter is an effort to urge the dialogue concerning the significance of vernacular irrigation networks in Wyoming.

Another philosophical problem emerges: if an irrigation ditch, lateral, sublateral or appurtenance is a landscape feature, it can be recorded as an historical archaeological feature-site in Wyoming according to the AHD. But according to the AHD, these features are also non-sites. How can this disparity be reconciled? The relevant clause reads:

… unless any of these property types exhibit significant architectural or engineering features, or are associated with a National Register-eligible site or district (either within the boundary, or clearly related to the significance of a NRHP-eligible site or district).

[Wyoming 2012:1–2; Wyoming and BLM 2012:1–2]

This clause allows for features such as irrigation laterals and appurtenances to be included as contributing elements to historic districts if and only if they can be associated and found significant. Rills, if extant, would be rare and should be assessed and evaluated for their integrity. More often than not, actual rills will have been plowed under or will have naturally smoothed out across a field after 50 years or more, but they may still be visible in LiDAR imagery, and that is something to consider.

It should be noted that the AHD concerning cultural resources in GTNP is tripartite having definitions and protocols coming from the NPS, BLM, and the State of Wyoming. The State Protocol between Wyoming and the BLM does not appear at first glance to have any
bearing on decisions made by a National Park, yet the AHD of the State of Wyoming includes multiple voices (Wyoming 2012:1–2; Wyoming and BLM 2012:1–2; Wyoming Bureau of Land Management and State Historic Preservation Office 2014). The BLM is a major land management agency in the State of Wyoming; the United States Forest Service (USFS) is another major federal land management agency in the state. That said, these two federal agencies have and continue to exert an influence on the definitions and praxis of CRM within the state. The State of Wyoming has adopted many definitions, protocols, and criteria from the BLM. Cultural resources located in GTNP are technically within the State of Wyoming. The WYSHPO recording and reporting standards are the official format through which cultural resources are recorded and reported in the state. Ultimately, within GTNP boundaries, cultural resources and their disposition are under the purview and aegis of the NPS; the Park can make the final determination of eligibility or outline mitigation measures for adverse effects in consultation with the WYSHPO.

Matters of ethics and professionalism, i.e. eupraxia, enter into the equation and process of doing CRM compliance work. CRM professionals comply with the rules and regulations of how assessments and recommendations are made, but they have less authority than state, federal, or tribal agencies to decide the outcome—consultants are not regulators; consultants may only recommend a resource be found eligible. CRM professionals tasked with making the assessments of cultural resources have the least power to determine eligibility. Does any CRM consultant have any influence whatsoever in the AHD? Unless an historic context becomes available for CRM professionals to identify, assess, and evaluate irrigation networks other than federally-constructed ones, few if any vernacular irrigation networks will be considered by CRM professionals as eligible to any local, state, or national registers. By pointing out some of the
problems of the current AHD in praxis and by providing guidance concerning the identification and assessment irrigation ditches, laterals, and sublaterals based on quantified essentialist and or exemplary qualities especially at the state- and local-levels, this dissertation hopes to help alleviate some of the decision-making difficulty of evaluating and recommending irrigation features for eligibility for listing on the NRHP in the future.

The NPS Thematic Framework: Theme VI. Expanding Science and Technology contains four topics: “1.) Experimentation and invention; 2.) Technological applications; 3.) Scientific thought and theory; and 4.) Effects on lifestyle and health” (Hardesty and Little 2009:23). Fences, settlement plans, temple architecture, dams, and irrigation networks are all ‘technological applications’ that have implications for evaluations of historic landscapes. The author firmly believes that the irrigation technology employed at Mormon Row is a prime example of the significance irrigation networks can have to local, state, and national history, a case study that others working in the Intermontane West could follow. The remainder of this dissertation will endeavor to resolve the research problem presented in Chapter I.
Significance and Conclusion

Now that major and minor irrigation features have been situated within the Washington and Wyoming State AHDs, attention will again be returned to irrigation technology, the MIP, for a re-test using Žižek’s criteria. In the final analysis the MIP is situated in relation to the Self and “the big Other” in order to reveal whether or not the MIP, a metapattern (*sensu* Bateson 1978), is the OMIDAR.

Preliminarily speaking, the systematic controlled flow of irrigation water appears to have facilitated the growth and defined the boundaries of the Grovont, Wyoming community, Antelope Flats, and the Dry Farms vernacular area (i.e. the areas north of the Gros Ventre River, the area north of Ditch Creek, the area west of the foothills of the Mt. Leidy Highlands and Shadow Mountain, and the area north, south, and east of Blacktail Butte within the GTNP) and the Mormon settlements along the Little Colorado River in Arizona. Systematic controlled flow of irrigation water is evident in a pattern provisionally referred to here in this dissertation as an MIP. This MIP metapattern (*sensu* Bateson 1978) represents a technology that appears to satisfy Leone’s criteria even though he did not consider irrigation features above a prime factor. It is time to test irrigation technology against Žižek’s rubric and discover whether the MIP, a metapattern (*sensu* Bateson 1978), is the OMIDAR. The final test will run in reverse; did or does the technology, the MIP, hide “impossibilities, and deficiencies, and antagonisms in daily life, or in society within capitalism” (Leone 2010:209)? But first another excursus is necessary to situate irrigation technology in the fullness of time.

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294.
Lowry Nelson observed:

The canals and roads [Mormons] built so arduously a century ago, would be relatively simple tasks with the heavy grading machinery and high powered tractors of today. To them these tasks seemed—and were—immense. But they performed the pioneering job in spite of odds, built their villages and towns, their schools and meeting houses, tabernacles and temples in the desert, and turned barren wastes into fruitful valleys. [Nelson 1952:xiii]

Nelson’s observation can be found, albeit provisionally, in another context—Mesopotamia in antiquity—in the *Hydraulic Hypothesis* (Steward 1955; Steward et al. 1955). In short, the size of the population affected the rate of interpersonal contact people had with one another and the complexity of social stratification was a direct result. Leone echoed Steward’s finding that:

The primitiveness of the irrigation system kept the population so low, and two-thirds to three-quarters of those who stayed [in the Little Colorado River settlements] were supported by the irrigation system. The paradox is that the system would not have functioned at all without periodic washouts. [Leone 1979:100]

The paradox to which Leone alluded is not a paradox. It is a conundrum—a complex and difficult ecological problem that requires vigilant attention. Vigilant attention here is equivalent to maintenance. Maintenance requires labor and laborers and irrigation requires vigilant labor to ensure that water flows to its intended destination. Thus the conundrum is resolved or is a non-issue as long as irrigation system elements were or are maintained. Thus clearing out the system after dam washouts is not a paradox, it is pragmatism. More to the point, as Leone pointed out in 1974, Mormons sacralize(d) all that they touch or touched. Thus ditch maintenance is not simply labor, it is God’s work. In this way Mormons engaged in the redemption of the Earth in advance
of The Rapture were and continue to be engaged in doing God’s work transforming *terra nullius* into capital into holy land with their hands and hearts. Feige found a similar articulation:

> Deceptively simple in theory, prior appropriation embodied the individualist and capitalist values of a society intent on exploiting and developing the western public domain. Under the law, irrigators attempted to treat streams like “natural resources,” raw materials that people could manipulate, possess, and transform into wealth. Prior appropriation and water rights ostensibly divided a stream into units that belonged to farmers, who turned the water into food and dollars. The doctrine allowed irrigators to negotiate between nature and the market, to translate a wild substance into private property. [Fiege 1999:87–88]

This is not dissimilar to the work of Maurits Ertsen (2012). Ertsen used hydrological and hydraulic modelling to re-examine the *Hydraulic Hypothesis* (Steward 1955; Steward et al. 1955). Of interest to Ertsen was the work of Eva Kaptijn (2009).

Kaptijn traced evidence of irrigation practices regressively through Mamluk period to Iron Age to Early Bronze and Late Chalcolithic settlements in the Zerqa triangle region of the Jordan Valley at a landscape scale. Kaptijn had environmental archaeological data from archaeobotanical samples of crops that could not have been cultivated without irrigation (2012:48-49). Ertsen re-presented a schematic map of 19th and 20th century irrigation canals from Kaptijn (2009:307) that has implications for the MRHD (Figure 35). There is an implication that the original inhabitants of the Zerqa triangle transformed ‘wild substance’ into an irrigated landscape, a kind of tribal property managed by relatively small groups of people in antiquity and in the historic period (Ertsen 2012; Kaptijn 2009).
Whereas there was a Native American presence in the GYE in prehistoric and protohistoric times, there are no known uses of irrigation technology by Native Americans in the GYE or the Snake River Valley; there is a known Native American presence in Leone’s Little Colorado River study area in prehistory and a suggestion that the Mogollon may have utilized irrigation technology (Leone 1968). That the Mormon settlers of the northern floodplain terrace of the Gros Ventre River and the Ditch Creek alluvial fan in Jackson Hole, Wyoming in the late 19th and early 20th centuries capitalized on two geothermal springs is not only pragmatic but significant. Without regulated irrigation, subsistence crops could neither have been grown at Grovont, Wyoming during the 90-day growing season in an alpine climate nor could crops have been grown in the arid near sea-level Zerqa River alluvial fan with a 100-day growing cycle during winter. The Mormon settlers along the Little Colorado River study area in Arizona are not known to have capitalized on geothermal or other spring water sources, but did draw water from turnouts on the river and behind dams which periodically washed out (Leone 1979). Thus it can be said with a degree of confidence that the irrigation networks of the settlers of all three places were engaged in a much broader historical pattern than the pattern of parallel in-field irrigation sub-laterals would suggest on the surface (sensu O’Connor 1998).

To repeat: “there is a class of modern religions which is oriented to change and as such is to in tune with the varying demands placed on adherents that the religious system changes as the rest of the culture changes” and as such the “rituals of Modern Religion have systematic empirical effect on the natural world by making the content of the rituals the practical problems of the day-to-day world of adherents” (Leone 1974:723) thus “ritual is embedded in ecology and facilitates the distribution of resources critical to survival” (Leone 1974:726). “Mormons actively create their own private understanding of [theology], and its meaning is not challenged. This
highly idiosyncratic interpretation meshes completely with the personal flexibility adults need to exploit the changeable environment in which they must live and survive” (Leone 1979:193). Moreover, “Mormonism’s unique survival value resides in its ability to impose the religious system on, to sacralize … whatever its people touch” (Leone 1974:730). “Ritual activity usually has an immediately sacred end, and for Mormons all pragmatic matters aimed at redeeming and building up the earth were sacred by definition” (Leone 1974:732).

One ought to accept Mormonism “as is” and not attempt to analyze or explain it in contexts other than Mormon (Leone 1977:44). Mormons regard their church “as true” (Leone 1977:56). Mormons “built stability out of instability, not by denying it, but by maximizing it” (Leone 1979:25). In Leone’s conception of Mormon salvation time, everything always will have been exactly as it is (supra); “there was no creation, for God and a part of everyone’s personal being always existed and will continue to exist into the infinite future” (Leone 1979:29).

Both God and man are subject to the natural processes of the universe, and both cooperate, under these constraints, to improve man’s estate. This cooperative process is called the Plan of Salvation. According to the plan, God gave mankind life with rules to live by (the gospel), a redeemer to atone for their sins (Christ), and an opportunity to achieve God’s glory. The ultimate goal of salvation is not to unite with God in the usual Christian sense but to become godlike. [Leone 1979:31]

Mormonism “is a religion for subordinates which serves to maintain their condition intact” (Leone 1979:vi). Despite the fact that archaeological records shows that the spring has flowed for thousands of years, the local legend of the origin of “Miracle” Spring is a testament to Mormon faith—both are truths; both are valid within their respective contexts.
Much like it is imagined to have been in the time of Christ, modern Mormon settlers and farmers took turns tilling, planting, and tending the Earth towards righteous redemption. They pooled their collective labor power and harvested the fields, and “[v]irtually everyone, including women and older children, took part” (Fiege 1999:133). James Budge and family, Thomas Hanshaw, Nels Hoagland, Albert Nelson, William S. Kissinger, Frank and Roy McBride, Frank Sebastian, Fred Lovejoy, Martin and Joe Henrie, and others followed suit, each receiving 160 acres or more after improvements and or irrigation ditches were dug. Thus, those who were able to bring about landscape transformations such as digging irrigation ditches were in advantageous positions to claim land as well as support themselves and their brethren (White 1991:401). Thus the Mormon Row project was predicated on the irrigation ditches the settlers created through individual, family, cooperative, and or community effort (i.e. labor). Thus, irrigation “hides the impossibilities, and deficiencies, and antagonisms in daily life, or in society within capitalism” (Leone 2010:209) in the historic period as it did in antiquity. This much has been established.

Now on to the next criterion: the “index or circulating object, one that is known to exist or have existed, and requires a structure be created to understand it” (Žižek 2008:177–263).

Ecologically speaking, irrigation networks circulated and continue to circulate water as part of the Earth’s hydrological cycle. Given that the water was ‘free’ yet required vigilant labor to make it work, an irrigation network was and is a circulating object that functioned and continues to function in the daily life of Mormon yeoman farmers and frontier settlers as well as farmers today while masking its role in capitalism. When there was and is enough water, irrigation technology facilitated and continues to facilitate the growth of fodder crops. Harvested hay became and becomes a commodity that acquired a value derived from the labor invested in the construction and maintenance of the irrigation network, the time and labor planting and
harvesting (communal efforts performed by Mormon communities), and the use value the hay generated or generates when it was or is consumed by livestock. Fodder crops fed and continue to feed livestock that were and are sold at market (capital); dairy cattle produced and produce dairy products the surplus of which was and is sold for cash or exchanged for other commodities. Similarly, tithed vegetables and other perishables were and are first and foremost for the survival of a Mormon community; any surplus commodity that could have been sold on the open market for cash or exchanged for other commodities including labor was or is presently. Tithing and the sale of commodities facilitated and continues to facilitate community participation in regional and world capitalism (even if only marginally) while benefitting the entire Mormon community nationally albeit in a continual and subordinate role to the U.S. federal government. The labor invested in building and maintaining irrigation networks was and is simultaneously God’s work and ecological pragmatism. Because the object, the piece of technology under scrutiny here)—a pattern of closely arranged parallel irrigation sub-laterals visible at a landscape-scale provisionally referred to here as an MIP—is qualifiable and quantifiable and is both active and passive like an agent, these qualities permit irrigation technology to be a material object and an index.

Since their arrival to the Intermontane West beginning in 1847, Mormon reclamation of arid lands anywhere and everywhere practicable in the American West via ritually and hierarchically managed irrigation networks was the sublime technological element necessary for community survival (Leone 1979). Irrigation networks built by Mormons in the 19th and early 20th centuries are “large, unattractive objects left over or resultant from the past of which we are all aware” (Leone 2010:209) yet hide in plain sight so well that they are mistaken for natural streams (Fiege 1999). This is slightly problematic, but there is a common denominator in this
illusion: both are known to contain water, ideally flowing water. This makes irrigation features Mercurial and mysterious. When we look at an irrigation ditch we see ‘too much of it’ while not seeing all of it. Once again, the problem is “not that of how to grasp the multiplicity of determinations, but rather of how to abstract from them, how to constrain our gaze and teach it to grasp only the notional determination” (Žižek 2008:x–xi; emphasis in original).

We see a technological object, a feature, its engineering, its shape and size when our eyes are trained. We see it either with or without water; flowing or standing water. We see only a segment of it (Figure 44). This is the real problem. Rarely does one see more than a segment of an irrigation ditch or a lateral at one time. Rarely is the entire irrigation network from its headgate or source to its distributary channels in fields visible at one time in one place. Irrigation networks are visible in their entirety in GIS.

Returning to Mormon dam re\construction, Leone links dams and the irrigation network of water distribution, but the irrigation network is regarded merely as a ‘prime factor’ and not as central as the dam. Leone argued that, “it is necessary for technological determinists … to come to grips with the dynamic connection between the two halves of any piece of technology” especially when “examining the connection between technology and belief” (Leone 1979:87). Once again, “all pragmatic matters aimed at redeeming and building up the earth were sacred” (Leone 1974:732). Thus, through righteous redemptive labor and irrigation technology, Latter-day Saints transmogrified terra nullius frontier environments into sacred landscapes and capital. Sanctified earth set apart from common ground is holy land.

Are irrigation networks, here the MIP, “large, unattractive objects left over or resultant from the past of which we are all aware” (sensu Žižek 2008)? The answer is a qualified, yes.
FIGURE 44. An irrigation ditch lateral in its natural environment in Grand Teton National Park (a) (Photo by author 2017).

It may not be readily apparent to untrained eyes the engineering and technology necessary for an artificial feature such as an irrigation ditch to exist, but it is readily apparent what it does; it conveys water from one place to another to grow plants, fodder in particular. Now that the problem has been resolved in GIS using LiDAR imagery and other forms of remote sensing in a phenomenological landscape archaeology perspective, the sum of irrigation’s parts can be reckoned with more holistically as a unary concept at a landscape scale (Llobera 1996, 2001, 2012). Because landscape is a structural synthetic abstraction, it provides a unifying concept for contrasting perspectives (Crumley and Marquardt 1990). Irrigation technology is real, material, yet it is difficult to quantify, qualify, or depict because of its varying scale.
Ditches are literally mundane, as in, of the world, of the earth. Irrigation canals, ditches, laterals, parallel sublaterals, and rills are physical, material ruptures in the surface of the Earth; they are also void spaces unless “filled” with flowing water. Standing water does not do work except in the case of a reservoir impoundment behind a dam that captures potential energy for future use as flowing water.

Irrigation ditches are larger than sublaterals and unattractive objects left over or resultant from the past which we are all aware of, yet hide in plain sight. The technology of irrigation incorporates void space to distribute water using gravity and gradient across a landform to facilitate the growth of vegetables, grains, and or fodder to feed humans and or livestock which by extension participate or participated in capitalism in one manner or another. An irrigation canal, ditch, lateral, sublateral, or rill is an artificial rupture in the Earth’s surface. As artifice, irrigation is a foil because it is made by humans to mask their true identity. Irrigation features circulated or continue to circulate water within the daily lives of Mormons while simultaneously revealing and hiding its role within capitalism (Žižek 2008) so well they are sometimes mistaken for God-given natural features (sensu Fiege 1999).

In Leone’s oeuvre, the irrigation system or network is a significant factor but does not play the starring role in the over-all ecological ritual that is integrated into Mormon ideology or earthly redemption. If irrigation is so integral to a.) the re-creation of New Zion and b.) subsistence and survival in precarious environments, the true role and worth of irrigation required (and still requires) hiding behind complex ecological rituals and esoteric beliefs so that economic exchange values were generated. The main source of security for the production of basic commodities—vegetables, fruits, grains, fodder, and livestock—was and always will be water. It is well that such a valuable resource is hidden from plain sight. Based on the evidence
presented so far in support of irrigation as a potential OMIDAR, the MIP meets all of Žižek’s criteria (Table 2).

TABLE 2
IRRIGATION TECHNOLOGY TESTED AGAINST ŽIŽEK’S CRITERIA

<table>
<thead>
<tr>
<th>Žižek’s criteria</th>
<th>Irrigation</th>
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<tbody>
<tr>
<td>Void or absence</td>
<td>Yes</td>
</tr>
<tr>
<td>Resultant from the past</td>
<td>Yes</td>
</tr>
<tr>
<td>Of which all are aware</td>
<td>Yes</td>
</tr>
<tr>
<td>Circulation in capitalism</td>
<td>Yes</td>
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</tbody>
</table>

Because the object, the piece of technology under scrutiny here—the MIP—is qualifiable and quantifiable and is both active and passive, these qualities permit irrigation technology to be a material object and an index. Irrigation is simultaneously a void, a deficiency, a technology from the past that is recognizable and something all are aware of at least conceptually. This can be explained. Irrigation is a technology people are aware of yet rarely does one see more than a segment or a portion of an irrigation network in person at the ground level at one time unless one endeavors to walk every inch of the network. There is a ideational disconnect or gap that emerges between the empirical experience of seeing a segment of an irrigation network and then seeing the entire network projected on a map or a computer monitor; the same is true in reverse, going from LiDAR imagery to the feature can be jarring. In this context the MIP is a phenomenal metapattern (sensu Bateson 1978) and an apt candidate as the OMIDAR.
Leone was only partially successful when he singled out the ideal Plat of the City of Zion because the City of Zion, as it was originally envisioned, was never fully actualized (Francaviglia 2015). This makes the Plat of the City of Zion a type of void or deficiency within Mormonism in general (sensu Žižek 2008). Because the ideal City of Zion was never fully actualized, it is not an unattractive material leftover, though it may persist in the minds of the Mormon faithful. The City of Zion does not materially exist yet it may exist symbolically and ideologically where it circulates conceptually within capitalism. Thus the ideal City of Zion is closer to Slavoj Žižek’s concept of the ‘object petit a,’ something that is a byproduct of human consciousness and needed to fill a void. The ‘object petit a’ is something sometimes best left in ignorance and not confronted in reality otherwise the lattice of illusions might crumble and fall. If this is the case, what remains is a desire to desire something beyond the here and now, a jouissance, and that keeps Mormon subjects engaged in a deliciously anticipated wish (sensu Žižek 2008) in salvation history. Mormonism holds that, “life has neither beginning nor end but is a continuous existence which always was and ever will be … which each Mormon has the ability and right to know and interpret” (Leone 1979:9).

Joseph Smith and Brigham Young encouraged 19th and early 20th century Latter-day Saints to fill a conceptual void—the City of Zion—with a New Zion anywhere and everywhere practicable (Leone 1979:28). If, according to the Book of Mormon, a Mormon is an embodiment through whom God speaks, then a Mormon is or has the potential to become an inter-item Saint through righteousness and strict adherence to the faith. Indeed,

God’s elect, in these latter days, exist because they please God. The Lord suffers them to exist because they continue to please him. In all millennial movements the imminent Second Coming of Christ meant that a group, for whom he was explicitly to come, was to
prepare the way for that coming. The preparation of that way was in the hands of those specially chosen by God for the task. The task was enormously difficult because it was two-sided. The earth had to be changed and prepared for its redemption by God’s more recent elect. But the very process of preparation was a demonstration by his elect that they themselves were worthy of the Second Coming. … Just as the desert of the original Zion was made green under the ministration of God’s elect, so the new Zion, also in a desert, was to be subject to an identical process. [Leone 1978:198]

In this view, a righteous Mormon’s life-work is also God’s-work. Earthly redemption and righteous living are therefore fundamental to Mormon culture.

In Žižek’s examination of ideological objects, he wrote about presuppositions such that:

Here we should rectify – or, more precisely, supplement – our previous analysis: the empty gesture, the act of formal conversion by means of which ‘substance becomes subject’. Is not simply dispersed among the multitude of subjects and as such proper to each of them in the same manner; it is always centered at some point of exception, in the One, the individual who takes upon himself the idiotic mandate of performing the empty gesture of subjectivation – of supplementing the given, substantial content by the form of “this is my will”. This is homologous with Christ: the subjects overcome the Otherness, the strangeness, of the Jewish God not by immediately proclaiming him their own creature but by presupposing in God himself the point of ‘incarnation’, the point at which God becomes man. This is the significance of Christ’s arrival, of his ‘It is fulfilled!’: for freedom to take place (as our positing), it must already have taken place in God as his incarnation – without it, subjects would remain for ever bound to the alien substance, caught in the web of their presuppositions. [Žižek 2008:261–262; emphasis in original]
This passage is taken to mean, for Mormons, there are certain key presuppositions: that salvation history is real; that Latter-day Saints are indeed saints, as in holy and of God; that Christ is the One; that New Zion is a work in progress; and that The Rapture is ever-anticipated.

The social organization and principles of Mormonism (Leone 1979) permitted and continue to permit them an ideological freedom precisely because of their ‘web of their presuppositions.’ This web, or in Leone’s terms, a cycle of causation, was presented graphically in a flow chart (Figure 1; Chapter I). In Figure 1, cause is at the center of the cycle. Ideology and technology revolve reflexively around a causative agent. The difficulty for Leone has been in identifying and locating the causative agent. If the OMIDAR—New Zion reified in the MIP—is substituted for the causative agent, then the work that irrigation networks have done and still do to transmogrify terra nullius Earth into an edenic holy land in the Intermontane West of North America is the agency. But first, humans had to build the irrigation network that does the work of earthly redemption. In this way, a Mormon’s righteous life-work is, once again, God’s-work in the transformation and transmogrification of terra nullius natural environments into an edenic holy land, a New Zion, which is a materialization of worldview. Irrigation sustained and continues to sustain Mormon ideology as a causative agent; this is graphically represented in Figure 45.

Leone made the claim that, “[t]he land of the saints really was going to bloom and, by God, it did. And it bloomed because they used fences” (Leone 1978:198). This liturgical allusion and the original text is worth presenting here so that the ideological aspects of the significance of Leone’s claim can be reckoned with according to the phenomenological and psychological perspectives employed thus far in this dissertation.
FIGURE 45. Flow charts of the cycle of causation related to irrigation and Mormon ideology (Diagram by author 2017).

In *Great Are the Words of Isaiah*, Monte S. Nyman (1980) compiled a chart of Isaiah citations and variants found in the *The Doctrine and Covenants of the Church of the Latter Day Saints: Carefully Selected from the Revelations of God* (Smith 1835). In “The Book of the Prophet Isaiah”, Chapter 35:1–10 says:

In the day of restoration, the desert will blossom, the Lord will come, Israel will be gathered, and Zion will be built up.

1. The wilderness and the solitary place shall be glad for them; and the desert shall rejoice, and blossom as the rose.
2. It shall blossom abundantly, and rejoice even with joy and singing: the glory of Lebanon shall be given unto it, the excellency of Carmel and Sharon, they shall see the glory of the Lord, and the excellency of our God.

3. Strengthen ye the weak hands, and confirm the feeble knees.

4. Say to them that are of a fearful heart, Be strong, fear not: behold, your God will come with vengeance, even God with a recompence; he will come and save you.

5. Then the eyes of the blind shall be opened, and the ears of the deaf shall be unstopped.

6. Then shall the lame man leap as an hart, and the tongue of the dumb sing: for in the wilderness shall waters break out, and streams in the desert.

7. And the parched ground shall become a pool, and the thirsty land springs of water: in the habitation of dragons, where each lay, shall be grass with reeds and rushes.

8. And an highway shall be there, and a way, and it shall be called The way of holiness; the unclean shall not pass over it; but it shall be for those: the wayfaring men, though fools, shall not err therein.

9. No lion shall be there, nor any ravenous beast shall go up thereon, it shall not be found there; but the redeemed shall walk there:

10. And the ransomed of the Lord shall return, and come to Zion with songs and everlasting joy upon their heads: they shall obtain joy and gladness, and sorrow and sighing shall flee away. [Isaiah 35:1-10; Smith 1835:49:24]

Verse 7 says that ‘for in the wilderness shall waters break out, and streams in the desert; and ‘the parched ground shall become a pool, and the thirsty land springs of water,’ which harkens to the Mormon Row local legend of the origin of “Miracle” Spring. Terryl Givens, a Mormon professor of literature and religion, unpacked the phrase “a marvelous work and a
wonder,” a phrase used to describe *The Book of Mormon*, such that “wonder is the effect of novelty on ignorance” (Givens 2002:7). It is no wonder that the origin of “Miracle” Spring was for the Mormon settlers of Grovont, Wyoming a ‘miracle’ and ‘a wonder’ of legendary status; it was a gift from God for their righteousness before, during, and after the Kelly Flood. But to claim that the desert bloomed because Mormons used fences is absurd from a realist perspective: fences did not contribute to the blooming of anything; water did, does, and always will. Leone’s meaning is taken here metaphorically as I believe it was intended. Indeed,

A Mormon who creates something green has shown his inner state. In this context, fences are valuable because of what they preserve behind them. What they preserve in addition to a subsistence base is a man’s right to a place in the Kingdom of God. [Leone 1978:198–199]

It is increasingly clear, now and however, that it was and is not fences, rather it is what is ‘behind them’ that was and is important ideologically and economically—water and irrigation ditches.

According to Žižek (2008), ideology attaches itself to the essence of *jouissance* and is always an excess beyond the lived experience of faith, labor, and suffering in the pursuit of ideological desire. *Jouissance* is peculiar. *Jouissance* means enjoyment in French, but it has a shadow side. Life should contain joy; *jouissance* entices and entrains humans to seek good in the here and now as well as the future. There is, however, a threshold beyond which the pleasure of the pursuit of happiness or the good becomes suffering. This results, paradoxically, in a pleasure in pain and suffering. Not only is there a threshold that reveals itself to us as a point after which there is a diminished return on the original investment in pleasure, there is also a satisfaction in achieving a level of suffering beyond the normal tolerance or threshold, a badge of honor of sorts. Those Mormon pioneers who endured several and serious trials, travails, and tribulations
on the wagon routes to the Great Basin bore and continue to bare testament to the faith and belief in a better world to come. There is also a suffering due in part to an excess zeal and desire to create a utopia while there exists the potential impossibility of ever realizing it, e.g. the City of Zion. This also applies to settlers and farmers who experienced droughts; droughts are beyond the hubris and control of humans and could be interpreted as punishment for sins or yet another test of the faithful depending on the circumstances. There are other examples of suffering.

In this articulation of pleasure and pain, the moment a person, a Subject, realizes that his or her existence and jouissance is contained and held beneath a mask of ideology, a momentary release from needless suffering can begin. In this articulation the sublime object of ideology is phenomenal and real; it is a fantasy wish and a reality that is simultaneously mediated through joy and suffering. This rather simple (yet psychologically complex) utility is one way in which ideology functions in the daily lives of subjects. Because an ideology, a system of beliefs or Lacan’s “the big Other,” an immaterial structure or collection of social conventions, codes, norms, laws, et cetera, is believed by its followers to be true (i.e. Mormonism exists simultaneously inside and outside of individual subjects), it serves to perpetuate Mormon society intact. Much the same can be said about Capitalism and its adherents. More, “the subject can ‘enjoy his symptom’ only in so far as its logic escapes him – the measure of the success of its interpretation is precisely is dissolution” (Žižek 2008:16) because, “belief … is definitely not to be conceived at a ‘psychological’ level: it is embodied, materialized in the effective functioning of the social field” (Žižek 2008:34); hence Mormon Saints are indeed saints. More, “[t]he mask is not simply hiding the real state of things; the ideological distortion is written into its very essence” (Žižek 2008:25).
If the preceding is true, then, “we find reasons attesting our belief because we already believe; we do not believe because we have found sufficient good reasons to believe” (Žižek 2008:35). Indeed:

It is this paradox which defines surplus-enjoyment [a plus-de-jouir]: it is not a surplus which simply attaches itself to some ‘normal’, fundamental enjoyment, because *enjoyment as such emerges only in this surplus*, because it is constitutively an ‘excess’. If we subtract the surplus we lose enjoyment itself, just as capitalism, which can survive only by incessantly revolutionizing its own material conditions, ceases to exist if it ‘stays the same’, if it achieves an internal balance. [Žižek 2008:54]

If ideology attaches itself to the essence of *jouissance* and is always an excess beyond the lived experience of ideological desire, then in the 19th and early 20th centuries the attachment to Mormon Doctrine (Smith 1835) and the desire to create a New Zion was, is, and always will be the Mormons’ *jouissance*. To prepare for The Rapture, Mormons settled together and built irrigation networks—actual, physical, material voids to redeem the earth literally and figuratively, actively and passively—that are embodied in lefts over from the past that participate(d) in daily capitalistic life.

By paraphrasing and making word substitutions to the following passage, In a kind of Hegelian twist, love does not simply open itself up for the unfathomable abyss in the beloved object; what is in the beloved “more than him/herself,” the presupposed excess of/in the beloved, is reflexively posited by love itself. Which is why true love is far from the openness to the “transcendent mystery of the beloved Other”: true love is well aware that, as Hegel would have put it, the excess of the beloved, what, in the beloved, eludes my grasp, is the very place of the inscription of my own desire into
the beloved object - transcendence is the form of appearance of immanence. As the melodramatic wisdom puts it, it is love itself, the fact of being loved, that ultimately makes the beloved beautiful, [Žižek 2012]

the resolution of the research problem is one step closer.

In a kind of Hegelian twist, [New Zion] does not simply open itself up … in the [Subject to be seen]; what is in the [Subject] ‘more than him/herself,’ the presupposed excess of/in the [New Zion], is reflexively posited by [faith] itself. Which is why true [faith] is far from the openness to the ‘transcendent mystery of the beloved Other”: true [God] is well aware that, as Hegel would have put it, the [New Zion], what, in the beloved, eludes [one’s] grasp, is the very place of the inscription of [Mormon] desire [for New Zion] - transcendence is the form of appearance of immanence. As the melodramatic wisdom puts it, it is [faith] itself, the fact of being [chosen], that ultimately makes the [Latter-day Saint holy].

If we perform word substitution once again–irrigation for New Zion–the passage reads:

In a kind of Hegelian twist, [irrigation] does not simply open itself up … in the [Subject to be seen]; what is in the [Subject] ‘more than him/herself,’ the presupposed excess of/in the [irrigation network-the OMIDAR], is reflexively posited by [faith] itself. Which is why true [faith] is far from the openness to the ‘transcendent mystery of the beloved Other”: true [God] is well aware that, as Hegel would have put it, [New Zion here on earth], what, in the beloved, eludes [one’s] grasp, is the very place of the inscription of [Mormon] desire [for New Zion] - transcendence is the form of appearance of immanence. As the melodramatic wisdom puts it, it is [faith] itself, the fact of being [chosen], that ultimately makes the [Latter-day Saint holy].
In the final analysis, Leone did identify irrigation’s importance but did not see it as an object perhaps because, unlike fences, settlements, temples, and dams, the whole object could not be seen. It appears that Leone failed to see what he purported Žižek failed to see: “Zizek couldn’t see” because “his combination of Marx and Freud didn’t allow him to see” (Leone 2010:213). This suggests that Žižek was blinded by Marx and Freud and could not see the truth behind either tautology; this may be because Marx and Freud were combined incorrectly in Leone’s interpretation; Žižek follows Lacan who followed Freud.

A close reading of Žižek reveals that he knew very well what he was breaking apart—the ‘spell of fetishizing abstraction’ concerning the sublime object of ideological desire. Žižek’s entire goal, his philosophical duty, was to deconstruct the construct while telling us along the way what he was doing, how, and why in order to ascertain the truth hidden behind the mask of ideological illusion. Leone appears to have missed the point behind the foil of positivist scientific methodology: that water, and by extension irrigation technology, was, is, and always will be the one and only way Mormons could have created a New Zion in the arid Intermontane West of North America in the 19th and early 20th centuries (or today). This is significant on several levels: materially, psychologically, and spiritually. This dissertation is a dissolution of Leone’s tautology. Such dissolution should not be attempted lest the entire lattice of structural-processual illusion crumble and fall. Luckily, the pieces fit back together with some “new glue.”

The purpose of this dissertation was to test the hypothesis that an OMIDAR which satisfies all of Leone’s and Žižek’s criteria either exists or does not. The OMIDAR must be identifiable and locatable in material form, but may not be readily visible to the observer, as well it should not be if it is indeed a mask for something bigger like an ideology. Through ‘a failure of symbolization,’ wherein it was known very well that ideology is an illusion, a foil, a
phenomenon was recognized for its potential to resolve the research problem and the test proceeded knowing fully well that which one seeks is “produced by the signifying texture itself” because “the process of searching itself produces the object which causes it: and exact parallel to Lacanian desire which produces its own object-cause” (Žižek 2008:180).

It is curious and humorous to note that before Leone discussed Žižek, he acknowledged the power of the seductive ‘vacuum created by not knowing how to discuss the origins of the earth, live, humanity, and it’s (our) accomplishments,’ (Leone 2010:97–98) an ideological void that Christianity fills or attempts to fill through ritual and belief. Science is muddied by theological topics because science cannot adequately explain phenomena, the disavowal that believers permit themselves in order to maintain their beliefs and their faith. It is precisely the Christian capitalist context through which any real understanding of Divine Providence, Manifest Destiny, or Mormon millenarianism in the past can be understood in the present in a social scientific paradigm aimed at reflexively discovering the truth behind the mask of ideology in things. It is through a phenomenological landscape archaeology landscape analysis that the index object, the OMIDAR, the MIP that is New Zion reified in the archaeological record, has been identified and located. The problem until recently has been the visibility of irrigation network features and the ability to see the whole network at once. By admitting that positivist hypotheses are inadequate to contend with an archaeological inquiry into objects of ideological desire, the antagonism is resolved through performing ‘labor:’ the breaking of the ‘spell of fetishizing abstraction,’ and the radical acceptance of Mormon salvation history and New Zion as Real, real, and real. The object of Mormon ideological desire—New Zion—was and is not only the Real, it was and is also reified; it is really real. This is, once again, how the MIP is New Zion and how New Zion can be located in the MIP, a metapattern (sensu Bateson 1978).
Can one be certain that the MIP is unique and exclusive to Mormons in the Intermontane West of North America? The short answer is, no, but there are clues found in Francaviglia’s seminal work, *The Mormon Landscape: Existence, Creation, and Perception of a Unique Image in the American West* (Francaviglia 1978). Until Francaviglia’s study, the critique that geographers were slow to investigate and describe the visual aspects of landscape was predicated on previously undefined visual qualities that made or make Mormon landscapes Mormon. Said visual impressions are vivid, vernacular, and valuable to present-day interpretation even if subjective. For Francaviglia (and others), the questions that empirical visual impressions raise include:

1) Is there really a distinctive landscape associated with rural-village Mormon settlement? If so, what is it? 2) How do these elements vary in space and time? 3) What were the primary factors in creating such a landscape? 4) How have writers and artists attempted to render the visual composition that is the landscape? and 5) Are the Mormons themselves aware of any difference between Mormon and non-Mormon landscapes? The answer to these questions, it is hoped, will offer a significant contribution to the field of geography. [Francaviglia 1978:xvii]

To accomplish this, Francaviglia invented an imaginary, composite Mormon village called Canaanville based on a list of ten criteria or factors one can use to identify a Mormon settlement:

1. Wide streets;
2. Roadside irrigation ditches;
3. Barns and granaries in town;
4. Open landscape around the town;
5. Architectural style (especially the central-hall house);
6. High percentage of brick homes;

7. The hay derrick;

8. Mormon fence;

9. Unpainted farm buildings; and


More, “[i]n the Western U.S., [s]imply stated, any town possessing more than five of these will be a Mormon town” (supra). Presence of five or more of Francaviglia’s qualities in addition to the presence of the MIP could, hypothetically, reveal Mormonism anywhere and everywhere in the Intermontane West of North America. Simply put, Francaviglia argued that the Mormon cultural settlement pattern contains elements including, “open fields, semi-arid mountainous setting, irrigation ditches, and occasional rows of poplars and primitive fences lining fields that give the rural landscape an almost biblical quality” (Francaviglia 1978:7). Because ‘open land around the town’ could be a quality of any Western settlement, a settlement with two or more of the qualities listed could hypothetically satisfy Francaviglia’s criteria. If only one criteria is met—the presence of an LDS chapel—then one can safely assume that the settlement was or is Mormon, but one would also be advised to look around for other denominational churches; the community or settlement was or could be mixed Mormon and Gentile, e.g. Jackson, Wyoming.

Francaviglia reduced what Thomas Tweed said into a paraphrase: “religions themselves are maps” (Francaviglia 2015:3). What Tweed actually proposed under the subtitle The Cosmos, which harkens landscape archaeology studies of materializations of worldviews, is:

17 Like Leone’s untested hypotheses and previously un compared study area, Francaviglia’s criteria-like qualities of a Mormon village deserve interrogation, cross-examination, and testing; such an hypothesis is beyond the scope of this dissertation. Francaviglia’s qualities, based on his observations, are presented here as a posteriori evidence—that there really are differences between Mormon and Gentile villages even if the differences are subjective and Canaanville is a fictitious composite place that does not exist. In this way, Canaanville is akin to an objet petit a.
Homemaking extends beyond the homeland’s borders, and the religious also negotiate power and meaning as they imagine the structure, history, and limits of the wider landscape and the entire universe. Using allocentric reference frames, they produce geographies, cosmographies, cosmogonies, and teleographies. Religions offer *geographies*, cognitive maps of the earth that include not only the home and the homeland but also the vast regions beyond intimate space and collective space. At its most basic, geographies involve autocentric framings that survey space in terms of the binary *here* and *there*, with *here* understood as the boundaries of the body, the home, or the homeland. This sort of mapping also involves chorographies, positioned representations of a region, as in the *pinturas* drawn by Amerindians at the request of Spanish colonial officials in the sixteenth century, but in many instances sacred geographies include mental maps that imagine the widest inhabited area of the earth. Using various geometric shapes (including the circle and the square) and a wide variety of symbols, the religious have mapped terrestrial space. [Tweed 2006:113; emphasis in original]

This full quote is different than “religions are themselves maps” (Francaviglia 2015:3) when put back in context. This means that if the MIP can be systematically located in the density map depicted in Figure 46, it may be argued that the ‘dream’ is—and in Mormon salvation history always was and will be—a reality. An investigation of this hypothesis is beyond the scope of this dissertation; future research is clearly warranted!

Whereas the entire list of qualities and technologies Francaviglia listed was not tested, it is evident in landscape archaeology landscape analysis of a 1:500,000-scale orthographic projection of Leone’s original study area in Arizona that the MIP existed and still exists in relict
and active fields (Figures 39-41). With this revelation, one can say with an increased degree of certainty that the historic Mormon creation of New Zion anywhere and everywhere practicable in the arid West (Leone 1979:28) is evident in irrigation features and in an MIP. Said MIP hid and continues to hide a void, a deficiency in large, unattractive landscape features left over or resultant from the past that circulated and or circulates presently in the daily lives of the Mormon settlers of the Little Colorado River and Silver Creek in Arizona and the northern floodplain terrace of the Gros Ventre River and the Ditch Creek alluvial fan in Jackson Hole, Wyoming in the late 19th, the 20th, and even the 21st centuries.

The proposed Great State of Deseret was well within the Intermontane West. Assistant Professor of Geography Brandon S. Plewe, Professor Emeritus of Ancient Scripture S. Kent Brown, Professor Emeritus of Church History and Doctrine Donald Q. Cannon, and retired professor of Historical Geography Richard H. Jackson at Brigham Young University in their *Mapping Mormonism: An Atlas of Latter-day Saint History*, presented a density map in Section 2 entitled: “The Empire of Deseret 1846–1910” (Plewe et al. 2014:70–71). This title alludes to the international expansion of the Mormon community circa 1870 in North America and is from an avowedly Mormon-centric perspective. The authors rapidly accounted for historical precedent and the present condition when they wrote: “Despite the ‘Americanization’ of the Church, the dream of the Empire of Deseret has been ingrained in the cultural landscape of the Intermountain West” (Plewe et al. 2014:70). Figure 46 is Plewe et al.’s (2014) map of “The Empire of Deseret.” Three values—presumably high concentration or presence, presence, and absence, as in little or no presence—are represented. No key is provided to tell the reader the exact meaning of the shading. No scale or north arrow is provided either. The shaded area is also the region of North American known as the Intermontane West.
What is remarkable about the second sentence in the text that accompanies this map is the almost surreptitious inclusion of the word ‘dream’ the second time “The Empire of Deseret” is mentioned. ‘Dream’ alters the meaning of the entire passage.

Once a fantasy is seen for what it really is, there is a disappointment; the shadow side of jouissance. This was poignantly pointed out in Leone’s *Critical Historical Archaeology* (2010) when he summarized the pivot point within Žižek’s second criterion such that the object of ideological desire is something we desire in the present and which represents a perfect, ideal, and stable past. From a presentist perspective, however, we know also that the past was anything but stable; the past was rife with antagonisms just as the present is. This antagonism is what Leone cited as Žižek’s contingency:
“Contingent” here means that the actual thing is, of course, a ruin. But the notions of “huge” and “vile” come from the social lives that these objects reveal—namely, slavery; absolute power, filth of every sort, human and financial degradation, and all those social processes described in the papal encyclicals. They are all the same. This is what Collingwood meant by history and the past not being dead. Concentrating on this process of objectification is what I see as the opportunity for historical archaeology—a largely missed opportunity so far, in my opinion, but, maybe, retrievable. [Leone 2010:210]

Ironically and somewhat disconcertingly, Leone summarized Žižek’s contingency as containing an ‘opportunity for historical archaeology—a largely missed opportunity’ potentially ‘retrievable’—yet did not retrieve the potential himself. There is, of course, a likely explanation for why Leone did not pursue his passion for historical Mormon ecological ritual further. That reason can be located in Leone’s preface to Chapter 8: Ideology at Work as Religion in Critical Historical Archaeology (Leone 2010). While in a class taught by American archaeologist Raymond Thompson, Leone discovered that … the real point of all this information on establishing dates was to impose a complete hegemony over chronological ordering by science. It worked for [Leone], everybody else, and for most of the Western world. … [I]t filled the public vacuum created by not knowing how to discuss the origins of the earth, life, humanity, and it’s (our) accomplishments. Therefore, the scientific task of those studying the past was to challenge inadequate explanations, incorrect explanations, and to make a better, more harmonious view of the central questions we face as professionals, accompanied by the understanding that, frequently, such questions are of great importance to virtually all people. [Leone 2010:97–98]
The potential opportunity to which Leone alluded is the corpus of this dissertation. This dissertation was aimed exactly at challenging ‘inadequate explanations, incorrect explanations, and to make a better, more harmonious view of the central questions’ raised in Leone’s back catalogue concerning ecological ritual and the technology that facilitated Mormon settlement of the Intermontane West in the 19th and early 20th centuries. Had Leone critically deconstructed his own tautology by breaking his own ‘spell of fetishizing abstraction,’ he might have discovered the fundamental flaws outlined and discussed here. Reflexive logic reveals that irrigation technology embodied in the MIP is something contained within the boundaries of fences within Mormon settlements based on the Plat of the City of Zion and Mormon settlements are connected by and integrated within a network of wards and stakes that were and are administered by Mormon High Councils in temples, especially the Salt Lake Temple. Whether or not dams were constructed to supply settlements with water, water resources and water rights were and are critical to agriculture and agriculture is critical to Mormon society. Irrigation builds and sustains social cooperation and cohesion because the entire community benefits over time. Irrigation is a causative agent. Indeed, irrigation is considered a cornerstone of civilization (Steward 1955).

Irrigation network features were and are a mediating technology, one which requires human labor to construct and maintain so that canals, ditches, laterals, sublaterals, and rills deliver and distribute water to fields which grow fodder and food for survival. In this light, landscapes transmogrified by Mormon Saints through irrigation practices were, are, and will always be “irrigated Eden” (sensu Fiege 1999) or New Zion in Mormon salvation time in preparation for His return. In this articulation, not only is the whole of one Mormon-built
irrigation network literally greater than the sum of its parts, all Mormon-built irrigation networks in the Intermontane West can be seen as a unary concept, i.e. New Zion.

In the final analysis, it takes a manmade earthen void to fill the conceptual, ideational, and ideological void that is the ever-anticipated Rapture in Mormon salvation history and it takes an Apollonian, i.e. godlike, perspective in contemporary GIS using LiDAR imagery (Haraway 1981) to identify and locate the entirety of an irrigation network at a landscape scale. Once the digital phenomenon is reckoned with, only then does irrigation technology begin to approach a material reality as an object. If the MIP is the reified intersection of 19th and early 20th century Mormon ideological desire with material evidence and jouissance in the archaeological record, then the metapattern (sensu Bateson 1978) that is the MIP is New Zion and the OMIDAR, “an object which is the embodiment of the lack of the Other” (Žižek 2008:192)\(^\text{18}\).

Now that the problem of identifying and locating the OMIDAR, is resolved, the result may seem anticlimactic, too mundane, vile even. That The Rapture has not happened yet presents an antagonism that still requires faith, continual labor, and material mediation or else the desire to desire a better world exhausts itself and fails due to entropy. The dissolution or fall of an ideological illusion can be jarring, but it does not have to be. There is an opportunity to re-interpret as Mormons are wont to do. Indeed, what may appear to be relict archaeological features can be revived and reused if labor is performed in reconstruction and maintenance and water once again flows through the distributary features to an intentional end-use: the redemption of the Earth anywhere and everywhere they already exist. Water was, is, and will always be life. Selah.

\(^{18}\) Other religions may have an object of ideological desire in the archaeological record also, e.g. the Dome of the Rock or the Holy Sepulchre (Christianity); Beit HaMikdash HaSheni (Second Temple and the so-called Wailing Wall; Judaism); the Qabba’a (Islam); the shivalingam (Hindu traditions). Several texts should be cited and examined; several potential objects for each religious tradition should be tested against Žižek’s criteria!
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Appendices
Appendix A. State Protocol between the BLM and WYSHPO; Appendix D

WYOMING STATE PROTOCOL; APPENDIX D
EXCLUSIONS: DEFINED NON-SITES AND PROPERTY TYPES REQUIRING NO FORMAL DOCUMENTATION

The Bureau of Land Management (BLM) cultural resource specialists must review and approve any deviation from this list. In most cases, formal documentation of the property types listed below is not required. **Existence of these defined non-sites and property types within the survey area, and justification for their exclusion, must be discussed in the project report.** If any of these property types exhibit significant architectural or engineering features, or are associated with a National Register eligible site or district (either within the boundary, or clearly related to the significance of a NRHP eligible site or district), they should be recorded on a Wyoming Cultural Properties Form (WCPF). Professional judgment and common sense should be applied. In general, Smithsonian numbers will not be assigned to the following property types:

1. Utility lines (i.e., power lines, towers, telephone lines, fiber optic cable, etc.)
2. Pipelines (i.e., water, gas, etc. This does not include early wooden pipelines.)
3. Isolated stock dams, troughs, spring boxes, and associated windmills.
4. Elevation, bench, and section markers (i.e. all survey or cadastral markers).
5. Car banks (i.e., the use of abandoned cars, farm machinery, appliances, etc. to stabilize riverbanks, stream banks, or drainages).
6. Rip-rap (i.e., the use of cobbles, rock, or wood to stabilize riverbanks, stream banks, or drainages)
7. Isolated abandoned motorized vehicles, appliances, and mobile homes.
8. Fences and enclosures (i.e., barbed wire, chain link, buck-and-pole, or other types of pasture fence.) This does not include corrals, roundup or load-out facilities.
9. Unnamed two-track roads (i.e., ranch roads, seismic roads, etc.). This will require standard historic research to determine if the roads are named. Named roads need to be formally recorded; generally, unnamed roads do not need to be recorded. Discuss in the report the historic research conducted (i.e. General Lands Office (GLO) check, county records, historic maps, etc.)
10. Recent trash (i.e., highway trash, etc.)
11. Producing oil/gas wells and dry hole markers.
12. Water control channels, laterals, spreaders, canals, and ditches that are not designated by name on the USGS Topographic maps. (Water records can be found on the State Engineering Office’s (SEO) website at https://seoweb.wyo.gov/e-Permit/ or in the “tabulation of Adjudicated Surface Water Rights of the State of Wyoming: Water Division Numbers One-Four.”)
13. Samples of defined lithic landscapes. Approval from the BLM cultural resource specialist must be obtained for the cultural resource permittee to apply this exclusion.
14. Short-term camps associated with stockgrazing and recreation that provide no significant information.
15. Temporary sawmill sites, slash piles, and isolated woodpiles.
16. Prospect pits and claim stakes associated with mineral exploration or mining with no associated features, cribbing, and/or less than 50 associated historic artifacts.
17. Roads that have been reconstructed within the last 50 years do not need to be recorded. Abandoned segments that are not associated with an eligible road do not need to be recorded.
DESCRIPTION: Water has always been a critical commodity to the settlement and growth of Wyoming. Under the Mining Act of 1866, Congress recognized the right of settlers and sluice miners to possess water rights by prior appropriation on federal lands and recognized their ditch and canal rights-of-way across unoccupied federal lands. From the days of the earliest Wyoming Territorial Legislature in 1869 to the present, water rights and the control of water has left its mark on the Wyoming landscape. With the U.S. government offering free grass and open unpatented rangeland, the open range cattle business of the 1870s brought settlement to all parts of the Territory of Wyoming as well as hundreds of thousands head of cattle. Numerous private ditches were constructed, and more were constantly created to irrigate small acreages of creek-bottom pasture and to provide domestic water for the homesteads popping up along those drainages. Gristmills show up on streams in the more populated areas of the territory, and towns began to use water for municipal purposes. Wyoming’s prominence in directing the history of irrigation in the arid West can be tied directly to Wyoming’s U.S. Senator Joseph M. Carey, who prepared the basic framework of the Carey Act of 1894 that opened unoccupied federal lands to irrigation and settlement. This precipitated a series of large irrigation networks throughout Wyoming’s drainage systems, beginning with the Shoshone Irrigation Company’s Cody Canal (1895) out of the Shoshone River; the Big Horn Basin Development Company’s Bench Canal Project out of the Greybull River (1896); the Wyoming Development Company’s Wheatland No. 3 Reservoir on the Laramie River (1897); the Big Horn Basin Colonization Company’s Sidon Canal out of the Shoshone River (1900); and the Big Horn Basin Development Company’s Wiley Canal out of the Shoshone River (1902). Water development continued in the 1900s with construction of no less than 30 reservoirs and dams. These facilities, and many others, have provided Wyoming with untold benefits in the 100 years since their construction. Their existing usefulness serve as testaments to the foresight of Wyoming’s settlers who built them or had them built. This proposal will create a historic context of the persons, places, events, structures, landscape features, and heritage resources associated with the historical development and use of Wyoming’s irrigation and water systems throughout the state.

RESOURCE RISKS: Significant heritage resources associated with the Wyoming Irrigation and Water Systems, from small ranch water diversion systems to the Bureau of Reclamation’s
Shoshone Irrigation Project Buffalo Bill Dam (a National Historic Civil Engineering Landmark), contain many unique engineering features that are in danger of being lost through age, neglect, and disrepair, as well as removal by other land uses.

**BENEFITS:** This study will contribute to Wyoming’s statewide historic preservation planning; will provide guidance and recommendations for federal and state land managers, landowners, and city and county planners; and will generate consistency in management practices. It will identify those Wyoming heritage resources worthy of protection and preservation and will have the potential of engaging the public in historic tourism. Inventories and sites associated with this property type will be digitized into the state’s database and geographic information system making the information readily available and reducing the likelihood of duplicative inventory.

**FEASIBILITY:** This study can be achieved through a single one-year contract. The contract would be administered out the Wyoming State Historic Preservation Office. The Wyoming SHPO Cultural Records Office would be responsible for compiling the data for this study into a geographic information system and database format. Funding would be provided by the State of Wyoming, with potential contributions from federal agencies and private sources. The study would contain several smaller contexts incorporating studies of ranch and homestead ditch systems, large irrigation canal systems, and reservoir construction.

**SUPPORT/PARTNERSHIPS:** This planning study will be welcomed and supported by Certified Local Government preservation planning boards, as well as county planning commissions and the tourist industry. Potential partners include the Bureau of Reclamation, the Wyoming Water Development Commission, the State Engineer’s Office, and private irrigation enterprise.
Appendix C. Dissertation Précis

OF RUPTURES AND RAPTURES:
LOCATING IDEOLOGY WITH LIDAR IMAGERY

By

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Dissertation Précis

Presented in partial fulfillment of the requirements
for the degree of

Doctor of Philosophy

Anthropology; Cultural Heritage and Applied Anthropology; Historical Archaeology

The University of Montana
Missoula, MT

December, 2018

To:

Dr. Kelly Dixon, Chair
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Dr. David Shively
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Abstract

Key words: ideology, technology, landscape archaeology, LiDAR

Archaeological praxis necessarily requires at least one object (a piece of technology or something that functions as an object) to articulate and explain ideologies from the past. This is problematic because ideology is abstract and difficult to locate in the archaeological record in reified form. Archaeology’s preoccupation for over one hundred years has been the systematic location, identification, and excavation of discrete artifacts; features, and sites; interpreting meanings from comparative studies and data sets; and putting the past in order all while documenting change over time. Historical archaeologist Mark P. Leone identified fences, the Plat of the ideal City of Zion, Mormon temple architecture, plan, and program, and dams on the Little Colorado River in Arizona as the technologies and objects that facilitated Mormon settlement, survival, and adaptation in the Intermontane West of North America in the 19th and early 20th centuries. In 2010, Leone revisited his life-work including a critical re-examination of his original research on Mormon fences, the Plat of the ideal City of Zion, and Mormon temples. In the interim, Leone read Philosopher Slavoj Žižek’s The Sublime Object of Ideology. Žižek defined three types of ideological objects: voids (or absences); large, unattractive objects left over or resultant from the past of which we are all aware; and a circulating object, one that is known to have existed and requires an ideological structure to understand it, e.g. Mormonism. Žižek’s definitions and rubric have a potential to answer a research question that emerges out of Leone’s life-work: What is or was the technological object of Mormon ideological desire in the archaeological record (OMIDAR)? The ultimate ideological desire of 19th and early 20th century Mormonism was the creation of a New Zion. A test revealed that none of the four technologies Leone previously identified completely meets Žižek’s criteria. This dissertation took up a critical re-examination of survey data from the Mormon Row Historic District (MRHD) (48TE1444) in Grand Teton National Park (GTNP) in which a provisional Mormon irrigation pattern (MIP) was identified. Leone considered irrigation associated with dams as an important factor, but did not consider it as an ideal technological object perhaps because, unlike fences, settlements, temples, and dam, irrigation was not seen as a unary object. The MIP was searched for along the Little Colorado River in Arizona. In each of the settlements in Leone’s original study area at least one relict field containing the MIP was located. As a technology and unary object, the MIP was tested against Žižek’s criteria and it passes. I aver that the MIP is the metaphysical and material ‘footprint’ of New Zion. Using landscape archaeology theory and landscape analysis methods, LiDAR imagery, if the MIP is New Zion reified, then the MIP is the OMIDAR.
Introduction

Archaeological praxis necessarily requires at least one object (a whole or fragmentary piece of technology or something that functions as an object) to articulate and explain ideologies from the past. This is problematic because ideology is an abstract notion and difficult to locate in the archaeological record in reified form, especially without written records. Archaeology’s preoccupation for over one hundred years has been the systematic location, identification, and excavation of discrete artifacts (objects; pieces of technology), features, and sites, deciphering and interpreting meanings from comparative studies and data sets, and putting the past in order all while documenting change over time. Thus the research problem is methodological. Given the limitations, historical archaeologist and Professor of Anthropology Mark P. Leone asked, “Can archaeology adduce the origins or early stages of any ideology?” (Leone 2010:53). Neither Dr. Leone nor the author is a member of the Church of Jesus Christ of Latter-day Saints (LDS); as Gentiles, both know about Mormonism only from the outside and through the eyes of inter-item Mormons; both endeavor to be objective while risking bias in interpretation.

An archaeological investigation seeking to locate an object of ideological desire must begin with a working definition of ideology. According to Leone by way of Louis Althusser (1971),

Ideology is a set of masks of illusions, which disguise the operations of daily, exploitative life in capitalism that serve to reproduce society intact. Such masking is achieved by using notions, or assumption, that appear to be the taken-for-granteds, or givens, of our daily lives. Such obviousnesses act through material things, like spaces, measures of time, and manifestations of individual personhood. The two key points are (1) that the givens of daily life (2) act through things. [Leone 2010:65]
Given the premises above, Leone answered his own question affirmatively:

… because … ideology’s actual history can be discovered in its tie to material variables, and because those variables are the subject matter of historical archaeology, then there exists the possibility for an important extension of materialist archaeology into historical archaeology. [Leone 2010:55]

It is equally important to remember that the ‘givens of daily life’ occur or occurred and ‘things’ are or were in places where humans interact or interacted with natural and constructed environments (Tuan 1977) or scapes (sensu Appadurai 1991). It is and was in places that material objects that have and have had some role or roles in a single or multiple ideologies in the past are known or are potentially (re-)discoverable in the present. Known places can be and often are mapped using various means, methods, and symbolic representations. Professional geographer, environmental designer, and Professor Emeritus of History, Geography, and Religious Studies Richard V. Francaviglia posited that if fiction, fantasy, and film places can be cognitively mapped, then, following Thomas A. Tweed (2006), “religions themselves are maps” (2015:3). Landscape archaeology utilizing GIS has the potential to map religion and or ideology if Althusser’s premises are accepted.

Gordon Willey, the purported Dean of New World Archaeology in the mid-twentieth century, grounded Americanist landscape archaeology when he defined landscape as:

The way in which man disposed himself over the landscape in which he lived. It refers to the dwelling, to their arrangement, and to the nature and disposition of other buildings pertaining to community life. These settlements reflect the natural environment, the level of technology on which the builders operated, and various institutions of social interaction and control which the culture maintained. [Willey 1953:1]
According to American archaeologist Tom Patterson,

Willey’s definition of settlement patterns was sufficiently broad that it gave archaeologists the opportunity to pursue studies concerned with both the relationships of people to their ecological settings and their social relationships with one another. It was also not wed to a particular social-theoretical standpoint (although Willey had one), but rather to the collection and analysis of empirical evidence. [Patterson 2008:78]

According to UK landscape archaeologist Henry Chapman (2006), maps tend to be increasingly less scientific and as a result are more subjective the more inputs and factors are included while simultaneously providing new perspectives and intersections of previously unconsidered data sets. More,

A disadvantage of past and current approaches to interpretive landscape archaeology is that there is a general desire to produce testable models and theories … [and] [a]lthough repeatable and testable experiments are useful in terms of positivist theory … the fundamental reasoning of post-processual interpretation lies beyond the need for them, this criticism levelled towards such processes. [Chapman 2006:23]

Experimental anthropologist Marcos Llobera (1996, 2001, 2012) advocated for the acknowledgement that GIS is a heuristic tool for the exploration of competing interpretations in or of social theory including landscape archaeology. Landscape archaeologists can utilize aerial and satellite imagery including LiDAR imagery of landforms and landscapes as units of analysis. GIS applications of other relevant data distributed across a landscape increase the scale and or number of associations available for present-day historical analysis and interpretation, i.e. landscape analysis. GIS is testable, repeatable, and positivistic if one is deliberate in how one constructs one’s research agenda and datasets (layers).
Landscape analysis methods facilitate present-day interpretations of patterns that connect human behavior with particular times, places, and ideologies such as capitalism (Ansheutz et al. 2001). Margaret Purser promoted the idea that, “[t]hese patterns can only be identified by archaeologists working back and forth across the range of scales at which capitalism was, and is, relevant” (Purser 1999:117) and “the sheer breadth and complexity of the topic demands a methodological creativity and interpretive flexibility we have yet to give ourselves the permission or authority to pursue” (Purser 1999:137). As with any research agenda, we must be “mindful that method is practice informed by theory, and encapsulated within the debates” (Beaudry 2011:22). Historical ecologist James O’Connor’s *Natural Causes* (1998), Carole Crumley’s (1994) “Historical Ecology: A Multidimensional Ecological Orientation,” (2001) “New Directions in Anthropology and Environment”, and Crumley and Marquardt’s (1990) “Landscape: A Unifying Concept in Regional Analysis” each pay strict attention to expressions of capitalism writ large on landscapes, an excursive interest of Leone (1974, 1977, 1979, 1999). In 2006, James Harmon, Mark P. Leone, Stephen Prince, and Marcia Snyder utilized LiDAR and GIS to qualitatively and orthographically visualize two 18th century Maryland gardens, William Paca’s Wye Hall Plantation and Tulip Hill Plantation1, at a landscape scale thus enabling the entire site at each location to become the focus of analysis because “the spatial relationships that comprise the whole often cannot be elucidated through application of standard field methods” alone (2006:649). The authors’ aim was “to test whether maps and images derived from LiDAR data could be used to accomplish these goals” (Harmon et al. 2006:652). Harmon et al.’s paper in *American Antiquity* is a cogent example of the utility of LiDAR and GIS in landscape archaeology that has positive implications for studies of Mormon ideology.

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1 It is curious to note that in their paper the authors do not mention by name Samuel Galloway or his wife for whom he built the estate that they studied with LiDAR imagery using landscape archaeology theory and landscape analysis methods which the authors also never explicitly label their research as even though that is essentially what they did.
In 2010, Mark P. Leone revisited his life-work in *Critical Historical Archaeology*, which includes, among other topics, a re-examination of his original investigations into historical Mormonism, Mormon historical ecology, and technologies employed by Mormons in their concerted attempts to settle and subdue the arid Intermontane West in the 19th and early 20th centuries. In *Archaeology as the Science of Technology: Mormon Town Plans and Fences* (1973, 1978, 2010), Dr. Leone advocated:

We might consider asking how the system of artifacts, the primary and undestroyed system of technology, caused or determined the social and ideological systems to take shape. What is there about the system of technology that either facilitated or determined parts of the social or belief systems? [Leone 1978:194]

and

… [a]rchaeology could profitably study both the manipulation of material culture (why and how we do what we do with technology) and the manipulating that technology does on the rest of culture. … Cause works both ways, and by considering plural contexts, one can assign cause a locus, albeit a shifting one. [Leone 1978:195] (Figure 1).


\(^2\) Leone never used the phrase, ‘object of Mormon ideological desire in the archaeological record.’ or OMIDAR for short. The OMIDAR is a conceptual combination of technologies investigated by Leone (1973, 1974, 1977, 1978, 1979) and Philosopher Slavoj Žižek’s definition of an object of ideological desire (Žižek 2008). The technological object sought by Leone is heretofore referred as an or the object of Mormon ideological desire in the archaeological record or as the acronym OMIDAR. The first use of this hybrid concept is in this dissertation.
… despite overwhelming changes in Mormon culture, there is an unchanged relationship between a key set of artifacts and a set of religious symbols. Fences still keep the same things in and keep the same things out. … The fences enable them to redeem the earth and manipulate and act out the categories used to deal with the world. Despite changes in form, there have been few changes in function. … Nothing has been said here about town plans and fences that is necessarily true outside of Mormonism. A comparative generalizing study has not been done. [Leone 1978:199]

This passage is interpreted to mean that Mormon fences and the ideal Plat of the City of Zion are technologies truly unique to Mormons and Mormon ideology. The latter part of that technologically determinative supposition can be accepted; no other religious or faith-based community has attempted to create a City of Zion in the same manner as the Mormons. Leone’s fence hypothesis has not been comparatively tested since 1978; other technologies were proposed. Throughout Leone’s published career, four technologies were extensively investigated and written about: 1.) Mormon fences; 2.) Mormon settlement patterns based on Joseph Smith, Jr.’s ideal Plat of the City of Zion; 3.) Mormon temple architecture, plan, and program; and 4.) dam reconstrucion orchestrated by Mormon High Councils (Leone 1973, 1974, 1977, 1978, 1979, 2010).

At some point before 2010, Leone read Slovenian Philosopher Slavoj Žižek’s (1989) *The Sublime Object of Ideology*. Leone’s discussion of Žižek in *Critical Historical Archaeology* occupies only six pages and deserves deeper examination. Leone began with praise:
I have come to like the answer I have gotten from Slovaj Zizek\(^3\) (1989:182–185). Zizek is one of the very few social theorists who actually deals with objects. … Zizek is concerned with objectification the way Freud was. Objectification is the misplacement of something of one’s own onto someone, or something, else. It is a psychological process and does not necessarily concern concrete things, although Zizek does include things. [Leone 2010:208]

Žižek, by way of German philosopher Georg Friedrich Hegel and French psychoanalyst Jacques Lacan, found that:

\[\text{… one should see not just the thing in front of oneself, but this thing as it is embedded in all the wealth of its concrete historical context…. The problem is thus not that of how to grasp the multiplicity of determinations, but rather of how to abstract from them, how to constrain our gaze and teach it to grasp only the notional determination. [Žižek 2008:x–xi; emphasis in original]}\]

Žižek also found:

\[\text{The Real is nothing but this impossibility of its inscription…. It is in this sense that the enigmatic Lacanian phrase defining the subject as an ‘answer of the Real’ is to be understood: we can inscribe, encircle the void place of the subject through the failure of his symbolization …. [Žižek 2008:195; emphasis in original]}\]

\(^{3}\) The first time Leone mentions Slavoj Žižek his name is spelled “Slovaj Zizek” (2010:208). This can be explained as a misprint. However, there is an error in at least three books by Leone that concern Mormon ideology. This curious pattern has not been searched for in the other books or papers written by Leone on other topics. It is simply noted here for posterity in the event that a hunch turns out to have some meaning in the future. The second point I wish to make here is that Leone cites the 1989 edition of Žižek’s The Sublime Object of Ideology and this dissertation cites from the revised second edition published in 2008 because it has a preface that is useful in understanding the rest of the text. The third point I wish to make here is that in Critical Historical Archaeology (2010), the font used does not retain the diacritical marks in Žižek’s name as I do here. To avoid confusion, when I directly or block quote from Leone’s Critical Historical Archaeology (2010), I will retain the way Žižek’s name is printed, but elsewhere, I will present Žižek’s name the way it should be spelled, with a caron over each zee.
Žižek outlined three types of objects “and objectifications” (Leone 2010:208) that are ideological and amenable to social scientific inquiry from a materialist perspective. Leone interprets Žižek’s objects thus:

The first is a void, or an absence, that creates a sense of mystery which then requires it to be filled. The void will be filled with an object or something that seems real.

The second kind of object is some large, unattractive object: a big leftover from another time, another world. This huge, often vile, object is unavoidable, by which Zizek means everyone has heard about it.

The third kind of object is an index or circulating object. It is something that people know exists but which requires that a structure be created to understand it. It is a leftover that requires an explanation. It demands a story. [Leone 2010:208–209]

Paradoxically, “Lacan’s Real is impossible, it is precisely the impossibility which is to be grasped through its effects, its texture, its notional qualities and abstractions” (Žižek 2008:184; emphasis in original) and “[t]hat is why the material real object is a sublime object in a strict Lacanian sense, an object which is the embodiment of the lack of the Other” (Žižek 2008:192).

Leone claims that, “Zizek couldn’t see” because “his combination of Marx and Freud didn’t allow him to see” (Leone 2010:213). In the final analysis, Žižek’s ontology of voids (or absences) may hold more proverbial water than Leone thought.

According to Mormon Doctrine, the ultimate Mormon desire in the 19th and early 20th centuries was the creation of a New Zion, the abode of Jesus Christ and the righteous and endowed Latter-day Saints who will reside in the City of God on Earth during the Future Tribulation or The Rapture. This leaves open the question: are fences and Mormon settlement plans the ideal expressions of technology employed by Mormons in the creation of a New Zion?
A pertinent compound research question emerges out of this line of interrogation: Can we in the present identify and locate New Zion—the Real object of Mormon ideological desire in the 19th and early 20th centuries—reified in the archaeological record, and if so, what was the technology responsible for its material evidence? The time has come to test Leone’s hypotheses.

**Research Objectives**

In 2010 Leone re-examined what bothered him about historical re-enactments and displays of class, gender, and perceived race at Colonial Williamsburg. Leone discovered that it was the perpetuation of national myth that was most unsettling, especially when there was ample archaeological evidence available to tell the truth. According to Leone (1973, 1978), the purpose of archaeology is to link archaeological contributions to current anthropological theory, especially materialist evolutionary theory, in an effort to garner a better understanding of the comparative meanings and uses of technology (artifacts) in past human societies. Leone by way of Lewis Binford had four principle goals for archaeology: (1) to add a formal and scientific approach to the profession; (2) to increase the temporal depth of the field; and (3) to study technology within the framework of culture while (4) arresting the perpetuation of false information or myth (1973, 1978). Hence, there is a presupposition that if one deconstructs a myth, one stands an increased chance of discovering the truth behind it.

Philosopher of the social and historical sciences Alison Wylie brought focused attention to the problem of Western American myth in the pursuit of the corrected archaeological record. Wylie found that, “archaeology has an absolutely critical role to play in these revisionist exercises, committed, as they are, to rigorous empirical reassessment of extant myths and presuppositions” (Wylie 1993:10; emphasis in original). Wylie cautiously reminded us, however, that any “adequate account of archaeological practice must [recognize] that the past as we know
it will always have mythic dimensions” (Wylie 1993:15). There is a second presupposition: if one deconstructs a myth through a ‘failure of its symbolization,’ (sensu Žižek 2008), the truth can be discovered by critically re-examining our methods and field practices following a phenomenological logic à la Matthew Johnson (2012a, 2012b) and not pure positivist science.

The central research problem, objective, and significance is to locate such a technological object and material evidence of it reified in the archaeological record. Based on this objective, there are four secondary objectives following the three unofficial dicta of historical archaeology: to confirm the facts, to contradict when necessary, and to contribute to the discipline: 1.) to re-examine Mark P. Leone’s oeuvre, argument, and method starting with technologies Leone previously identified (1973, 1974, 1977, 1978, 1979, 2010) that have a potential to answer a pertinent research question: Can we in the present identify and locate New Zion—the Real object of Mormon ideological desire in the 19th and early 20th centuries—reified in the archaeological record?; 2.) to search a comparative study area and data set at MRHD for the same technologies; 3.) to test Leone’s technological objects against Žižek’s criteria; a fitness test; failing that, 4.) to deconstruct archaeologically the Mormon Row local legend (myth) of “Miracle” Spring to discover the truth behind it; the truth behind the legend potentially leads to the identity of the object of Mormon ideological desire in the archaeological record (OMIDAR). It is posited here in this dissertation that landscape archaeology landscape analysis will assist in the arrest of false information or myth while also acknowledging that mythic dimensions will persist (sensu Wylie 1993).

Hypotheses and Expected Supporting Evidence

I acknowledge that the hypotheses presented are seductive and false, but in this disclosure the proverbial door is opened to the phenomenal by way of Johnson (2012a, 2012b) while
respecting Žižek’s ontology and Leone’s research problem. It is acknowledged here, too, that rather than construct a new scientific paradigm without hypotheses, the dissertation will proceed with false hypotheses.

\[ H_1 \] There is a real, material, mediating object of Mormon ideological desire that is a void or deficiency, a large and unattractive leftover from the past about which all are aware, and something that is identifiable in the archaeological record which circulates or circulated within capitalism (\textit{sensu} Žižek 2008).

Alternatively:

\[ H_2 \] The object of Mormon ideological desire is not identifiable or locatable in reified form in the archaeological record; it is an immaterial, abstract notion and byproduct of human consciousness; a deliciously anticipated wish intended to fill an ideological void or gap in the daily lives of righteous Mormon believers (\textit{pace} Žižek 2008).

If an OMIDAR is not identified among Leone’s previously identified technologies, one that meets Leone’s and Žižek’s criteria and resolves the research problem, there are at least two possible outcomes. One outcome is that there is yet another object that exists in Leone’s original study area that was overlooked or discounted in the past; an object that has not been fully identified or tested for its potential to resolve the research problem and, most importantly, is a manifestation of ideological desire in reified form. Another outcome is that there is not an OMIDAR that resolves the research problem; the argument returns to the premise that ideology is purely abstract and cannot be located in reified form archaeologically or otherwise. If the problem is not resolved by the identification and location of a material object, the \textit{real} object of Mormon ideological desire must remain an abstract notion, a deliciously anticipated wish.
Theory and Methods

Landscape archaeology’s aim is to identify and locate the ‘fingerprint,’ ‘footprint,’ or ‘imprint’ of culture on landforms that transform natural environments into landscapes over time. The pattern sought is a web of influence and interaction between the society, other societies, the raw materials, landforms, natural environments, and landscapes in between. What does that look like? The Conclusion section will reveal the answer to that tantalizing question.

As a presupposition, in order to define something as a ‘thing’ (Leone and Potter 1999), an object, an artifact, one must participate and already believe in an ideology (a Lévi-Straussian Structure). The experiment, the exercise in historical archaeology is to see more than the ‘thing’ into its multiplicity of meanings, and then return with cogent explanations of how the ‘thing’ fits in with the ideology, the rest of culture, and ideally how it changed over time. The present has the benefit of accumulated and accessible information and data about the past. The past can be easily made to look inevitable, but that can also be an example of repetition of popularly held belief, myth, or legend; Bell’s problematic ‘xeroxing.’ By deconstructing and re-examining myths the truth is uncovered; masks are taken away. There is, however, a risk of seeing too much behind the mask or not enough when one does this.

In 2010, Leone introduced Žižek’s definition and rubric of an object of ideological desire to his own research agenda, but did not test his objects against Žižek’s schema. Leone hypothesized that fences, settlement plans based on the ideal Plat of the City of Zion, Mormon temple architecture, plan, and program, and ritual dam re\construction orchestrated by Mormon High Councils on the Little Colorado River in Arizona facilitated Mormon settlement and social cohesion in the 19th and early 20th centuries in the Intermontane West (1973, 1974, 1977, 1978, 1979, 2010) (Figure 2), yet he never comparatively tested them or another study area against his
hypotheses (Leone 1978:199). If cause can be assigned a locus (Leone 1973, 1978) and “religions themselves are maps” (Francaviglia 2015:3; Tweed 2006), then distribution maps of Mormon settlements and cultural resource loci projected in LiDAR imagery in GIS can theoretically reveal ideology anywhere and everywhere there are traces of Mormons. In order to conceptualize Mormon religion as a map, one must suspend disbelief and accept Mormon religion as it was and as it is—a phenomenon. Through the function of fetishistic disavowal, i.e. “‘I know very well that things are the way I see them … [yet] I believe in Another Space (the domain of pure symbolic authority) which matters more than the reality of its spokesmen,’” (Žižek 2012) one can break the ‘spell of fetishizing abstraction’ (Žižek 2008:x). Simply put, “if one limits oneself to what one sees, one simply misses the point. This paradox is what Lacan aim[ed] at with his les non-dupes errent: those who do not let themselves be caught in the symbolic deception/fiction and continue to believe their eyes are the ones who err most” (Žižek 2012). It is posited in this dissertation that the research problem of identifying and locating the OMIDAR can be resolved if Žižek’s ‘spell of fetishizing abstraction’ is broken through fetishistic disavowal (Žižek 2012).

Indeed, in Lacanian psychological terms, if desire is at its core the desire to desire some thing, then in materialist terms, the process of searching itself produces the object which initiated or caused the search in the first place (Žižek 2008:180). The OMIDAR must be a ‘thing’ (Leone and Potter 1999) that is ‘the perfect, the ideal, the stable in the past’ (Leone 2010), a material and ideological void or a deficiency that is resultant from the past; that participated in daily life in the

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4 The best example of this is delivered by Chicolini Marx impersonating Groucho Marx as Rufus T. Firefly in Duck Soup when Chicolini-Rufus says: “‘Ma’am, who you gonna’ believe, me or your own eyes?’” (Marx Brothers 1933). Žižek published this quote as, “In one of the Marx brothers’ films, Groucho Marx, when caught in a lie, answers angrily: ‘Whom do you believe, your eyes or my words?’” (Žižek 2012). If asked why there is this glaring discrepancy, Žižek would likely answer with the exact same quoted question: “‘Whom do you believe, your eyes or my words?’”. This ambiguity, this failure of symbolization between the ‘Real’ and ‘the real,’ is, in a nutshell, ideology. You have to see the movie and the scene in order to believe me. Trust me, you won’t be disappointed.
past; and is something about which all are aware yet may hide in plain sight as it mediates lived reality and ideological desire (Žižek 2008) within constraints of modern capitalist society and the limits of nature. The OMIDAR may not be the most obvious or visibly apparent technological object; it should not be if it is indeed a mask for something bigger. The difference between the ‘Real’ and ‘the real’ is not arbitrary; the OMIDAR must be an embodiment of both the myth of fulfillment and the reality of its absence because it is a reified void-object representative of the Other. Thus it is not “how to grasp the multiplicity of determinations, but rather of how to abstract from them, how to constrain our gaze and teach it to grasp only the notional determination” (Žižek 2008:x–xi; emphasis in original) when archaeologists, anthropologists, or ethnographers attempt to get into the mind of a Mormon, as Leone suggested.

As an extension of Lewis Binford’s dicta (1962, 1982), early postprocessual archaeology theory promoted that,

... it is not so much the mechanisms of human adaptation to changing natural circumstances that deserve attention, as the different ways in which people in the past perceived and ordered their environments according to space, time and culture. New diachronic approaches were developed that highlight the continuous reuse of [features] and the constant reordering of landscapes within subsequent societies with different social, ritual and mnemonic systems. [Kluiving and Guttmann-Bond 2012:9]

Materializations of worldviews in landscape archaeology incorporate cosmology, genesis stories, theology, spirituality, and celestial events among other pertinent cultural aspects, features, and functions of a social group. Hence, “[e]xtending landscape to the celestial sphere … afford[s] new insights into the timing and significance of practices … and their meanings in terms of particular belief systems” (Patterson 2008:79). As more research projects incorporated
phenomenology, more controversy and frustration has emerged as a result in part due to the sometimes uneasy antagonism between positivist ‘hard’ sciences and the ‘soft’ social sciences. In order to ascertain meanings and their relationships to ideologies in the past, material evidence is necessary because the immaterial is mediated by the material.

UK Professor of Archaeological Science Martin Bell encourages social scientists not “to xerox,” but rather “we need to utilise the full toolkit of available approaches, social and scientific, including experiments” (Bell 2015:42), and

Traditionally, experiments involve defined steps. They begin with observation, highlighting a strong empirical basis; then a hypothesis is formulated to account for the observations; next, an experimental methodology is identified to test the hypothesis; and, finally, the resulting observations, measurements and tests produce data that provides a basis to refute, or confirm, the original hypothesis. The result may be further tested by replicated experiments. [Bell 2015:43; emphasis in original]

Bell encourages archaeologists, “to devise effective combinations that enable an interpretation derived from one source to be critically examined against evidence from other sources,” because “the gathering of data is not independent of the theory to be tested” (Bell 2015:42) and “in the historical sciences we are seldom in a position to prove anything” (Bell 2015:45; emphasis in original). We must be mindful that, “[t]his assumes that a degree of objectivity can be achieved, and that the observations are not totally obscured by underlying assumptions based on pre-understandings” (supra; emphasis in original).

American ethnoarchaeologist and Professor of Anthropology David Killik is likewise concerned with the manner in which archaeologists and historians arrive at conclusions. In Killik’s argument,
Most archaeologists are pragmatists, and thus evaluate the adequacy of interpretation/explanations by examining how well they account for the archaeological evidence, without resorting to formal methods. But archaeological evidence is woefully incomplete. [Killik 2015:161]

The fact that archaeologists will never have the entire data set they seek to explicate presents gaps that archaeologists and historians too often fill with repetitions of legend (Bell’s ‘xeroxing’) that result in the perpetuation of mythology, a central concern of Leone (1973, 1978; Shurtleff 1967). This dissertation re-examines Leone’s oeuvre for theory and method and repeats parts of both, yet also takes the opportunity to test hypotheses that Leone did not in his time using theory and methods that were unavailable at the time of his past publications.

After deconstructing ‘modern’ conceptions in landscape archaeology, UK landscape archaeologist Matthew Johnson proffers three ways forward for the discipline: “… abandon the highly rhetorical use of theoretical bogeymen and the invitation of false choices … ; maintain and extend the critical examination of field practices … ; [and] open the practice of landscape archaeology up to different groups and stakeholders” (Johnson 2012a:522). Johnson softly concludes that landscape archaeology and its practitioners have a choice:

… we can cling to a myth of academic detachment that has long since been comprehensively discredited … [or we can] think carefully and self-critically about how it moves from evidence to inference. The amassing of evidence in itself, however carefully and arduously done, is not the single defining or primary feature of science; theoretical reflection on the means of inference is at least equally important. It is this point which has been lost in some recent commentaries on the field, and which needs to be placed at the centre of everything that we do. [Johnson 2012a:523]
According to Johnson, at some point,

We are all phenomenologists. Few archaeologists would now deny that it is necessary to consider issues of meaning and subjectivity to achieve a full understanding of archaeological landscapes, and further that they would accept the starting point of the phenomenological tradition, namely, that understanding human experience is necessary but is not a commonsense undertaking. [Johnson 2012b:279]

LiDAR imagery and Digital Elevation Models (DEMs) assist in interpretation of space and place because they are viewed top-down. This elevated, Apollonian perspective cuts through the more experiential qualities that one would have in person on the ground. GIS manipulation of LiDAR imagery such as shading or color ramping and the projection of simulated height or elevation on a 2.5-dimensional map image all assist landscape archaeological survey data collection, management, and interpretation (Chapman 2006:20–21). The Apollonian and Cartesian perspective that GIS and LiDAR affords landscape archaeology studies is not only illuminative, it is phenomenal (all connotations intended). Distinguished American Professor Emerita in the History of Consciousness and Feminist Studies Donna Haraway has called this phenomenon a “God-trick” (Haraway 1991:189).

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In 2016, I undertook a Summer Resources Internship with the National Park Service at Grand Teton National Park (NPS-GTNP) in Moose, Wyoming. The original purpose of the internship was the fulfillment of the GTNP’s Science and Research Management (SRM)—Cultural Resources Division (CRD) National Historic Preservation Act (NHPA) Section 110 survey and inventory of the Mormon Row Historic District (MRHD; 48TE1444) (Figure 3). The MRHD is also an apt comparative study area and data set against which one may test Leone’s
technologies and hypotheses. During the internship and the writing of “A Modified NHPA Section 110 Class II Inventory Using LiDAR Imagery to Locate Historic-era Homesteads and Irrigation Features of the Lower Gros Ventre River Floodplain Terrace and Ditch Creek Alluvial Fan within Grand Teton National Park, Teton County, Wyoming, Volumes I and II” (Schroeder 2017), the author located five published versions of the Mormon Row local legend of the origin of “Miracle” Spring (also known as Mud Spring(s) and Kelly Warm Springs) and 11 site records for the associated prehistoric archaeological site 48TE449-450. Each of the local legends of the origin of “Miracle” Spring and the site records for 48TE449-450 contains similarities and differences. There are kernels of truth within the various legends, maps, and site records that potentially point to the truth of the ‘miracle.’

**Preliminary Results and Discussion**

It deserves reiterating that neither Dr. Leone nor the author is a member of the Church of Jesus Christ of Latter-day Saints (LDS). All observations and interpretations by this author are subjective and are open to critique. I have done my best to stay faithful to Leone’s understanding and interpretation of Mormon ecological ritual while giving Mormon ideology justice. Given this disclosure, I systematically traced the four technologies Leone identified through Leone’s back catalogue as well as the theories and methods he employed to reach his hypotheses.

The first phase of the test checked Leone’s previously identified technologies for presence or absence at Mormon Row. The second phase of the first test sought to check Leone’s previously identified technologies against Žižek’s definition and rubric to determine if there is a match. Because there was not a perfect match, an alternative was proposed. A second test was necessary to identify an alternative technology, one that resulted from a ‘failure of symbolization’ (*sensu* Žižek 2008); one that satisfied the criteria in theory and then tested in both
study areas. It is posited here that landscape archaeology landscape analysis and textual
deconstruction of the Mormon Row local legend of the origin of “Miracle” Spring has revealed a
technology that does satisfy Leone’s and Žižek’s criteria and resolves the research problem
posed above.

While fences served a particular function in Mormon society, it is not clear that fences
determined Mormon society if the City of Zion was never fully actualized (Francaviglia 2015). The ideal City of Zion is closer to Slavoj Žižek’s concept of the “objet petit a,” an object of
ideological desire necessary to fill a void created by “the big Other;” a structure or collection of
social conventions, codes, norms, laws, et cetera that exist simultaneously inside and outside of
an individual Subject; something that is sometimes best left in ignorance and not confronted in
reality otherwise the lattice of illusions might crumble and fall. What remains is a desire to desire
something which keeps Subjects engaged. Settlements based loosely on the ideal Plat of the City
of Zion were built and many thrive unto today (Nelson 1952; Francaviglia 2015), but none is the
City of Zion, not even Salt Lake City. Ultimately it is not the fence but what the fence ‘contains’
within its boundaries within Mormon settlements that is the real object of Mormon ideology.

Leone tried again to locate the object of Mormon ideological desire in 1977 (before it
was a concept sensu Žižek 2008) as Mormon temple architecture, plan, and program, and again
was only partially successful. Only inter item Mormon Saints are permitted to experience the
interior architectural program of a Mormon temple as it relates to the endowment ceremonies
(Leone 1977). Mormon temples, therefore, are not an object about which all are aware.

Leone investigated historical Mormon dam re\construction on the Little Colorado River
valley of Arizona in the late 19th century in a quest to discover the relationships between
ideology and technology by interrogating Mormon High Councils, local authority hierarchies,
and calendrical ritual (Leone 1974, 1979) (Figure 2). Dams are not a void in the traditional sense of the word. A dam is a physical mass and volume. Dams create or may result in the formation of a void space if there is no water behind them, though rarely are dams not holding water. In this sense they may be regarded only as a deficiency. Whereas Mormon historical ritual responses to dam re\construction was unique and special to the Mormons of the Little Colorado River valley in the 19th and early 20th centuries (Leone 1979), an historical ecological response is not an object. A response very nearly functions like an object but has no material substance nor was the practice ubiquitous, i.e. not all historic Mormon settlements built dams. There are or were no manmade dams at Mormon Row for example. The closest dam to Mormon Row was and is the Jackson Lake Dam. The Jackson Lake Dam is not hydroelectric; Jackson Lake Dam does provide irrigation water to the Snake River Valley over 40 miles away in Idaho but not locally (Fiege 1999). Dams initially appear to satisfy the criteria of an object of ideological desire, yet they, too, fail at an elementary level.

As Žižek reminded us, that which we seek is “produced by the signifying texture itself” (Žižek 2008:180). According to Žižek, “[i]t is to the eternal credit of ‘structuralism’ to have ‘de-hermeneuticized’ the very field of the symbolic, to have treated the signifying texture independent of the universe of the experience of meaning” (Žižek 2013:697). The ‘signifying texture’ exists apart from the Earth and from the people who envision(ed) it, here the Mormon ideological desire for and of a New Zion. The signifying texts which form the ‘signifying texture’ are the five published accounts of the origin of “Miracle” Spring. The legend of “Miracle” Spring perpetuates Mormon ideological desire and thereby serves to perpetuate Mormonism. The published accounts are material ‘things,’ ‘artifacts,’ data (Leone and Potter 1999). In this articulation the five published accounts are material evidence of an immaterial
belief beyond an historical event. Taken individually as objects, the legends serve as data amenable to comparison, contrast, and verification of facts. The best available evidence is used to confirm or contradict what is known about the origin of “Miracle” Spring. Through an examination of the discrepancies in the accounts there is an expectation that the truth will be revealed, and in the reverse analysis, artifactual evidence on or in the ground can be tested against the ‘signifying texture.’ If, “the process of searching itself produces the object which causes it;” if “it is an exact parallel to Lacanian desire which produces its own object-cause” (Žižek 2008:180), and if there is a perfect match between the material evidence and the ideological ideal, then the antagonism between the ‘real’ and the ‘Real’ will have been resolved.

Landscape archaeology landscape analysis of archival maps and documents and the archaeological record of Kelly Warm Springs (48TE449-450) revealed a common denominator: water. Four of the five local legends about “Miracle” Spring mentioned irrigation directly or indirectly. The fifth legend, Kreps’s retelling of Hansen’s telling, mentioned wells. Curiously, none mentioned the original hot spring. The original unnamed hot spring supplemented geothermal water to Hot Springs Ditch from 1899 until 1927; Mud Spring(s) supplied and or supplemented geothermal water to Mud Spring(s) Ditch, Enlarged Mud Spring(s) Ditch, and the May Stock Ditch from 1896 until at least 1945; Mud Spring(s) later known as Kelly Warm Spring has supplied and or supplemented geothermal water to Mormon Row Ditch from 1927 until the present (Schroeder 2017). Reinterpretation of historical events was and is a distinctive cultural and ideological component of Mormon culture, one that facilitated and continues to facilitate their adaptive ecological strategy as well as their relationship with God wherein everything always will have been exactly as it is (Leone 1979:25). This answers the question
regarding the true origin of “Miracle” Spring, but it does not answer the question about the truth in the legend.

Leone went to great lengths to situate dams within historical Mormon ecological ritual by describing, detailing, or including the technology as an integral element of Mormon ideology. When Leone discussed dam reconstruction on the Little Colorado River in Arizona, he did not interrogate in the same trenchant manner the manmade distributary features that physically comprise a large proportion of an irrigation system’s physical footprint for which impounded water behind dams was and is intended. Indeed less is said about the canals, ditches, headgates, turnouts, checkdams, diversions, laterals, sublaterals, and rills or other appurtenances of irrigation systems than any other technology investigated by Leone. Why? Perhaps because, unlike actual fences, actual plats and actual settlements, actual temples, and actual dams, the whole object could not be seen in person on the ground.

After the legend was deconstructed, additional landscape analysis of LiDAR imagery of the Lower Gros Ventre River and the Ditch Creek alluvial fan included tracing in GIS all of the faint irrigation sublaterals that are etched and stretched across the Mormon Row study area. A pattern was noticed by the author beginning around the mouth of the Gros Ventre River and Kelly Warm Springs (Figure 4). Taking a virtual step back at the 1:48,000-scale reveals more of the MRHD (48TE1444) than was ever visible or known before (Figure 5). The pattern of closely spaced parallel irrigation sublaterals is provisionally referred to here as a Mormon irrigation pattern (MIP). An MIP metapattern (sensu Bateson 1978) may be considered an object created by humans in the past that circulated in capitalism and which persists in the archaeological record thus prompting new questions: Is irrigation or the MIP the ideal technology that facilitated Mormon settlement of the Intermontane West? and Is irrigation or the MIP the OMIDAR?
If the pattern evident at Mormon Row is an MIP, then it should be evident among other Mormons in Jackson’s Hole at or about the same time. Is the pattern evident at Mormon Row evident elsewhere in the Park? After tracing all of the irrigation features in the Park, the short answer is a qualified yes. Figure 6 is a 1:250,000 topographic and hillshaded projection of the traced irrigation feature layer co-created by the GTNP and the author. Four areas of closely spaced irrigation sublaterals were identified through previous archival research by the author (Schroeder 2017) and others who performed cultural resource management in the study area.

In “Survey Report of Selected Historical Cultural Properties Located within Grand Teton National Park, Wyoming,” Ann Hubber and Janene Caywood found that:

Winter approached, and the Idaho contingent sought refuge with neighbors from adjacent communities before constructing cabins in the spring of 1897. The McBrides chose to settle on Flat Creek, south near Jackson; the Allens chose land to the north, near Moran; and the May and Budge families filed on homesteads at the south end of Blacktail Butte, near water and well-sheltered from wind and winter storms. [Hubber and Caywood 1997:14]

Bureau of Land Management (BLM) General Land Office (GLO) (2016, 2017) records confirm what Hubber and Caywood reported about the Allen family in the vicinity of Moran, Wyoming. Unfortunately, no information about James Manges’s faith has been located to corroborate or contradict the argument presented here; that wherever the MIP is found there were or are Mormons, i.e. metapattern (sensu Bateson 1978). More archival research on James Manges is therefore warranted. Likewise, another test of Leone’s historically Mormon Little Colorado River settlements is necessary. If the same or a similar irrigation pattern exists among Little Colorado River settlements, then an argument can be made that there is a Mormon
irrigation pattern (MIP) identifiable and locatable in the archaeological record that represents historic Mormon attempts to create New Zion anywhere and everywhere practicable in the Intermontane West (Leone 1979:28).

Unfortunately, there is not a publicly available LiDAR data set available for the area Leone investigated; there is publicly available orthoimagery. Landscape archaeology landscape analysis was performed on 2016 National Agriculture Imagery Program (NAIP) orthoimagery in ArcGIS by the author in 2018 in and around each known historically Mormon settlement along the Little Colorado River and Silver Creek in Leone’s original study area.

The parallel sublateral pattern, the provisional MIP, was searched for, and where present, the pattern was traced in ArcGIS. The pattern is evident in Figure 7, a 1:10,000-scale orthographic projection of the hamlet Hay Hollow, Arizona—the only Mormon settlement mentioned in Leone’s doctoral dissertation (Leone 1968). Taking a virtual step back to look at more than one Mormon settlement along the Little Colorado River at one time at the 1:63,630 scale further illuminates the pattern (Figure 8). 1:500,000-scale orthographic projection of the entirety of Leone’s original study area in Arizona reveals there is material evidence that the same type of closely spaced parallel irrigation sublaterals seen at Mormon Row in Wyoming are evident in Mormon Arizona (Figure 9). Each of the Mormon settlements in Leone’s study area contains at least one representative field with the MIP present; many more are extant but were not traced.

The presence of the MIP in both study areas demonstrates that the MIP existed and still exists in relict and active fields. Irrigation was and is a technology that facilitated agricultural subsistence in marginally productive arid landscapes in the Intermontane West of North America. With this revelation, one can say with an increased degree of certainty that the historic
Mormon creation of New Zion anywhere and everywhere practicable in the arid Intermontane West (Leone 1979:28) was and is predicated on irrigation technology embodied in the MIP. It should be noted that the MIP and a circular pattern of irrigation are both present in Figure 7. At some point after 1950 center-pivot irrigation machinery was installed and used in Hay Hollow, Arizona as evidenced by the bulls-eye pattern of concentric rings superseding the still-visible MIP.

Joseph Smith and Brigham Young encouraged 19th and early 20th century Latter-day Saints to fill a conceptual void—the City of Zion—with a New Zion anywhere and everywhere practicable (Leone 1979:28). If, according to the Book of Mormon, a Mormon is an embodiment through whom God speaks, then a Mormon is or has the potential to become an inter-item Saint through righteousness and strict adherence to the faith. Indeed,

God’s elect, in these latter days, exist because they please God. The Lord suffers them to exist because they continue to please him. In all millennial movements the imminent Second Coming of Christ meant that a group, for whom he was explicitly to come, was to prepare the way for that coming. The preparation of that way was in the hands of those specially chosen by God for the task. The task was enormously difficult because it was two-sided. The earth had to be changed and prepared for its redemption by God’s more recent elect. But the very process of preparation was a demonstration by his elect that they themselves were worthy of the Second Coming. [Leone 1978:198]

The City of Zion is equivalent to Slavoj Žižek’s concept of the ‘objet petit a,’ something that is a byproduct of human consciousness and needed to fill an ideological void. The ‘objet petit a’ is something sometimes best left in ignorance and not confronted in reality otherwise the lattice of illusions might crumble and fall. If this is the case, what remains is a desire to desire
something beyond the here and now, a *jouissance*, and that keeps Mormon subjects engaged in a deliciously anticipated wish (*sensu* Žižek 2008) in salvation history. Mormonism holds that, “life has neither beginning nor end but is a continuous existence which always was and ever will be … which each Mormon has the ability and right to know and interpret” (Leone 1979:9).

In this view, a righteous Mormon’s life-work is also God’s-work. Earthly redemption and righteous living, the goal of which was and is to prepare a place, a holy land in advance of His return is therefore fundamental to Mormon culture. “Just as the desert of the original Zion was made green under the ministration of God’s elect, so the new Zion, also in a desert, was to be subject to an identical process” (Leone 1978:198). The Mormon settlement plan and the employment of fences are, for Leone, embodiments of this ideological ideal, and:

… allows a Mormon to accomplish … something more beautiful, more orderly, and more refreshing; something neater, cleaner, and more desirable. He has created a semblance of the divine. … By managing, manipulating, and grooming the earth, he has imitated God and proven that he is worthy: he is a saint. [Leone 1978:198–199.

At the very end of his Lacanian-Althusserian-Hegelian examination of ideological objects, Žižek wrote about presuppositions such that:

Here we should rectify – or, more precisely, supplement – our previous analysis: the empty gesture, the act of formal conversion by means of which ‘substance becomes subject’ is not simply dispersed among the multitude of subjects and as such proper to each of them in the same manner; it is always centered at some point of exception, in the One…. This is homologous with Christ: the subjects overcome the Otherness, the strangeness, of the Jewish God not by immediately proclaiming him their own creature but by presupposing in God himself the point of ‘incarnation’, the point at which God
becomes man. This is the significance of Christ’s arrival, of his ‘It is fulfilled!’: for freedom to take place (as our positing), *it must already have taken place* in God as his incarnation – without it, subjects would remain for ever bound to the alien substance, caught in the web of their presuppositions. [Žižek 2008:261–262; emphasis in original]

This passage is taken to mean, for Mormons, there are certain key presuppositions: that salvation history is real; that Latter-day Saints are indeed saints, as in holy and of God; that Christ is the One; New Zion is a work in progress; and The Rapture is ever-anticipated. The social organization and principles of Mormonism (Leone 1979) permitted and continue to permit them an ideological freedom precisely because of their ‘web of their presuppositions.’ This web, or in Leone’s terms, a cycle of causation, can be represented graphically in a flow chart (Figure 1). In Figure 1, cause is at the center of the cycle. Ideology and technology revolve reflexively around a causative agent. The difficulty for Leone has been in identifying and locating the causative agent in reified form in the archaeological record. If the OMIDAR—New Zion reified in the MIP—is substituted for the causative agent, then the work that irrigation networks have done and still do to transmogrify *terra nullius* Earth into an edenic holy land in the Intermontane West of North America is the agency. Irrigation sustained and continues to sustain Mormon society. But first, humans had to build the irrigation network that does the work of earthly redemption; a Mormon’s righteous life-work is, once again, God’s-work in the transformation and transmogrification of *terra nullius* Earth into an edenic holy land (Figure 10).

Leone made the claim that, “[t]he land of the saints really was going to bloom and, by God, it did. And it bloomed because they used fences” (Leone 1978:198). This is absurd from a realist perspective: fences did not contribute to the blooming of anything; water did, does, and always will. Leone’s meaning is taken here metaphorically as I believe it was intended. Indeed,
A Mormon who creates something green has shown his inner state. In this context, fences are valuable because of what they preserve behind them. What they preserve in addition to a subsistence base is a man’s right to a place in the Kingdom of God. [Leone 1978:198–199]

This rather simple (yet psychologically complex) utility of fence technology is one way in which ideology functioned and continues to function in the daily lives of Mormon subjects. It is increasingly clear, now and however, that it was and is not fences, rather it is what is ‘behind them’ that is important ideologically and economically.

**Significance and Conclusions**

According to Žižek, ideology attaches itself to the essence of *jouissance* and is always an excess beyond the lived experience of faith, labor, and suffering in the pursuit of ideological desire. *Jouissance* is peculiar. *Jouissance* means enjoyment in French, but it has a shadow side. Life should contain joy; *jouissance* entices and entrains humans to seek good in the here and now as well as the future. There is, however, a threshold beyond which the pleasure of the pursuit of happiness or the good becomes suffering. This results, paradoxically, in a pleasure in pain and suffering. Not only is there a threshold that reveals itself to us as a point after which there is a diminished return on the original investment in pleasure, there is also a satisfaction in achieving a level of suffering beyond the normal tolerance or threshold, a badge of honor of sorts. Those Mormon pioneers who endured several and serious trials, travails, and tribulations on the wagon routes to the Great Basin bore and continue to bare testament to the faith and belief in a better world to come. There is also a suffering due in part to an excess zeal and desire to create a utopia while there exists the potential impossibility of ever realizing it, e.g. the City of Zion. Suffering also applies to settlers and farmers who experienced droughts; droughts are beyond the hubris
and control of humans and could be interpreted as punishment for sins or yet another test of the faithful depending on the circumstances. There are other examples of suffering.

In this articulation of pleasure and pain, the moment a person, a Subject, realizes that his or her existence and jouissance is contained and held beneath a mask of ideology a momentary release from needless suffering can begin. In this articulation the sublime object of ideology is phenomenal and real; it is a fantasy wish and a reality that is simultaneously mediated through joy and suffering. This rather simple (yet psychologically complex) utility is one way in which ideology functions in the daily lives of subjects. Because an ideology, a system of beliefs or Lacan’s le grande Autre, “the big Other,” an immaterial structure or collection of social conventions, codes, norms, laws, et cetera, is believed by its followers to be true, i.e. Mormonism exists simultaneously inside and outside of individual subjects; it serves to perpetuate Mormon society intact. Much the same can be said about Capitalism and its adherents. Indeed, “the subject can ‘enjoy his symptom’ only in so far as its logic escapes him – the measure of the success of its interpretation is precisely is dissolution” (Žižek 2008:16) because, “belief … is definitely not to be conceived at a ‘psychological’ level: it is embodied, materialized in the effective functioning of the social field” (Žižek 2008:34). “The mask is not simply hiding the real state of things; the ideological distortion is written into its very essence” (Žižek 2008:25). Indeed:

It is this paradox which defines surplus-enjoyment [a plus-de-jouir]: it is not a surplus which simply attaches itself to some ‘normal’, fundamental enjoyment, because enjoyment as such emerges only in this surplus, because it is constitutively an ‘excess’. If we subtract the surplus we lose enjoyment itself, just as capitalism, which can survive
only by incessantly revolutionizing its own material conditions, ceases to exist if it ‘stays the same’, if it achieves an internal balance. [Žižek 2008:54]

If jouissance and is always an excess beyond the lived experience in the pursuit of ideological desire, then in the 19th and early 20th centuries the attachment to Mormon Doctrine and the desire to create a New Zion was, is, and always will be the Mormons’ jouissance. To prepare for The Rapture, Mormons settled together and built irrigation networks—actual, physical, material voids to redeem the earth literally and figuratively, actively and passively—that are embodied in leftovers from the past that participate(d) in daily capitalistic life.

In this dissertation, I systematically traced the four technologies Leone identified through Leone’s back catalogue as well as the theories and methods he employed to reach his hypotheses, albeit untested. The dissertation tested the hypothesis that an OMIDAR is identifiable and locatable in the archaeological record, one that satisfies all of Leone’s and Žižek’s criteria, and one that may not be readily visible to the observer. Through ‘a failure of symbolization,’ through a dissolution of ‘fetishist disavowal’ wherein it is known very well that ideology is an illusion, a foil, but will proceed anyway with a belief in what one wants to see (a vision) and what one wants it to be—a manifestation; a materially reality; a thing in itself (Žižek 2012)—a phenomenon is accepted.

In the final analysis, Leone did identify irrigation’s importance but did not test it as an object perhaps because, unlike fences, settlements, temples, and dams, the whole object could not be seen. A perversion of positivistic logic reveals that Leone failed to see what he purports Žižek failed to see: “Zizek couldn’t see” because “his combination of Marx and Freud didn’t allow him to see” (Leone 2010:213). This suggests that Žižek was blinded by Marx and Freud
and could not see the truth behind either tautology; this may be because Marx and Freud were combined incorrectly in Leone’s interpretation; Žižek follows Lacan who followed Freud.

A close reading of Žižek reveals that he knows very well what he is breaking apart through the dissolution of fetishistic disavowal: a Lacanian notion of a sublime object of ideological desire that is both real and Real. Such dissolution is cataclysmic and should not be attempted lest the entire lattice of structural illusion crumble and fall which is precisely Žižek’s goal, his philosophical duty: to deconstruct the construct while telling us along the way what he is doing, how, and why in order to ascertain the truth. Leone appears to have missed this point behind the foil of positivist scientific methodology: that water, and by extension irrigation technology, was, is, and always will be the one and only way Mormons could have created a New Zion in the arid Intermontane West of North America in the 19th and early 20th centuries (or today). This is significant on several levels: materially, psychologically, and spiritually.

This significance is poignantly pointed out in Leone’s (2010) Critical Historical Archaeology, he summarized the pivot point within Žižek’s second criterion: that the object of ideological desire is something we desire in the present and which represents a perfect, ideal, and stable past. From a presentist perspective, though, we know also that the past was anything but stable. This antagonism is what Leone cited as Žižek’s contingency, wherein:

“Contingent” here means that the actual thing is, of course, a ruin. But the notions of “huge” and “vile” come from the social lives that these objects reveal—namely, slavery; absolute power, filth of every sort, human and financial degradation, and all those social processes described in the papal encyclicals. They are all the same. This is what Collingwood meant by history and the past not being dead. Concentrating on this process
of objectification is what I see as the opportunity for historical archaeology—a largely missed opportunity so far, in my opinion, but, maybe, retrievable. [Leone 2010:210]

Ironically and somewhat disconcertingly, Leone summarized Žižek’s contingency as containing an ‘opportunity for historical archaeology—a largely missed opportunity’ potentially ‘retrievable’—yet does not retrieve the potential himself. Had Leone critically deconstructed his own tautology by breaking his own ‘spell of fetishizing abstraction,’ he might have discovered the fundamental flaws outlined and discussed here. Reflexive logic reveals that irrigation technology embodied in the MIP is something contained within the boundaries of fences within Mormon settlements based on the Plat of the City of Zion and Mormon settlements are connected by and integrated within a network of wards and stakes that were and are administered by Mormon High Councils in temples, especially the Salt Lake Temple. Whether or not dams were constructed to supply settlements with water, water resources and water rights were and are critical to agriculture and agriculture is critical to Mormon society. Irrigation builds and sustains social cooperation and cohesion because the entire community benefits over time. Irrigation is a causative agent. Indeed, irrigation is considered a cornerstone of civilization (Steward 1955).

It is curious and humorous to note that before Leone discussed Žižek in 2010, he acknowledged the power of the seductive “vacuum created by not knowing how to discuss the origins of the earth, life, humanity, and it’s (our) accomplishments” (Leone 2010:97–98), an ideological void that Christianity fills or attempts to fill through ritual and belief. Science is muddied by theological topics because science cannot adequately explain phenomena. There is a disavowal that believers permit themselves in order to maintain their beliefs and their faith in a better world to come accomplished through righteous action and living. It is precisely the Christian capitalist context through which any real understanding of Divine Providence, Manifest
Destiny, or Mormon millenarianism in the past can be understood in the present in a social scientific paradigm aimed at reflexively discovering the truth behind the mask of ideology in things. It is through a phenomenological landscape archaeology landscape analysis that the index object, the OMIDAR, the MIP that is New Zion in the archaeological record, has been identified and located. The problem until recently has been the visibility of irrigation network features and the ability to see the whole network at once.

Ultimately, it takes an Apollonian, i.e. godlike, perspective in contemporary GIS and LiDAR imagery (Haraway 1981; Chapman 2006) to identify and locate the entirety of an irrigation network as a unary object at a landscape scale. Once the digital phenomenon is reckoned with, only then does irrigation technology begin to approach a material reality as an object. Only a real material object can serve to reify an ideological desire of a New Zion. Irrigation technology embodied in irrigation features is a real material object capable of serving and fulfilling the Mormon ideological desire for a New Zion unlike any other technological object hypothesized by Leone. The MIP thus represents the intersection of Mormon ideology and *jouissance* with material evidence, hence the MIP, a metapattern (*sensu* Bateson 1978), is simultaneously New Zion and the OMIDAR.

By admitting that positivist hypotheses are inadequate to contend with an archaeological inquiry into objects of ideological desire, the antagonism is resolved through performing ‘labor:’ the dissolution of fetishistic disavowal and the radical acceptance of Mormon salvation history and New Zion as *Real, real*, and real. The object of Mormon ideological desire—New Zion—was and is not only the *Real*, it was and is also reified; it is really real.

It is evident in landscape archaeology landscape analysis of a 1:500,000-scale orthographic projection of Leone’s original study area in Arizona that the MIP existed and still
exists in relict and active fields (Figures 7–9). Said MIP hid(es) a void, a deficiency in large, unattractive landscape features left over or resultant from the past that circulated and or circulates presently in the daily lives and social organization of the Mormon settlers of the Little Colorado River and Silver Creek in Arizona and the northern floodplain terrace of the Gros Ventre River and the Ditch Creek alluvial fan in Jackson Hole, Wyoming in the late 19th, the 20th, and even the 21st centuries. This cause and effect cycle is represented in Figure 10.

The proposed Great State of Deseret was well within the Intermontane West. Assistant Professor of Geography Brandon S. Plewe, Professor Emeritus of Ancient Scripture S. Kent Brown, Professor Emeritus of Church History and Doctrine Donald Q. Cannon, and retired professor of Historical Geography Richard H. Jackson at Brigham Young University in their Mapping Mormonism: An Atlas of Latter-day Saint History, presented a density map in Section 2 entitled: “The Empire of Deseret 1846–1910” (Plewe et al. 2014:70–71). This title alludes to the international expansion of the Mormon community circa 1870 in North America and is from an avowedly Mormon-centric perspective. The authors rapidly accounted for historical precedent and the present condition when they wrote: “Despite the ‘Americanization’ of the Church, the dream of the Empire of Deseret has been ingrained in the cultural landscape of the Intermountain West” (Plewe et al. 2014:70).

Figure 11 is Plewe et al.’s map of “The Empire of Deseret” (2014:71). Three values—presumably high concentration or presence, presence, and absence, as in little or no presence—are represented. No key is provided to tell the reader the exact meaning of the shading. No scale or north arrow is provided either. The shaded area is also the region of North American known as the Intermontane West. What is remarkable about the second sentence in the text that
accompanies this map is the almost surreptitious inclusion of the word ‘dream’ the second time “The Empire of Deseret” is mentioned. ‘Dream’ alters the meaning of the entire passage.

Francaviglia reduced what Thomas Tweed said into a paraphrase: “religions themselves are maps” (Francaviglia 2015:3). What Tweed actually proposes under the subtitle The Cosmos, which harkens landscape archaeology studies of materializations of worldviews, is:

Homemaking extends beyond the homeland’s borders, and the religious also negotiate power and meaning as they imagine the structure, history, and limits of the wider landscape and the entire universe. Using allocentric reference frames, they produce geographies, cosmographies, cosmogonies, and teleographies. Religions offer geographies, cognitive maps of the earth that include not only the home and the homeland but also the vast regions beyond intimate space and collective space. At its most basic, geographies involve autocentric framings that survey space in terms of the binary here and there, with here understood as the boundaries of the body, the home, or the homeland. This sort of mapping also involves chorographies, positioned representations of a region, as in the pinturas drawn by Amerindians at the request of Spanish colonial officials in the sixteenth century, but in many instances sacred geographies include mental maps that imagine the widest inhabited area of the earth Using various geometric shapes (including the circle and the square) and a wide variety of symbols, the religious have mapped terrestrial space. [Tweed 2006:113; emphasis in original]

This full quote is different than “religions are themselves maps” (Francaviglia 2015:3) when put back in context. This means that if the MIP can be systematically located in the density map depicted in Figure 11, it may be argued that the ‘dream’ is—and in Mormon salvation
history always was and will be—a reality. An investigation of this hypothesis is clearly warranted!

In the final analysis, it takes a manmade earthen void to fill the conceptual, ideational, and ideological void that is the ever-anticipated Rapture in Mormon salvation history and it takes an Apollonian, i.e. godlike, perspective in contemporary GIS using LiDAR imagery (Haraway 1981) to identify and locate the entirety of an irrigation network at a landscape scale. Once the digital phenomenon is reckoned with, only then does irrigation technology begin to approach a material reality as an object. If the MIP is the reified intersection of 19th and early 20th century Mormon ideological desire with material evidence and *jouissance* in the archaeological record, then the metapattern (*sensu* Bateson 1978) that is the MIP is New Zion and the OMIDAR, “an object which is the embodiment of the lack of the *Other*” (Žižek 2008:192)\(^5\).

Now that the problem of identifying and locating the OMIDAR, is resolved, the result may seem anticlimactic, too mundane, vile even. That The Rapture has not happened yet presents an antagonism that still requires faith, continual labor, and material mediation or else the desire to desire a better world exhausts itself and fails due to entropy. The dissolution or fall of an ideological illusion can be jarring, but it does not have to be. There is an opportunity to re-interpet as Mormons are wont to do. Indeed, what may appear to be relict archaeological features can be revived and reused if labor is performed in reconstruction and maintenance and water once again flows through the distributary features to an intentional end-use: the redemption of the Earth anywhere and everywhere they already exist. Water was, is, and will always be life. Selah.

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\(^5\) Other religions may have an object of ideological desire in the archaeological record also, e.g. the Dome of the Rock or the Holy Sepulchre (Christianity); Beit HaMikdash HaSheni (Second Temple and the so-called Wailing Wall; Judaism); the Qabba’a (Islam); the *shivalingam* (Hindu traditions). Several texts should be cited and examined; several potential objects for each religious tradition should be tested against Žižek’s criteria!
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Figures accompanying Précis text

FIGURE 1. Theoretical cycle of causation in the archaeological record (Diagram by author 2018).
FIGURE 2. Leone's original study area along the Little Colorado River in Arizona (1979:xvi).
FIGURE 4. All known cultural resources near Kelly Warm Springs and traced irrigation features revealed by 2014 LiDAR imagery in GIS (Map by author 2017).
FIGURE 5. Schematic map of all irrigation features of the MRHD (48TE1444) traced in GIS over 2014 LiDAR imagery (Map by author 2017).
FIGURE 6. All traced irrigation features within Grand Teton National Park (Map by author 2017).
FIGURE 7. 1:500,000-scale orthographic projection of representative Mormon irrigation pattern (MIP) examples in or near known historically Mormon settlements on the Little Colorado River in Leone’s original study area in Arizona (Map by author 2017).
FIGURE 8. 1:63,630-scale orthographic projection of representative Mormon irrigation pattern (MIP) examples in or near known historically Mormon settlements on Silver Creek in Leone’s original study area in Arizona (Map by author 2017).
FIGURE 9. 1:10,000-scale orthographic projection of representative Mormon irrigation pattern (MIP) examples in the hamlet of Hay Hollow in Leone’s original study area in Arizona (Map by author 2017).
FIGURE 10. Flow chart of the cycle of causation related to irrigation and Mormon ideology (Diagram by author 2017).
