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A. J. SIMMONDS

The rise and fall of the Bear River

The Rev. Canon H. Baxter Liebler, the missionary to the Navajo Indians at Bluff, Utah, used to tell a story about the schoolboy essay written by an Episcopal bishop. The bishop chose as his topic "The World And All It Contains!"

I had reason to remember that phrase on Jan. 9 when I spoke to the special symposium on the Bear River. State Sen. John Holmgren asked if I would speak on "The History of the Bear River." I did. It was like the bishop's essay. I started at 34,000 B.C. and ran out of time about 1866 A.D., just when I was on a roll.

But one of the things that leaped out of the pages I researched to prepare that speech was the fact that there has been an enormous fluctuation in the flow of the river since it was first discovered and recorded by Americans and Canadians in 1818.

We only have good, scientifically valid measurements of the flow of the Bear River since 1896 when Samuel Fortier of the Utah Agricultural Experiment Station did the first duty of water studies in Cache Valley. But we have good historical records that contain narrative accounts of the rise and fall of the Bear River since at least 1825, and we have some fair indications of the rise and fall of the Great Salt Lake (to which the Bear River contributes roughly one-half of its total inflow) as far back as 1750.

The records are buried in little-used government documents and hidden as sentences in mountain man narratives where they are often overlooked by readers more interested in the mechanics of the fur trade era and the first contact with the Indians and with Rocky Mountain wildlife. But the indications are there of just what the Bear River has historically done.

This becomes important in view of the current agitation to form a water conservancy dis-



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The Bear River leaving Cache Valley, shown in 1905, before construction of Cutler Dam.

trict to build dams on the river (a conservancy district that has the power to tax all property in the county — and that parenthetical phrase should leave little doubt about where I stand on the issue). Records since 1896 simply don't give much of a history of river flow. They only record one very high period — that beginning in 1982 — and only one really low period — that in the drought of the early 1930s.

We have some regional experience with dividing water flow based on inadequate information. When the Colorado Compact was signed dividing up the waters of the Colorado River amongst the states that border it, the flow was calculated as considerably more than the river has since flowed. As a consequence, the whole history of water development on the Colorado has been marked and

marred by litigation.

Even a cursory examination of the historical record shows that the flow of the Bear River has been marked by great rises and falls. For instance, in early May of 1825, the Canadian trappers of the Hudson Bay Company under Peter Skene Ogden easily crossed the river on horseback between Weston and Fairview. Yet a few weeks later, when the spring melt began, they were forced to build bull boats to float their furs back across the river between Lewiston and Cornish.

During the rest of the 1820s and the 1830s, most of the accounts that I have examined at all closely indicate that the river flow was low enough that wading the river was possible almost anywhere in Cache Valley. Clearly, the river did not impede travel by the mountain men.

Contrast that to the situation in the early 1860s when ferries were established at Benson, at Amalga and at Bridgeport west of Preston to ferry wagons — and horses — across the river.

The water flow must have substantially increased by the 1860s; and there is indication that this was so. Wagon trains bound for Utah report far more days spent in camp because of summer rain and mud in the 1860s than in the 1850s. And it was in the 1860s that the lake began its rise to its historic high in 1873 — a high not matched until 1986.

In 1868, the Deseret News contained a short article indicating that no irrigation had been necessary in northern Utah that year — only the second time since settlement that that was the case. And in 1873 there was an editorial in the Ogden Junction that stated

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that the great increase in rainfall which northern Utah had been experiencing would soon mean that irrigation would be a thing of the past and that the ditches could be plowed in to yield more farm land.

Things didn't work out that way.

There are some very curious items about the flow of the Bear River that appear in the early pioneer accounts of Cache Valley.

In 1866, when it looked like a new war with the Shoshoni was threatening, Peter Maughan sent David Jenkins on a midnight ride from Logan to Clarkston to call the settlers there back to the safety of Smithfield. Jenkins wrote that he had to swim his horse across the Bear River and that the next morning when the Clarkston wagons reached the Bear in the present area of Amalga, they had to be floated across the river.

Yet by 1877 a federal map of Cache Valley indicated that the place where Jenkins swam his horse and where the Clarkston wagons were floated was the site of a ford. Indeed, all of the maps in the late 1870s and into the 1880s indicate that it was possible to ford the Bear River almost any place in Cache Valley.

And then in June of 1888, when the first work had been done on what is today the Bear River Canal system in Box Elder County — a system that takes its water out of the Bear in Cache Valley at Cutler Dam — the flow of the river was so low that John R. Bothwell, who was masterminding the effort, worried that there wouldn't be enough water in the river to supply the two canals.

From floating wagons and swimming horses in the summer of 1866 to worrying about flow in the summer of 1888. That is quite a difference.

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Looking Back



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Cache Valley was called Willow Valley by early British fur trappers.

Trappers gave Cache Valley its name(s)



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Cache Valley was called Willow Valley by early British fur trappers.

Trappers gave Cache Valley its name(s)

For at least 10 years in the early history of the fur trade in the central Rockies, the name Cache Valley is almost invariably followed by the phrase "or Willow Valley" in the contemporary diaries.

Willow Valley seems to have been the earliest name; and, almost certainly, it was a name applied by the British of the Northwest Fur Company who entered Cache Valley in 1818. It was during this first "Snake Country Expedition" that Michel Bourdon named the Bear River and applied the name "Little Bear River" to what we today know as Logan River.

The name Cache Valley seems to have originated in the summer of 1826 when surplus goods brought up from St. Louis for the rendezvous of that summer were stored in a cache. Among the goods cached somewhere above Nibley were a set of blacksmith tools.

The recently identified and published journal of Jedediah Smith for 1826-27 seems to indicate very clearly that it was he who gave the name Cache Valley and Blacksmith Fork River to future generations of mapmakers based upon that cache and its contents.

But the Smith journal also indicates that the Americans did not use the name Bear River or Bear Lake. So, why is it that we have in this valley place names dating back to both the first American and the first Canadian trappers to enter the place? The reason is probably to be found in the first clash in the central Rockies between the two groups of trappers.

In May 1826, most of the trappers working for Peter Skene Ogden's expedition deserted the British firm and joined General Ashley's American trappers at Mountain Green in Morgan County.

Those deserters doubled the effective American trapping strength in the mountains. They brought with them their traps, their horses and their intimate geographical knowledge of the area. And part and parcel of British geographical knowledge was the knowledge of place names, names that they taught to

the Americans with whom they worked.

Some American names prevailed where those names reflected important American economic activity. Thus, because the supply goods were cached, the name Cache Valley stuck. Likewise, the name Blacksmith Fork. When the American trappers memorialized one of their own, that name took precedence over earlier names.

Thus, Jedediah Smith was memorialized in a major tributary of the Bear River near Montpelier: Smith's Fork. And the old name "Little Bear River" was replaced in 1828 as a memorial to a fallen comrade who was killed by Indians that year. His name was Ephraim Logan. But where there wasn't a purposeful replacement of an earlier name, it was the British name that seems to have survived. Thus, today we use the British "Bear Lake" rather than the American "Sweet Lake."

But one of the names that was replaced was Willow Valley.

Almost certainly, in 1818, that name aptly described the valley.

Warren Angus Ferris indicated in 1832 that of all the length of the Bear River that he had explored, there were only major wooded areas around Montpelier and in Cache Valley. Earlier, in 1825, Peter Skene Ogden described his surprise at finding oak and maple trees on the mountains above Liberty and Huntsville after traversing the entire length of Cache Valley. He wrote:

"... we found on descending the mountains Covered with Oak & maple trees rather a Strange Sight as we have Seen no Wood of any kind except Willows for these two months past ..."

Two months earlier, Ogden and his trappers were near Arco, Idaho. Surely, they must have seen something other than willows — if only the juniper trees around Lava Hot Springs and in Gentile Valley.

But, it is significant that Ogden can write that he only saw willows. We can probably take that to mean that willows predominated in the valley.

There is historical evidence that it is true. In the summer of 1856, U.S. surveyors in Cache Valley noted that the streams and rivers were all lined with a heavy growth of willows. The first pioneers of Logan in 1859 found the Logan Island covered with willows; and used that forest for kindling wood for the first decade of Logan's history.

In northern Cache Valley, the Shoshoni referred to the Bear River bottoms at Riverdale and Bridgeport as "Mo-sa-da-kunie," the place of firewood. While there are some junipers, a couple of cottonwood trees and some Russian olives there today, it could by no stretch of the imagination be considered a place of firewood.

But if moisture is right and the new growth is not disturbed, willows have a disconcerting tendency to grow in this valley. During the recent wet years, the rights of way of the Union Pacific through Cornish and Trenton were filled with shallow lakes, and where UP crews have not sprayed the growth and killed it, there are groves of green willows.

One doesn't need a degree in silviculture to realize that the flowing springs along Logan's 10th West must at one time have been ringed with willows. Indeed, a substantial part of the valley floor east of the Bear River might have had a heavy covering of willows.

The story of Henry Gates' fatal encounter with a bear near the old site of the Logan Sugar Factory and Vance Walker's story of the Big Slough Grizzly in Mendon both mention that the bears were in heavy clumps of willows.

Thus, the British were merely recognizing a botanical fact when they named this place Willow Valley.

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This Everett Thorpe painting shows Cache Valley about 10,000 years ago, with mammoths on the River Heights bench.

The prehistoric climate of Cache Valley



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This Everett Thorpe painting shows Cache Valley about 10,000 years ago, with mammoths on the River Heights bench.

The prehistoric climate of Cache Valley

When I discussed the Bear River at the symposium that Sen. John Holmgren hosted in Logan last month, it became clear to me that what we really don't know about the Bear River is what the prehistoric climate was like, the climate that fed the Bear River and, by extension, the climate of Cache Valley.

Of course, we can't really know what it was like; but the things that we do know can give us some very clear hints about it. And the things that we don't know are tied up in the rise and fall of the Great Salt Lake. Today the Bear River contributes one-half of the total inflow to the lake. There is no reason to think that it was any different in the past; so, if we know something about the lake, we might be able to make some statements about the Bear River and about the climate in Cache Valley.

With a huge inland sea, Lake Bonneville, filling much of the eastern Great Basin, and with permanent glaciers topping the Bear River Range separating Cache and Bear Lake valleys, it is clear that during the last stage of the Ice Age, the Cache Valley climate was much colder and wetter than at present. Indeed, it is likely that at the so-called "Provo Level" (when the lake bench at the level of Old Main was formed) some 12,000 years ago, Lake Bonneville regularly froze over during the winter months, and that all seasons of the year were marked by much increased precipitation.

The great canyons of Mink Creek, Cub River, Weston Creek, High Creek, Summit Creek, Logan Canyon, Providence Canyon, Blacksmith Fork Canyon and the Little Bear River were cut by streams many times greater in flow than those today. During the Ice Age, Green Canyon must have also had a substantial stream.

The gradual warming of the climate beginning some 10,000 years ago marked the end of the last Ice Age. Accompanying the warming was a decrease in precipitation. These, of course, were the two factors that shrank Lake Bonneville from an inland sea to the

present Great Salt Lake: evaporation and decreased rainfall.

The next few thousand years seem to have been marked by dramatic changes in precipitation — and possibly temperature. After the lake dropped below the Provo Level (and thus below the Red Rock Pass outlet to the sea), precipitation increased and the lake rose again at least once — and maybe twice — to again overflow at Red Rock.

The last Ice Age that ended some 10,000 years ago may, indeed, not have been the last. There have been two mini-Ice Ages since then. Some 500 years before the birth of Christ, a little Ice Age made a granary of North Africa. The same cooling temperatures and increased precipitation that made a garden of the Mediterranean brought great changes to Cache Valley. The Great Salt Lake rose to a height of 4,230 feet — some 20 feet above its 1986 high. With the increased precipitation that lake level represented, it is likely that at Christ's birth, Cache Valley was covered with forest and that the more poorly drained areas may have held shallow lakes.

But overall, after some 12,000 years, until perhaps 1500 A.D. or so, the climate gradually dried and warmed, approaching the climatic conditions that greeted the first pioneers and that experienced by today's Cachians.

The nadir of this drying and warming trend was about 1200 A.D. when the entire American Southwest was gripped by a severe drought. It was this drought that drove the Anasazi cliff dwellers of southern Utah, southwestern Colorado and northern Arizona from their homes and the fields they had tilled for centuries. The drought was severe enough and long enough that it is likely the water flow in the Bear River became intermittent and that the Great Salt Lake virtually dried up.

When Richard the Lion-Hearted was leading the Third Crusade, when the Magna Carta was signed at Runnymede, Cache Valley was a desert — more like

western Wyoming with sand dunes and sparse vegetation: a little Sahara.

A climatic change began about 1500 A.D. with a gradual increase in precipitation and general cooling of the temperature — a trend that seems to have lasted until the mid-1800s. The beginnings of this wetter (pluvial) period seems to have coincided with Europe's "Little Ice Age."

Between 1500 and 1700 the climate of the Southwestern United States was considerably wetter than in recent years. By the end of the 1600s, the Great Salt Lake was at a level of 4,217 feet: five feet higher than in 1986 and a full 17 feet higher than in July, 1847, when the first Mormon pioneers entered the Salt Lake Valley.

Again, as at the beginning of the Christian Era, Cache Valley may well have been partially forested. Certainly its grasslands were lush and green, prime grazing for the deer, elk and buffalo whose far western limit of range (central Nevada) seems to have been reached about 1540.

It is never safe to say that a climate has stabilized. Human life or even recorded human life on this continent is too short to give much of an indication of rises and falls; but there seems to have been a rise of precipitation — as stated above — in the late 1600s. Again, about the time of the Declaration of Independence, at least two reports indicate that the level of the Great Salt Lake was higher than at present. And again, in 1826, the lake was almost certainly as high — if not higher — than it is today. That is the year that four American trappers paddled around the lake in boats made out of buffalo skins stretched over willow frames.

The past climatic conditions of the lake, the Bear River and of the valley may well reflect a statement I heard last week when we had a heavy wind, a snow squall, a shower, and sunny skies on the same morning: "If you don't like Cache Valley's weather, wait 15 minutes!"

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Looking Back



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The 'Junction Hills' behind Newton show the rounding caused by the overflow of Lake Bonneville.

Lake Bonneville flood changed Cache Valley

The 'Junction Hills' behind Newton show the rounding caused by the overflow of Lake Bonneville.

Lake Bonneville flood changed Cache Valley

Editor's note: This is the second part in a series on the Bear River.

Fifteen thousand years ago (give or take 5,000 years) when Lake Bonneville overflowed into the Snake River Basin, the overflow altered the look of the valley.

The flood was catastrophic. All along the Snake River Plain in southern Idaho, boulders sit isolated in fields miles from the Snake River. Twin Falls sits in a depression washed by the flood. One estimate suggests that the flow from Lake Bonneville was four or five times the annual flow of the Amazon River and that the high water lasted but a few weeks. In that time, the waters of the lake began the first step toward physical change of the topography of Cache and Bear River valleys.

The huge rush of waters between the main body of the lake and the bay that covered Cache Valley — the bay through which the lake found its outlet to the sea — markedly changed the topography of the hills and mountains that stood in its path.

Compare the gently rounded tops of the Junction Hills at Beaver Dam and north of the Long Divide between Newton and Fielding with the rugged peaks of the Wellsvilles and Clarkston mountains. As the retreating flood waters of Lake Bonneville rolled from Box Elder into Cache Valley, they crossed those hills (at the lake's high point only Molly's Nipple was exposed above the lake) and changed them. Whatever their previous topography, after the Bonneville flood had subsided, they were the gentle slopes we see today.

Trenton Hill was also altered, with the south end, which received the brunt of the force of the current, shaped sharply like a ship's prow and the north end reasonably protected from the full force of the current.

Examine any topographic map, or look at clear aerial photos, and the course of the flood is clear — from the Collinston Summit to Red Rock Pass; and where mountains or hills obstructed the current, the deposition of the silt wrenched from the tops of the hills is evident. Since Trenton Hill created an eddy, there is a huge bar that rises between Newton and Clarkston. And it is likely that the Bonneville flood

was responsible for the present dog-legged course of Clarkston Creek.

In Box Elder County, mountains that were in the way of the flood look like they have been scoured. Compare the slopes of the Wellsville Mountains above Honeyville or Deweyville with the west-facing slopes of the Bear River mountains above Providence or Millville in Cache Valley — slopes that were not in the path of the flood. Note the rounding of the mountains behind Tremonton, Garland and Riverside — hills that were likewise in the path of the outgoing water as the northwest arm of Lake Bonneville rushed over them en route to Cache Valley and to Red Rock Pass.

Once the lake had cut Red Rock Pass down to bedrock, the lake stabilized at about 4,770 feet above sea level. It was at that elevation that the lake stabilized for perhaps its longest period, creating at that level the most distinctive of its shorelines. Since that shore was first recognized at Provo, it has since been called the "Provo Shoreline," though it is recognizable throughout the entire basin. Locally, it is the level of the campus of Utah State University. It is also the level of lesser institutions in the state: BYU and the U of U!

It was at the Provo Level that the Bear River began its major work in the restructuring of Cache Valley and of the Bear River Valley — at this level and at its succeeding levels that the present landscape was formed.

The first impact of the Provo Level — and that one that has historically proven to be the most important — was the formation of a lake bed sediment of clay, relatively impervious to later water flow. It is this bed, since exposed along the Bear and the Cub and in other areas of the valley, where surface water ceases to readily penetrate and thus percolates to the downstream side, that it is suggested is responsible for the various landslides and erosional problems that occur in the northern part of the valley, when the movement of surface water is blocked by high ground water from canals, from irrigation, or from impounded water flooding the river bottoms.

A careful study of Bear River sedimentation from the 1930s indicates that slippage in the sandy bluffs

above the Bear River stems from a wetting of the clay layer at the base of the bluffs rather than from penetration of surface moisture.

But after the clay layer that was the lake bed was deposited, the Provo Level of Lake Bonneville was essentially responsible for the present land surface in both Cache and Bear Lake valleys. At every point where a stream entered the lake, a delta was created. The most prominent are the sites of USU and the LDS Temple in Logan, of the city of Hyrum at the south end of Cache Valley, of Weston in Franklin County and — especially — of the sandy reaches of Preston. At Preston, the Bear River deposited the fine silt that it carried.

Since the time of the Provo Level of Lake Bonneville was the end of the last Ice Age, we are speaking of an era of increased precipitation and of decreased evaporation. A lake the size of Lake Bonneville gives a fair indication that other Inter-mountain valleys and basins were also filled with water. During the Provo Level, it is likely that the Bear Lake was considerably larger than at present — probably reaching from Meadowville in the south to Georgetown in the north. At that elevation, the Bear River flowed through Bear Lake, depositing as it did the heavier debris it carried. This scenario accounts for the gravelly marsh north of the lake at the present time. It is in this area — between Montpelier and Bennington on the east and Paris and Ovid on the west — that most of the heavy materials carried by an Ice Age Bear River were deposited.

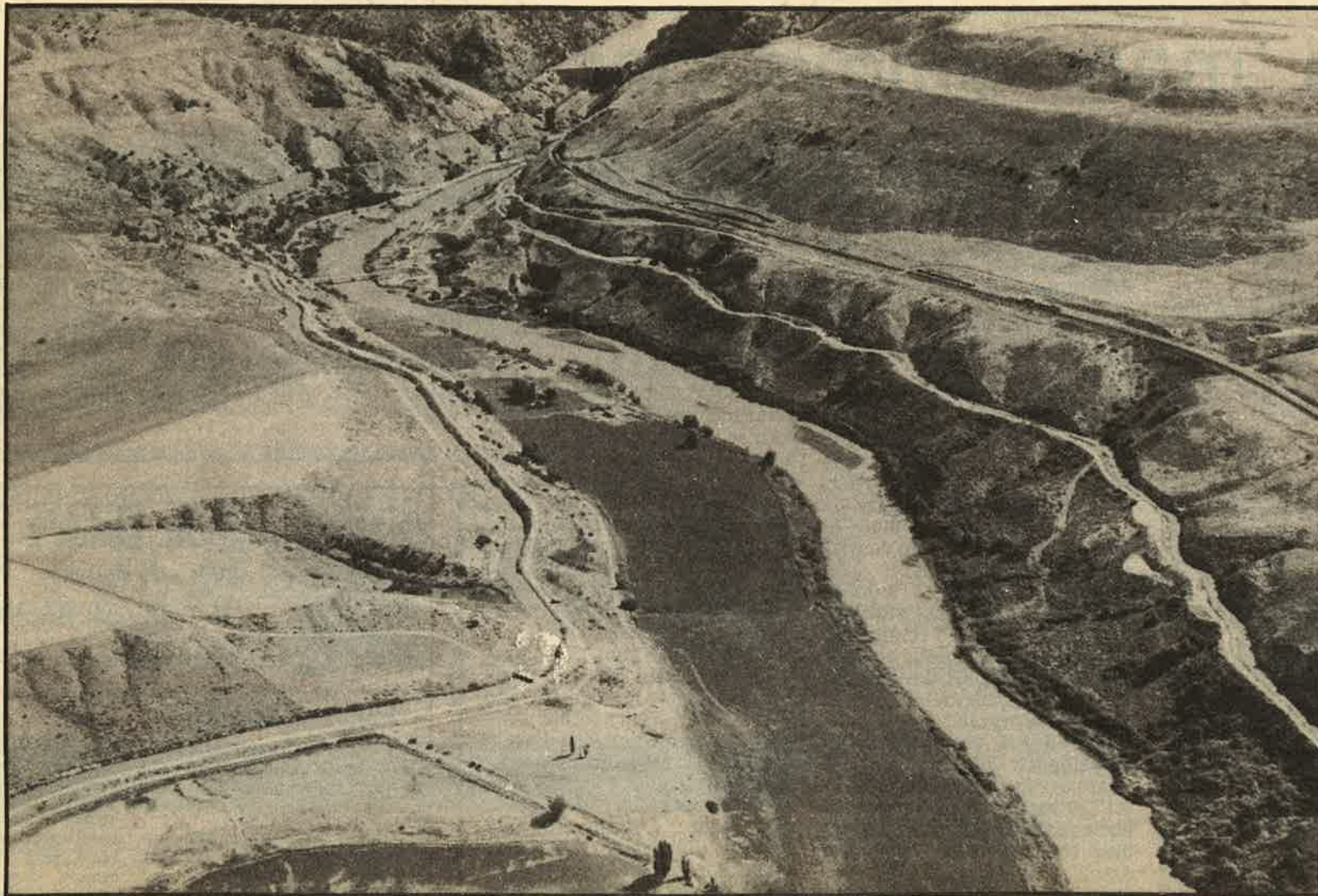
What was carried further, or what was eroded further downstream, was deposited when the river flowed into the waters — the retreating waters of Lake Bonneville. And these were the deposits that built the great sandy flats at Preston and Riverdale.

There is evidence to suggest that during the next few thousand years, Lake Bonneville successively rose and fell, and that at least on two occasions it rose high enough to again flow into Marsh Valley and thence to the Pacific via Red Rock Pass.

But the overall tendency of the lake was downward, down to the present, shrunken remnant that exists as Great Salt Lake.

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Looking Back



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The Bear River below Cutler Dam (top center), showing the various levels of the river as it flowed out of Cache Valley.

River deposits changed the valley floor

The Bear River below Cutler Dam (top center), showing the various levels of the river as it flowed out of Cache Valley.

River deposits changed the valley floor

Editor's note: This is the third and final part of a series on the Bear River.

As Lake Bonneville gradually declined in elevation, the Bear River deposited its silt at the point that it entered the lake. Other streams did also.

The delta on which Utah State University is located was laid down at this time, as were the deltas where Hyrum and Weston are built (the first by the Little Bear River and the second by Weston Creek).

The major change was that wrought by the deposits of the Bear River. A huge deposit of sand was built across the north end of Cache Valley. Any driver on U.S. 91 going north from Franklin to Preston gradually climbs this delta of some 10,000 years ago.

Going between Dayton and Preston on Idaho 86, one crosses the sand deposits of the river on both sides of the Bear. And in between, the present Bear River bottomlands at Bridgeport show just how far the river cut as the lake further dropped.

During the decline of the lake, the Bear River consistently cut through its delta and deposited the reworked material further south and at a lower elevation. Benson is built on sand that was originally at Preston and before that in Wyoming.

It is this reworking of the sands north of Preston that accounts for subsequent identifiable Bear River deltas at Cornish, at Linrose and at Lewiston. At some point, the evaporation of the lake so far exceeded stream-flow into it, that no further deltas were deposited in Cache Valley. Rather, the sand was built up in stream terraces along the river as it flowed at a fairly rapid rate into the lake.

It is to this phenomenon that we can attribute the relatively narrow bands of fertile sandy soil above the Bear River in the present-day towns of Cornish, Lewiston, Trenton, Amalga and Benson, where the bluffs drop off sharply to the river to the east and

more gradually taper into the clayey lake bottom soils of the Barrens to the west.

It is obvious that at some point, the lake stabilized long enough for a minor delta to be created at Benson. Because of the position of the sandy soils at Benson, it is likely that the river entered the area from the west, before it flowed into the combined stream of the Logan, Little Bear and Blacksmith Fork — probably somewhere near the present Logan-Cache Airport.

By 8,000 to 10,000 years ago (and the dating is dependent upon controversial rapid-carbon dating from caves in the western desert), Lake Bonneville had completely withdrawn from Cache Valley, and the remnants of its deposition were being deposited as stream terraces in what is now Box Elder County between Bear River Canyon and the mouth of the Bear River at Corinne.

It is this series of stream terraces that seems to have pushed the course of the Malad River to the west and to have deposited the rich sand from Fielding to Bear River City as a bank to the declining river. In fact, Bear River City may well represent the last deposits of the reworked Cache Valley soils that the Bear River carried to its union with a declining Lake Bonneville.

At that time, perhaps contemporary with the beginning of the Christian era — or even later — the present landforms of Gentile, Cache, Malad and the Bear River valleys were essentially formed, essentially what they are today.

And for hundreds of years before that time — probably since before the lake finally retreated from Cache Valley — there were men in the area, walking its shores, and hunting its game — game that included the mammoth, remains of which have been recovered from Provo Level deposits in gravel pits at

Trenton and Smithfield.

Excavations by the anthropology department of Idaho State University of the caves in Weston Canyon show an almost continuous residence of people in Cache Valley for the last 5,000 years. Those same excavations also reveal what sorts of animals lived in the valley. They are much the same as the native fauna of today with the exceptions of the mountain sheep, which constituted the bulk of the animal diet of the Indians, and the buffalo.

The prolonged drought of the 1200s no doubt decimated the local life and may very well have contributed to a complete drying of the Great Salt Lake. Indeed, it is not unlikely that the lake has periodically dried up completely several times in the last 6,000 years; and it is possible that during such era of prolonged drought, Bear Lake may have absorbed virtually the entire flow of the Bear River, leaving little beyond downstream infusions to wet the river bed and flow into a salty marsh somewhere west of Antelope Island.

But once the present ecosystem and hydrologic system of the valleys watered by the Bear River stabilized about 1400 A.D., the change from conditions met by the first white and black entrants into this area seems to have been minimal.

The ecological impact of the Indians, during the half-century before major outside intrusion, does not seem to have left its mark. A hunting and gathering folk whose major protein was based upon hunting the mountain sheep and gathering nuts, berries and grass seeds did not affect the land nor the river adversely. They existed upon its shores and in league with it.

To find the first impact of man upon the Bear River, we must wait until the appearance of the mountain men and the fur trappers.

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Tapping the Bear River

Nowhere below Soda Springs does the Bear River flow close enough to the surface of the adjacent arable land to be easily diverted for irrigation.

While the pioneer settlers of Cache and Box Elder counties considered the possibility of tapping the Bear River, neither the technology nor the resources were available in the 1860s to allow the river to be tapped.

The first serious attempt to divert the Bear was proposed in 1869 by the founders of Corinne, Utah, who planned to build a canal from Bear River Canyon to irrigate the lower Bear River Valley around Corinne. They asked Congress for a grant of land containing the lands to be irrigated and then watched in frustration as the bill languished in committee.

They tried again in 1872 with the same result. Congress, having given away massive amounts of the public domain to build railroads, was not agreeable to giving away small amounts to be irrigated.

Corinne's efforts to secure federal help for reclamation — later a given in the arid West and in Congress — drew scorn from its neighbors. The Salt Lake Telegraph of July 23, 1869, heaped scorn on the petition to Congress:

"Corinne is getting desperate The dust is bad, and the water is worse and it takes a frightful amount of whiskey to enable that town to worry through between the trains. By making a ditch or canal of some twenty miles in length, it is said that good water could be had, when Corinne would become a good place for a town."

The Corinne petitions to Congress for help in irrigating the lower Bear River Valley by a major reclamation effort seem to have led others to look at heavily capitalized canal projects.

In 1876 the Goodwin brothers of Logan, John C. Young and George A. Lowe of Salt Lake City, and James Jackson of Omaha, Neb., incorporated the Bear River Canal Co. to bring water from the Bear River to the sandy grasslands west of the river in Cache Valley.

The original articles of incorporation (now in the Utah State Archives) show red lines drawn through the names of Lowe and Jackson. Since those two were likely the ones who had access to the capital markets to build the canal, their withdrawal (as suggested by those red lines) probably doomed the project. It was reborn, however, in 1898, as the West Cache Irrigation



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William Goodwin started the Bear River Canal Co., which built its canal along approximately the same surveyed line as the canal projected in 1876.

It is interesting that the first proposals to use the Bear River for irrigation were those of major projects on the lower Bear. Not until the late 1870s or the early 1880s were canals actually dug from the Bear to irrigate settlers' fields and townsites. In testimony delivered to the Senate Special Committee on Irrigation and Reclamation in 1889, there is no indication of any use of the Bear River for irrigation

below Soda Springs.

On the other hand, above Soda Springs, where the Mormons had settled the Bear Lake Valley in the mid-1860s and Rich County, Utah, in the late 1860s and early 1870s, there were numerous small ditches dug from the river. Of course, in those areas, the river flowed at the surface of the irrigable land and diversion from the Bear River was no more difficult than diversion from the smaller creeks which fed it.

Yet the total numbers of acres irrigated in the Upper Bear River Basin was miniscule. The river's real potential for irrigation lay below Soda Springs, and potential for irrigation there involved the use of Bear Lake as a holding reservoir.

Irrigation diversion of the Bear River below Soda Springs was ultimately dependent upon two conditions: settlement of the area where river waters might profitably be used to support irrigated agriculture, and the availability of capital to support a multi-year building project.

Settlement occurred in a haphazard way as the more readily irrigated lands were occupied and a second generation looked for new lands. In this way they were helped by the increased precipitation of the late 1860s and early 1870s that allowed the short-term development of rain-fed agriculture. The second condition was harder to achieve.

As early as 1874, Eastern travel author John Codman noted the dearth of capital in Utah. He wrote:

"If a business man of large experience and extended acquaintance in Utah could borrow one million dollars in New York or any cheap money market, at ten per cent per annum, for use in Salt Lake City and vicinity, he could lend it there on first class security, and clear for himself ten or fifteen per cent yearly on the whole sum."

Eventually, Codman's advice was taken. For the Bear River in Cache and Gentile valleys, the most important player became George H. Champ of Rockford, Ill., and Council Bluffs, Iowa.

In 1892 Champ organized Utah Mortgage and Loan Corp. with headquarters at Logan.

Using the company as a vehicle, Champ filtered mortgage money from Rockford and other Midwestern centers into mortgages along the Bear River, both for private investment and for major projects like canals.

History

By A.J. Simmonds

Cache Valley was formed by a complex series of geologic forces involving plate tectonics, which has gradually thinned the surface of the Great Basin allowing Cache Valley to drop along fault lines between the Wellsville and Clarkston mountains on the west and the Bear River Range on the east. By 100,000 years ago, Cache Valley had probably begun to assume its present appearance, though the valley floor was likely a hilly and broken upland rather than the virtually flat surface it presents today.

The present valley floor is the product of Lake Bonneville and of the Bear River. Some 30,000 years ago, the Bear River was diverted from its earlier outlet — into the Portneuf, Snake and Columbia rivers, and ultimately to the Pacific Ocean — into Cache Valley and the Great Basin. The river caused whatever lake or lakes earlier existed in the basin to rise and become what has come to be known as Lake Bonneville. Eventually, some 15,000 years ago, the lake reached an elevation of 5,150 feet above sea level. At that level, the present site of downtown Logan was under nearly 650 feet of water. But also at that level, the lake overflowed at Red Rock Pass, the northernmost point in Cache Valley, sending its waters down Marsh Valley to the Snake and thence to the Pacific.

The flood is estimated to have been four to five times the flow of the Amazon River and to have lasted perhaps only a few weeks. During the flood over Red Rock Pass, Lake Bonneville was lowered to 4,770 feet. At that level the streams and rivers flowing into the lake created the most pronounced landforms in Cache Valley: College Hill in Logan; the sites of Preston, Weston and Hyrum; and the most distinctive of the benches that surround the valley.

By some 6,000 years ago the lake — effectively evaporated by a climatic change that decreased precipitation and increased temperature — withdrew from Cache



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Geologists with the U.S. Geological and Geographical Survey camp near Franklin Butte in 1877.

Valley and left the present surface upon which the valley's life is lived.

During its declining stages, Lake Bonneville was first seen by humans, the ancestors of the American Indians. Also walking its shores were animals whose caricatures grace Saturday morning cartoons — the woolly mammoth, remains of which have been recovered from gravel beds along the lake's ancient shores at Smithfield and Trenton.

And as the lake subsided, the Indians moved on to the shore. Excavations in a series of rock shelters in Weston

Canyon have yielded evidence of continuous life in the valley for the past 6,000 years. Only now are we coming to understand the nature of that human occupation.

From perhaps 600 A.D. until about 1300 A.D., Cache Valley was occupied by Indians of the so-called Fremont Culture who combined hunting and gathering with agriculture. Current thinking suggests that they were replaced about 1300 A.D. — at the same time a regional drought forced the evacuation of the cliff dwellings in

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southern Utah — by the ancestors of the Shoshoni, the group that lived here at the time of the first settlements.

Cache Valley first became known to “civilized” man in 1812 when four fur trappers, detached from an overland party of John Jacob Astor’s American Fur Company, trapped the Bear River and almost certainly entered the valley, giving the name of the leader, Miller, to the Bear River.

The first certain entries into the valley were the trappers of the Canadian Northwest Fur Company in 1818. The second-in-command of the group, Michel Bourdon, a French-Canadian, named the Bear River and probably fixed the name Willow Valley upon the land.

It was the mountain men who gave most of the early names to the places in the valley — Logan, High Creek, Blacksmith Fork, Bear River, Summit Creek, Little Bear River and the name of the valley, itself, named for the “cache” of trade goods left near Nibley after the great rendezvous of 1826.

Though the great days of the Rocky Mountain Fur Trade were over by 1840, the valley was the scene of some of the opening events of the Overland Migration.

The first wagon train to California, the Bartleson-Bidwell company, came through northwestern Cache Valley in August 1841, and in 1843 the same part of the valley was explored by John C. Fremont. Fremont’s published report included the first illustration of Cache Valley — the Standing Rock in Weston Canyon.

Cache Valley settlement began in 1855 as a ranching venture. A drought combined with overgrazing had ravished the central Utah range, and surplus animals were trailed north to Cache Valley to feed off the lush growth of grasses in the valley.

The Elkhorn Ranch was established in July 1855, in what is now northern Nibley. All would have been well, except that the winter of 1855-1856 was one of the most severe in the valley’s history. Only 400 animals out of some 2,600 lived to see spring. Nevertheless, the valley had been occupied and, more importantly, brought to the attention of the other Utah towns.

The next year, a company from Tooele County under Peter Maughan established the first permanent settlement — now Wellsville. A beginning was also made in

Mendon. Then followed three years in which all of Utah was dislocated by the Utah War, the arrival of nearly one-quarter of the troops of the U.S. Army to garrison Utah.

That broke the floodgates. With the army to protect new settlements, there was a wholesale movement of people, and in 1859 and 1860 eight new towns were founded in Cache Valley. Settlement received a setback with a minor Indian skirmish in July 1860; but on Jan. 29, 1863, as part of a planned move to secure overland communication at a time when the Civil War was raging in the East, the U.S. Army attacked the Cache Valley Indians in their winter camp at Battle Creek some five miles north of Preston. The resulting “Battle of Bear River,” one of the largest Indian fights in U.S. history, resulted in the virtual annihilation of Cache Valley’s Indian population.

By eliminating the native population, the valley was opened for further settlement, and by 1880 virtually all of the towns in the valley were settled.

Settlement was accompanied by a major development that removed Cache Valley from a subsistence frontier to the forefront of the agricultural regions in the intermountain West — the discovery of gold in Montana and Idaho.

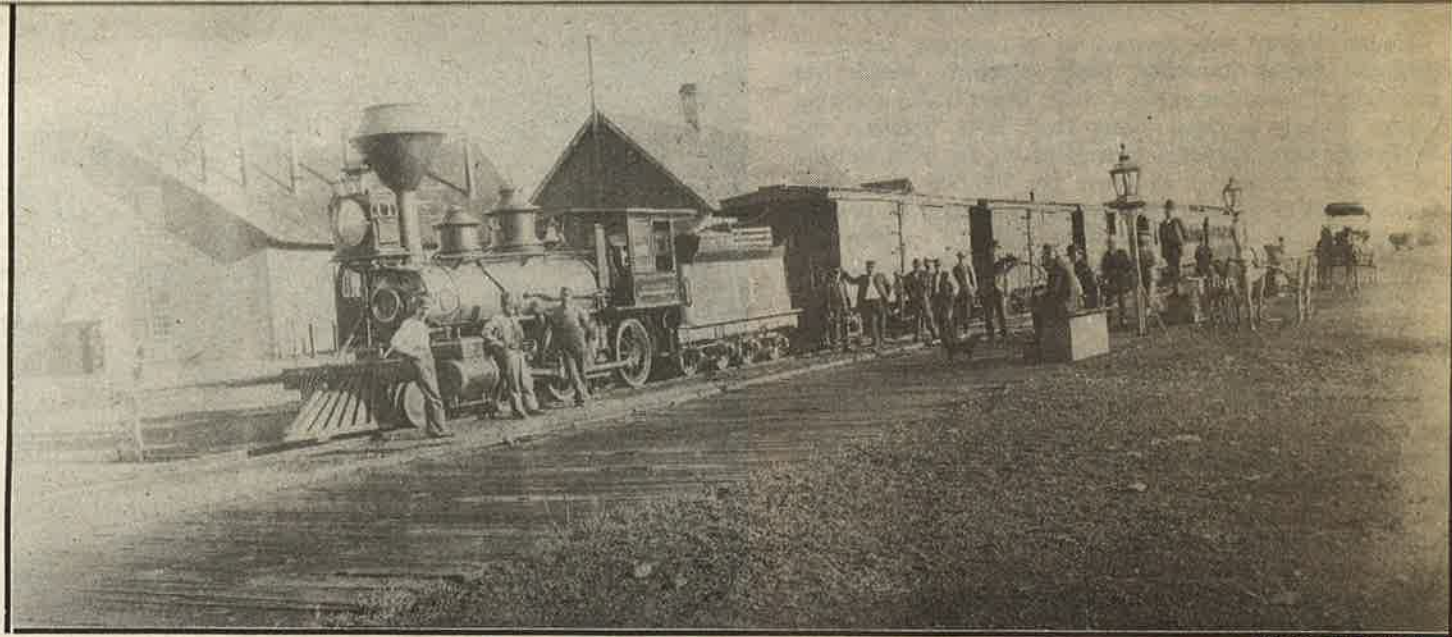
While the miners who flocked to the

new camps drew fortunes from the placer mines, the one thing they lacked was something to eat. For more than 20 years after 1862, Cache Valley’s surplus agricultural production was trailed north — first in wagon trains and then in the cars of the Utah & Northern Railroad that succeeded the wagon roads — to feed the mining camps.

It was this trade that drew the railroad to Cache Valley in 1873. It was also to

supply that trade that Logan became the pre-eminent city in the valley because it had a source of readily tapped water power in the Logan and West Fields Canal. By the mid-1870s, a whole series of industries driven by water power had made Logan the major manufacturing town in the valley, and its largest city.

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A Utah & Northern Railroad train at the Logan depot in the early 1880s.

History

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Of course, Logan was not alone in industrial development — a development that occurred very early in the valley's settled history and a phenomenon due to the nature of the population. The great bulk of the populations were Mormons, and the bulk of the Mormons were European converts who brought to Cache Valley all of the skills that they had learned in their homelands.

Thus, in 1860, when there were only 2,605 people in Cache Valley, the U.S. Census showed 18 separate occupations, including chair-maker, millwright, machinist and tanner. The wealth of professions meant that virtually whatever skill was needed in the society was almost immediately available to it. Thus, within only 19 years of its settlement, Logan and the surrounding towns had the native expertise to begin construction of the Logan LDS Temple, the biggest construction project in the valley's history until the building of Logan Regional Hospital in 1980.

Initially, it was assumed that all of Cache Valley was part of Utah Territory and, until 1872 when the border was finally surveyed, a single county government administered all of the valley. With the fixing of the territorial border, the two halves of the valley pursued their separate courses as parts of Utah and of Idaho. Initially, the Idaho part of the valley was part of Oneida County — and not until 1913 was a separate county, Franklin County, established.

The survey of the border represented the beginning of an important federal presence in Cache Valley. That continued after the 1800s, but was most importantly seen in the 1888 chartering of Utah State University as Utah's land-grant institution. From small beginnings, the university has grown to become the major industry in Cache Valley.

The years at the turn of the century also resulted in the

The major post-World War II development in Cache Valley has been the phenomenal expansion of Utah State University. Today, nearly one-third of the population of the valley are students and staff or the family of students and staff at USU.

final integration of the Cache Valley economy into the national economy. The pioneers made do with very little beyond what they could make for themselves. With the mechanization of agriculture, there simply wasn't the ready money in the valley to purchase new machines.

But, beginning in the 1890s with George H. Champ and Utah Mortgage and Loan Corporation, money from Illinois banks became available for investment. Recorded mortgages indicate that Cache farms entered the modern era by obtaining ready mortgage money from Illinois — a situation that enabled the development of a whole series of farm-based industries.

The first was the sugar boom of the years 1903 to 1935 when Cache Valley ran on an economy of sugar beets with five factories in operation by 1917: Logan, Amalga, Cornish, Lewiston and Whitney. It was outside money invested in manufacturing that led to the dairy boom that followed with major milk, butter and cheese manufacturing facilities that still dominate much of the rural economy.

Side-by-side was the growth of the transportation

system that moved from dirt roads and Indian trails to paved highways. It was a development that was hastened by the defense needs of World War II. It has been the developing highway system that has allowed a surplus Cache Valley population to continue to live in Cache Valley while obtaining employment outside of the valley: at Second Street (Defense Depot) and related installations in Ogden during World War II, and after the war at Hill Field and later at Thiokol and Nucor in Box Elder County and at Monsanto in Soda Springs.

But the major post-World War II development in Cache Valley has been the phenomenal expansion of Utah State University. Today, nearly one-third of the population of the valley are students and staff or the family of students and staff at USU.

In 1956, at the time of the centennial of settlement, S. George Ellsworth summed up the valley in the most eloquent of phrases:

“Movements from outside this valley home have penetrated to the very hearth. On the other hand, the valley itself has from the beginnings of permanent settlement contributed to the world, and become known by the world. The steady stream of Latter-day Saint missionaries, letter-reports of Cache Valley residents to their friends and relatives ‘back home,’ representatives of the people to higher levels of government, and distinguished citizens in various fields who have gone abroad into positions of world leadership — have made known this valley, and have left their stamp on history's page. The home, like the living lake, has received and given fully in turn.”

Editor's note: A.J. Simmonds is curator of Special Collections at Utah State University and writes "Looking Back," a weekly local history column for The Herald Journal's Cache magazine.

A.J. Simmonds

Bridgerland this and Bridgerland t

I've never become reconciled to the naming of everything in Cache Valley and beyond after Jim Bridger. I think that the mountain men ought to be recognized — after all, they represent the only factor in our history that can be said to be neutral. They aren't Mormon or Gentile. They aren't pioneer or Shoshoni. They aren't Republican or Democrat. By the luck of early arrival, the mountain men are neutral. More than that, they are at the very start of what we know about Cache Valley's history.

But, why does everything have to be named for Jim Bridger?

That is something I've never figured out.

Bridger first came into Cache Valley in the fall of 1824 with the party of John H. Weber. They came down the Bear River from Soda Springs after a fall hunt on the western slope of the Continental Divide. The Weber party went into winter quarters on the Cub River near the present site of Franklin, Idaho. Bridger was there. There's no doubt about it. And he stayed in the mountains for the next thirty years.

So what?

Every second year, I teach a class in Cache Valley history. (It's being offered again this winter quarter). And every second year I have to come to terms with why this place is called Bridgerland. It's a pretty rough one to answer. I've thought about it for years, and I finally came to the conclusion that it was called Bridgerland just because Jim Bridger hung around long enough for everyone to get to know his name. Other people who came into the Central Rocky Mountains in search of pelts made their fortune and retired to the Midwest or the East. Not Jim Bridger. He didn't make much money, so he stayed in the mountains long enough for all the



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Trappers gather around a winter fire in this 1830 sketch.

pioneer settlers to know who he was. His name lived on in the Central Rockies because he lived on in the Central Rockies. People like William Sublette or Jedediah Smith or William H. Ashley made their pile and went home. Smith's name is remembered on a fork of the Bear River above Montpelier. Sublette's name is given to a flat-land south of Cokeville, Wyoming. Ashley has a creek named for him near Vernal. Other "big" names in the mountains are similarly remembered: Etienne Provost for the Provo River, Peter Skene Ogden for the Ogden River. And each have cities named for them.

Bridger's name was, during his lifetime, only given to a creek and a mountain peak near it near Big Piney, Wyoming. But in the last thirty years, every spare part of the Central Rockies have been socked with the name Bridger. Isn't anyone at all the least creative?

Why not pay some attention to a man whom the Logan River and the city of Logan are named after: Ephraim Logan. Not much is known of Ephraim Logan — but then, not much is known of any of the mountain men except for the very successful ones (and even successful ones like David Jackson are little more than echoes from those far-off days).

But Logan must have enjoyed a prominence among his fellows that few others of the mountain men enjoyed. After his death, a major river in the valley was named for him, and for a while, Cache Valley was known as "Logan's Hole," an equivalent for the valley in Wyoming named Jackson's Hole or in Idaho named Pierre's Hole — Hole being the trapper term for valley.

Ephraim Logan first appears in the record in 1824-1825 when he comes into Cache Valley with Capt. Weber and spent winter quarters at Franklin. He was no

doubt in Cache Valley for the great rendezvous of 1826, and he shows on the accounts for the Bear Lake Rendezvous of 1827.

At Bear Lake, the partners of Smith, Jackson and Sublette sent a team of four men to trap the lower reaches of the Snake River during the fall and winter hunt of 1827-1828: Jacob O'Hara, William Bell, James Scott and Ephraim Logan. It was not a happy hunt. The four men were way-laid by the Shoshoni below Twin Falls and killed that winter.

Only gradually did the realization of their loss dawn on the trappers. They didn't return to the summer rendezvous of 1828 (also held at the south end of Bear Lake). At some point their colleagues decided that they weren't coming back.

It was at that point that it became evident just how much their colleagues thought of them. Or at least how much they thought of Ephraim Logan. In the

and that



Special Collections

fall of 1828 or during 1829 what had previously been known as the Bourdon River (named for Michel Bourdon of the Hudson Bay Company who had discovered and named Bear River in 1818) was renamed as Logan River.

Ephraim Logan's fame must have spread quickly. And that, itself, is an interesting commentary on travel and communication during the Fur Trade years, for in 1829 George C. Yount, a trapper operating out of Santa Fe, New Mexico, indicated in his journal that his company went into winter quarters in "Logan's Hole." The description in the journal leaves no doubt that he was talking about Cache Valley. It is fascinating to consider how fast and how far the terminology had traveled and equally fascinating to wonder what it was about Ephraim Logan that made him so regarded amongst his fellows to name a river and valley after him. That must say something important about Logan that we can only guess at.

There are bits and pieces of data in various books about him. There are probably more records in the National Archives and in the various census returns. Perhaps a few hours of research at the Genealogical Archives in Logan or Salt Lake could yield more. Perhaps the City Council should appropriate some funds for an examination of the available record to determine just what can be found out about the long-dead trapper who gave his name to the river, to the city and for a while to the valley.

At least he's worthy of as much local recognition on signs and seals and insignia as Jim Bridger.

A.J. Simmonds is curator of Archives and Special Collections at USU's Merrill Library.

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Bourdon explored the valley in 1818

This is the second part of a two-part series about Cache Valley before Jim Bridger visited the area.

Records are silent about the next seven years in Cache Valley. It is possible that trappers from Missouri penetrated the valley between 1811 and 1818, but nothing is certain. The next move was up to the British.

With the war of 1812, the Americans at Astoria were placed in a difficult position — isolated from the United States on a coast dominated by the British Navy. The Americans sold Astoria to the North West Company on Nov. 12, 1813. Donald McKenzie, one of Astor's employees, took the sales proceeds to New York where Astor, annoyed by the forced sale of his post and company, refused to have anything to do with him.

In 1816 he returned to Astoria, now Fort George, and entered the employ of the Nor'Westers where he was given command of fur trapping in the interior of the Oregon Country. Because of the resistance of the Canadian company officials to an American, McKenzie was able to do little for two years. Finally, in 1818, he was allowed to take 100 men and establish a post among the Nez Perce Indians (near the present site of Walla Walla, Washington). Leaving Alexander Ross and 45 men to complete Fort Nez Perce, McKenzie left with 55 men, 195 horses, and 300 traps in September 1818 to explore the country of the Snake (Shoshoni) Indians.

Among his men was Michel Bourdon. Reaching the Bear River near Soda Springs, McKenzie apparently left Bourdon in charge while he returned to Fort Nez Perce by way of Star Valley, the Tetons, and the Sawtooth ranges. He stayed only a short while, and with 15 additional men under William Kittson, returned to Bear River via the

SNAKE RIVER VALLEY route. By Sept. 10, 1819, the party was at Bear Lake where McKenzie wrote back to Ross at Fort Nez Perce from "Black Bears Lake" recounting the journey:

"The McKenzie party returned to Fort Nez Perces on June 22, 1820, after a most successful trapping expedition. They had 154 horses loaded with beaver. The total catch for the year was nearly double what it had been in recent years.

"McKenzie took just 12 days to rest his horses and men and headed back to the Snake Country on July 4, 1820, with a party of 70 men. He returned on July 10, 1821, with returns even better than the preceding year and without the loss of a single man."

The McKenzie party must have struck Bear River in October 1818, probably near the Great Bend at Soda Springs, where Michel Bourdon named it "from the great number of those animals on its borders." While McKenzie was gone on his first return trip to Fort Nez Perces, the company, apparently under Bourdon, entered Cache Valley. Bourdon named the rivers in the southern part of the valley. In succession he named the three streams that the British looked upon as the forks of the Bear: Little Bear River (Logan); Middle Fork or Bourdon River (Blacksmith Fork); and South Fork (Little Bear River).

While Bourdon obviously explored the west and south of Cache Valley, he was thoroughly bewildered by the Bear River. He had initially assumed it "to be the Spanish River or Rio Colorado," but in 1829, commenting on the bend of the Bear River at Amalga and Benson, Peter

Skene Ogden wrote, "The river makes a considerable bend to the westward and this gave rise to a supposition by the first who descended this river, the late M. Bourdon, that it was a fork of the Willamet."

It is possible, though by no means certain, that McKenzie's men were in Cache Valley again in 1820-1821. British penetration of the central Rockies as far as Cache Valley is difficult to document until the highly organized Hudson's Bay Company absorbed the more informal Nor'Westers in 1821 — though the reorganization was not complete in the Oregon Country until several years later. Michel Bourdon led the Snake Country expedition of 1822, apparently into Montana and Eastern Idaho, though it is not improbable that he got south to the Bear. In 1823 Finian McDonald led a brigade, apparently down the west side of the Rockies, Tetons and Wasatch Mountains. He may very well have been in Cache Valley. He was certainly on the Bear River, for in 1825 Peter Skene Ogden noted that McDonald, like Bourdon before him, had assumed the Bear to be "the Spanish River or Rio Colorado."

There is one bit of circumstantial evidence for McDonald's party reaching Cache Valley. In 1825 Kittson noted that Bourdon named Blacksmith Fork River "Middle Fork." He also noted that an alternative name for it was "Bourdon River." The name would probably not have been applied until Bourdon's death, which occurred in 1823, only a few months before the McDonald party would have reached Bear River.

A.J. Simmond is curator of Archives and Special Collections at USU's Merrill Library.



The proposed reservoir would flood roughly 4,000 acres at the Barrens.

Battle at the Barrens

Battle at the Barrens

To a casual observer, the broad, largely flat expanse known locally as the Amalga Barrens would seem an odd place to build a dam and water storage reservoir. But to a panel of politicians and water czars from northern Utah, the roughly 4,000-acre area is one of the last best hopes to develop Bear River water. The 35,000- to 100,000-acre-feet of water that may potentially be stored within the Barren's planned series of dikes could be used in Cache County and re-diverted into the Bear at Cutler Reservoir. But for the most part, it is water interests in neighboring Box Elder County who have expressed the most interest in having the state — and Utah taxpayers — build the Barrens reservoir.

Not really a dam in a way many perceive one — that of a single dike or dam stretched across a narrow point on a river — the Barrens reservoir would impound water within roughly 12 miles of earthen dikes. It would create a two-and-a-half mile by three-mile, mostly rectangular-shaped, shallow pond. It would look somewhat like Willard Reservoir on the shores of Great Lake south of Brigham City, rather than like Hyrum or Porcupine dams in Cache County.

A chief proponent of the project is Sen. John Holmgren, a Republican from Bear River City who also co-chairs Utah's Bear River Development Task Force, a panel of lawmakers and people with a range of interests in water development. That panel is plotting the future of what some consider Utah's last watering hole. In November, all but one of its members approved a conceptual plan to present to the full Legislature that, if approved, could eventually lead to the Barrens dam being built. At an estimated cost of \$27 million to \$79 million, the proposed

dam is likely to get careful scrutiny from the state's 104 lawmakers.

The Barrens was first studied as a potential reservoir site as part of the Amalga Reservoirs project, according to a 1988 report prepared by the Utah Division of Water Resources. That project, investigated in 1983, was somewhat different than the current proposal in that it then entailed two dams and reservoirs. One dam was proposed on the main stem of the Bear River east of Amalga and about a mile north of Cache Valley Cheese. It is currently called the Smithfield site and is still under consideration and study. The second reservoir, the off-stream Barrens site, was proposed then much as it is today. Back then, the two proposed reservoirs would have been inter-connected by pipelines and canals.

Although both those dam sites, as well as three others, are currently being investigated by the water resources division via a number of private consulting firms, the most talked about dam site is the Barrens. Also under investigation in the latest round of "pre-design feasibility studies" authorized by the 1990 Legislature are the Oneida Narrows site on the Bear in Franklin County, Idaho, the Honeyville site in Box Elder County, and the Avon, Mill Creek and Smithfield sites in Cache.

Studies under way include:

- Salt Lake City-based CH2M Hill is completing geo-technical and feasibility investigations as well providing a cost analysis for each project. The cost, \$261,000.

- Logan-based Bio/West is completing the environmental analysis, including wetlands, soils, plants and wildlife inventories. The cost, \$225,000.

- Logan-based Ecosystems Research Institute is completing water quality and analysis work at the five sites. The cost, \$175,000.

- Salt Lake City-based James Montgomery Engineering is studying water quality as well, but from a "treatability" standpoint. Montgomery and ERI will share information that will lead to conclusions about existing water quality conditions, as well as what might be expected if dams are built. The cost, \$128,000.

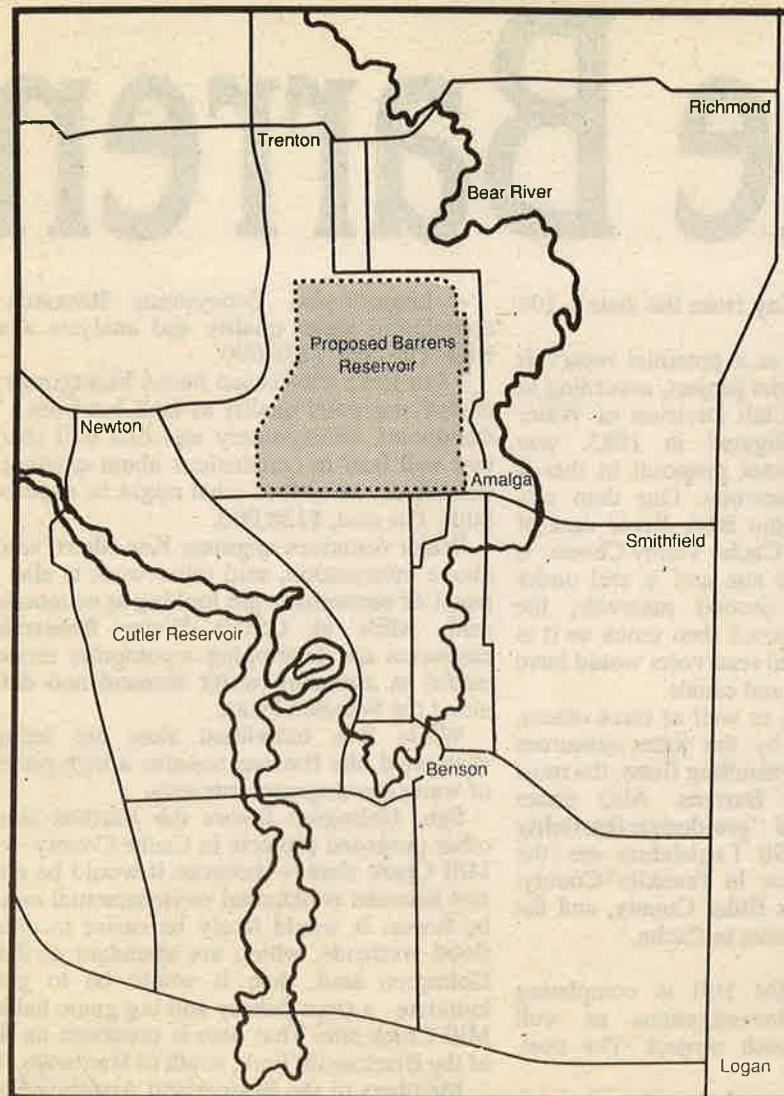
Water resources engineer Ken Short, who provided the above information, said other work is also under way. A panel of economists are looking at economic issues, Short said, while at USU's Water Research Laboratory, engineers are developing a computer model that will be useful in assessing water demand and delivery systems along the Wasatch Front.

While five individual sites are being further investigated, the Barrens remains a high priority in the eyes of water development interests.

Sen. Holmgren favors the Barrens site over several other proposed projects in Cache County — the Avon and Mill Creek sites — because it would be cheaper to build and because anticipated environmental constraints would be fewer. It would likely be easier to obtain permits to flood wetlands, which are abundant at the Barrens site, Holmgren said, than it would be to get approval to inundate a trout fishery and big game habitat in, say, the Mill Creek site. That dam is proposed on the headwaters of the Blacksmith Fork, south of Hardware Ranch.

Members of the Bridgerland Audubon Society disagree

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The map shows the proposed site of the Barrens reservoir.

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with Holmgren on that point. Audubon member Alice Lindahl, who along with others are spearheading local opposition to damming the Barrens, claim the area's wetland and wildlife values far outweigh its uses for storing water.

"The Barrens represents a unique area in Utah. The shallow ponds, extensive marshes, salt flats, pastures, fallow fields, agricultural croplands, ditches, canals and the waters of Clay Slough produce a variety of ... habitats which provide prime nesting, resting and feeding areas for well over 100 species of birds," Lindahl said.

Preliminary wetlands inventories done this year by Bio/West indicate that more than 1,400 acres of wetlands, including wet meadows, marsh and mudflats, and aquatic beds exist in the Barrens.

Lindahl and others oppose construction of the Barrens dam "because it would result in the loss of valuable wildlife, agriculture and recreational resources that will not be offset by the advantages and costs of the impounded water."

"This area will become even more valuable in the future as greater numbers of Utahns and tourists seek out natural areas in the West to view wildlife and the number of such areas declines," Lindahl said.

The Barrens site is also being eyed by the more than 50 land owners and other parties who may, in the future, find the state offering to buy or condemn their land in order to build the reservoir. At a meeting held by lawmakers in Amalga in October, a majority of the townspeople said they are far from enthusiastic about the prospect of damming and diking the Barrens. While support for a Barrens dam site is less than strong among local residents, it is the lesser of two possible evils, according to Amalga Mayor Boyd Smith. He and other council members, as well as townspeople, dislike the on-stream Smithfield dam proposal.

"We want to go on record that it is objectionable to us," Smith told members of the Energy, Natural Resources and Agriculture interim committee in October. "... if we took a poll, 99 percent of the people would be against it."

Opposition was so strong five years ago when the pair of

Text: John J. Wise
Photos: Pete Schrop

of five sites being studied by consultants hired by the Division of Water Resources.

projects was proposed, that the negative sentiment was noted in "findings" recorded during an extensive public involvement program headed by the Utah Division of Water Resources. That January 1986 document noted: "There is strong and organized opposition to the Amalga (joint) site for a number of reasons, including the inundation of facilities or operations and the threat of high water tables."

Those concerns about the Barrens still exist and a number of others have since surfaced. Among them are questions about the water quality and even about how the huge, shallow pond may modify the local micro-climate and how that might create fog during cold weather.

Although the Bear River panel listed the Barrens and Honeyville sites as top priorities, Holmgren said that the jury is still out on the feasibility of both proposals. If the studies, due in October 1991, indicate that the Barrens could store only the minimum amount of water — 35,000 acre-feet — its feasibility as a state-sponsored project will greatly be diminished, he said.

"If we can't get a lot more water than that, I don't think I can support it. We're waiting to see if it's a viable project."

Earlier studies concluded that the site, termed a "natural depression" could store little more than 35,000- to 40,000 acre-feet. That limitation, according to a 1988 report, stems from the way the reservoir would be filled with water. Since it's an off-stream site, the West Cache Canal, which diverts water from the Bear north of Preston, Idaho, would be used to convey the water bound for a Barrens Reservoir.

The 1988 Water Resources Division report states that some surplus irrigation water could be diverted into the reservoir during the time it's used for irrigation purposes, from April 15 through Sept. 15, but most of the water would be diverted during the off-irrigation season. That off-season is also limited because sub-freezing water would restrict water flows unless the canal was upgraded and the diversion of water kept constant.

"In order to deliver water through the West Cache Canal during the winter months, the flow in the canal would have to be constant," states the '88 report.

"Numerous computer (model) runs were performed to determine the impact of varying the reservoir size or altering the delivery system," the '88 report continues. "An

analysis of the data generated shows the optimum size of the reservoir to be about 35,000 to 40,000-acre-feet. Any increase of the reservoir size beyond 40,000 acre-feet produces only a marginal increase in project yield."

Alternatives such as enlarging the canal or lining it or constructing a pipeline have been discussed as ways to overcome that limitation. Yet in the latest cost estimates for the Barrens project, the cost of conveyance systems are not included. Also not included, but suggested as an alternative delivery system, is pumping water from the Bear River near Amalga, west to the Barrens site. Pumping water, as irrigators know all too well, is expensive.

The '88 report states that two diking alternatives needed further study because of "surface faulting" at the Barrens. Cost estimates were also presented, and compared to the most recent figures, they show a considerable discrepancy. In 1988, the full alignment dike system, the larger of the two reservoir proposals, was estimated to cost about \$12 million. The alternative dike system, essentially a smaller reservoir with its western-most dike moved to the east, was about \$17 million. Again, more recent estimates put the cost of the larger reservoir at between \$27 million for 35,000 acre-feet of storage, to \$79 million to triple its capacity.

To store 35,000-acre-feet requires flooding about 3,500 acres and building about 50,000 feet of dikes roughly 28 feet tall. To store 100,000 acre-feet, 4,470 acres would be flooded and 59,000 feet of dikes roughly 43 feet tall would be required, according to the division's October 1990 pre-design status report.

The report states that "several embankment (dike) alignments have been designed to best fit the area for various size reservoirs." With storage capacity variable, the final size will still depend on how much water can be delivered to the site.

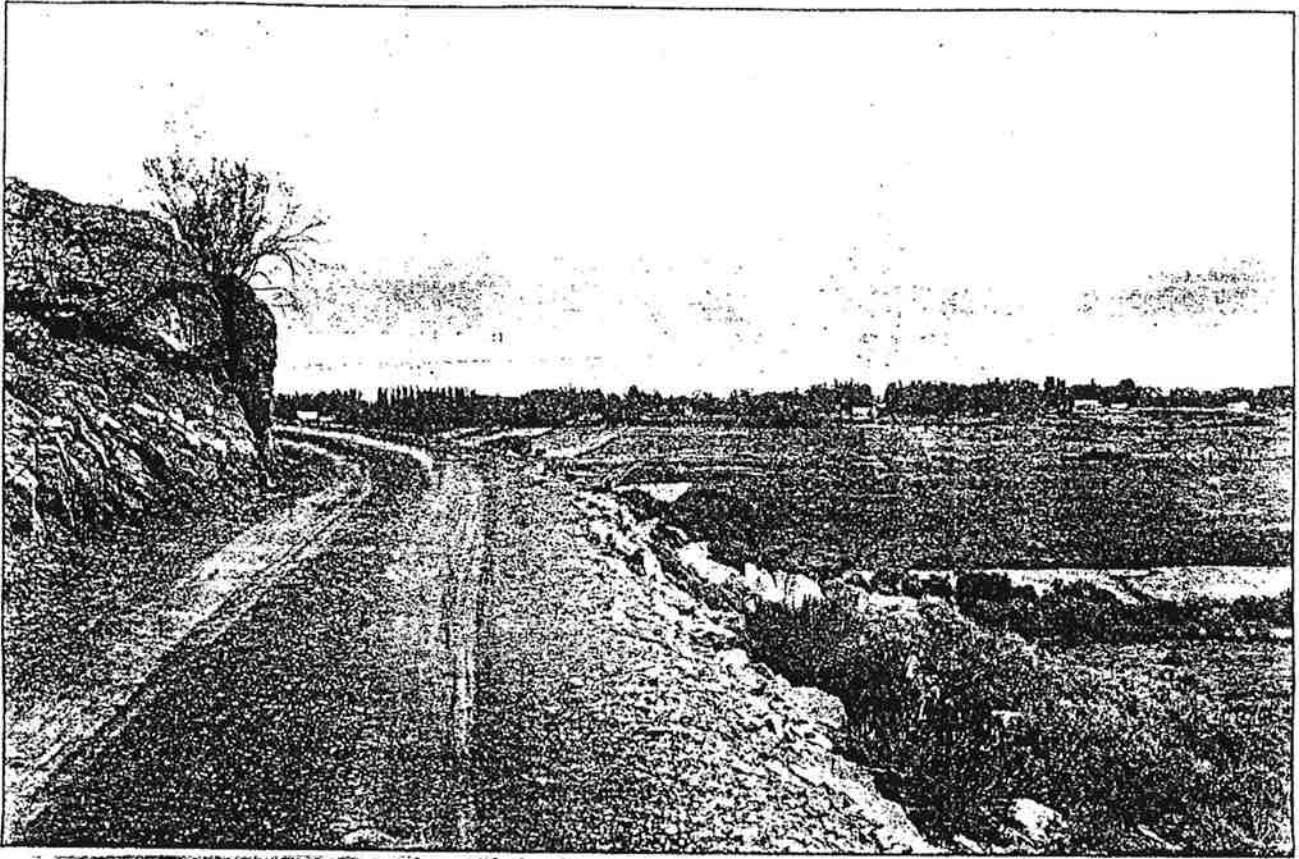
Many other unknowns, when answered, will also determine what the Barrens reservoir will look like — if it is ever built at all.

Time will tell. Perhaps some proponents were correct when they agreed that if the project isn't feasible, if its price tag is excessive and its water is not fit to drink, or if the environmental costs are too high to build it, it might be better to leave it for the birds.

Maybe, in the final analysis, that may be the outcome.



The Barrens contains a diversity of wetland types



A view of Bear Lake and Garden City, Utah, from Logan Canyon Road in the 1930s.

Bear Lake becomes focus of area

Editor's note: This is the first in a series about Bear Lake and the people who use and enjoy it.

Somewhere, sometime, I read a comment by a former editor of *The Saturday Evening Post* regarding meetings. He said that any time a meeting had more than six people or went longer than 30 minutes, one ceased to have a meeting and started to have a performance.

I sort of agree with that assessment. Essayist Ashley Brilliant wrote in 1986 that "Many of our meetings are held to resolve problems which would never arise if we held fewer meetings." I sort of agree with that, too.

But I have one of those feelings that for some time to come, anyone who is interested in the Bear River and in Bear Lake are going to be attending lots of meetings. I've gone to a few myself recently.

When the landowners around Bear Lake were making noises about filing a lawsuit to prevent any further dredging of the channel that leads to the Lifton Pumps, Senator John Holmgren, R-Bear River City, put together an ad hoc group that has since organized and incorporated in three states: the Bear River Water Users' Association.

It is composed of all the canal companies and the individual pumpers that draw water directly from the Bear River.

Since the Utah State University Library probably has the largest collection of materials upon historical development of the river of any of the Utah or Idaho institutions, I am interested in the discussions; and I've been to a lot of them recently.

The pending suit seems to be one of those classic cases that Mark Twain mentioned: "In the West, whisky is for drinking and water is for fighting." There doesn't seem to be much room for compromise between people who say they have a right to consume the water in Bear Lake, and people who don't want them to consume it.

At any rate, it is an interesting enough topic that this col-

umn is going to be devoted for the next couple of months to an historical examination of Bear Lake and its impact upon the citizens of southeast Idaho and northern Utah.

The Lake was probably first seen by civilized man in 1818 when a group of trappers of the Northwest Fur Company trapped into Shoshoni country, first entering Cache Valley and then going on to Bear Lake. There is an extant letter that was sent from the expedition back to their headquarters at Fort Walla Walla dated "Black Bears Lake."

This was the same expedition, with Michel Bourdon as second in command, that named the Bear River and most of the streams in Cache Valley. It was probably this expedition that gave the name Willow Valley to Cache Valley.

There had been Americans in the area earlier than the British Northwest Company, but they don't seem to have seen Bear Lake.

A map that shows their geographical discoveries does not show Bear Lake. It does show the Bear River (named Miller's River, after one of the five men who explored the area), including the big bend of the river at Soda Springs.

The Americans probably saw Cache Valley in 1812, but the final map showing their discoveries was not published until 1821 — and then it was published in Paris. By that time, most of the Intermountain West, including Bear Lake, was intimately known to British and Canadian trappers and explorers.

Bear Lake was located in a very convenient spot to be a primary focus of the Rocky Mountain fur trade.

The American companies largely operated out of Missouri, and the easiest way from Missouri to the source of pelts was the rivers: the Platte and the Sweetwater. At the head of the Sweetwater, caravans easily passed over the low gradient of South Pass. Beyond South Pass, the water courses led to the Green River, and then across a low range to the valley of the Bear River near the present site of Kemmerer, Wyo.

Since the view from Wyoming clearly showed a mountain range dead ahead, the companies (first mule trains and then the wagons of the Oregon Trail) moved north along the Bear. At the present-day Dingle, Idaho, the lake was evident to travelers on the trail.

The British found the Lake in 1818, and it was a fixture easy enough to find and easy enough to get to, that it led to the American fur companies having two of their famed Rendezvous along its southern shore, the gatherings of 1827 and 1828.

The first wheeled vehicle west of the Continental Divide came to Bear Lake in 1827. It was a little two-pound cannon on a caisson. Just why General Ashley brought the thing up from Missouri is one of those historical footnotes lost in the mists of the past. But bring it he did. The only time it is recorded as having been fired was in July 1827 when it was fired as a salute to Jedediah Smith, who had just returned from his first expedition.

Bear Lake also saw the first milk cow in the region. General Ashley brought that too. There has to be a long and fascinating story about that. This cow walked all the way from Missouri to Bear Lake so that Ashley could have fresh milk and cream. And then she walked back again. General Ashley was just eccentric enough that I think I could have liked him.

The lake figures prominently in the writings of the American fur trade, and it was the site of the first settlement in the region when Peg Leg Smith built a trading post south of present-day Montpelier.

But all of the early uses just deal with the Lake as background. Not until settlement in the 1860s did people start to use the water in Bear Lake. And that started the whole controversy we deal with today.

A.J. Simmonds is curator of Archives and Special Collections at USU's Merrill Library.

Mormon cities become land use model

Editor's note: This is the third in a series about the Lake area and the people who settled it.

Those of us who live in the Great Basin know that many of the decisions relating to our part of the country are not made in our part of the country.

Most of the land is owned by the Federal Government, the greatest absentee landlord of all. The land and the mountains may be in our backyard, but others have the primary say.

And since we live in an area of scenic wonder, people who like those wonders and want to protect them also have a marked influence upon what decisions are made in the region.

That sort of out-of-place decision making has been a constant in the history of the Great Basin and other parts of the American West. The area was inhabited in 1848, when a treaty with Mexico suddenly changed the political orientation of much of the western U.S. from Mexican to American ownership.

The various army expeditions that came into Utah and east Idaho withdrew considerable amounts of land as military reserves. And people studied the region in which those settlers lived for reasons quite unrelated to the needs of the actual settlers.

In 1849 Captain Howard Stansbury and members of the U.S. Corps of Topographical Engineers spent a year in Salt Lake City, surveying the Great Salt Lake and the mountains and valleys that surrounded the lake.

All through the 1850s various governmental agencies looked at the West with one or another purpose in mind for the place: railroads, military reservations, Indian reserves.

It was a work that has only been continued in the various investigations that have recently been made — and which continue to be made — of our backyard by people and agencies far removed from our backyard.

And it was Bear Lake which drew the attention of one of the foremost scientists and thinkers of his day, Major John Wesley Powell. Powell was a hero of the Union armies during the "late unpleasantness" at Vicksburg. After the war, he taught college in Illinois and honed his interests in the partially explored west.

In 1869 and again in 1871 he led expeditions that explored the Colorado River and the Grand Canyon, expeditions that attracted massive national attention. And that attention also attracted the actions of the United States Congress.

Powell was appointed head of an agency charged with exploring the Plateaus of the arid west.

The major took his duties very seriously. His reports were regularly filed and published by the Interior Department, and his travels throughout the region were extensive.

In common with most people in the Nineteenth Century, Powell looked upon the public domain in the West as a national resource that should be passed as quickly as possible into private hands.

Powell saw his role as one of facilitating that passage by the most extensive exploration and by recommendations that would meet the particular needs of the American West.

The most important factor in the whole was its lack of water. If the area was to be settled and developed — and that was Major Powell's desire as well as the general wish of the U.S. Government as a whole —

then the processes that had been used in the humid east would have to be modified in the West.

The Mormon pioneers discovered that in the first days of settlement. Instead of waiting for the Federal Survey that would divide the land into square mile sections, Mormon settlement centered on villages with the concentrated farm land being in an area where canals could distribute irrigation water to the fields.

In Mormon areas farmers, instead of living in some isolation on 160 acre tracts, lived together in town and the farmlands (in amounts much less than quarter sections) were consolidated in places where the land could be watered.

That impressed Powell, and in 1878 he wrote his most famous work: "Report on the Lands of the Arid Regions of the United States." In it he embodied his recommendations for the West — recommendations that would ultimately have an impact upon Bear Lake and Bear River.

William H. Goetzmann discussed Powell's "Report" in a 1965 book:

"Two fifths of the United States was, in fact, arid. What was needed was a scientific and environmental approach to the West and its resources. First the country must be mapped, and the lands classified as mineral lands, coal lands, pasture lands, timber lands, and irrigatable lands. Then Powell proposed two new land laws which would organize irrigation districts and pasturage districts.

As stated, the bills involved a sweeping change of the existing land laws. No longer would the traditional Land Office grid pattern with its 160 acre farms be mechanically laid down across the West. Instead settlement would be in irrigation districts similar to the Mormon colonies Powell had observed in Utah. The unit of each irrigated farm would be, not 160 acres, but 80, and all water rights would inhere in the land.

Groups of farmers would be encouraged to come together to form irrigation cooperatives, thereby sharing the enormous expense of the required dams, flumes, and ditches. They would be governed democratically and, if possible, locally, in the public interest.

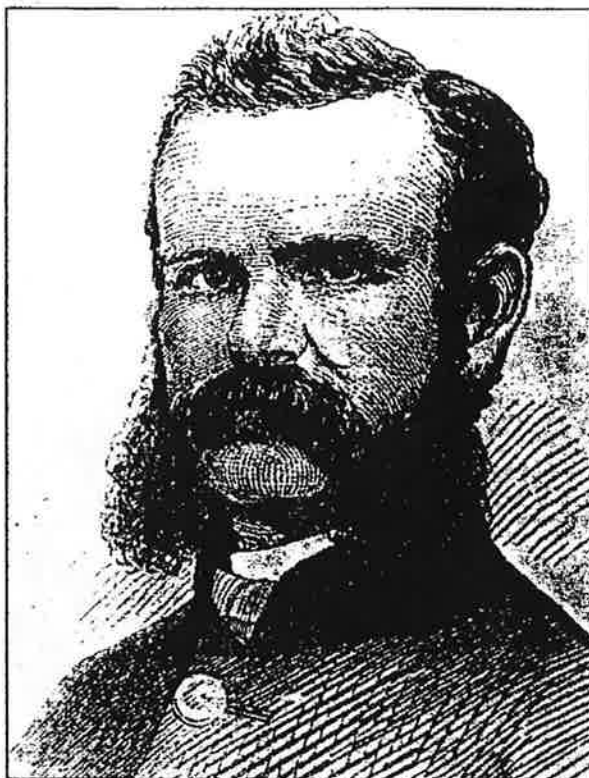
"These proposals, the capstone of Powell's years of work as a Western explorer, were designed to prevent a number of evils which he had observed in the West.

Principal among these was the monopoly of water rights, which according to traditional settlement patterns and Anglo-Saxon law was perfectly possible under present conditions in the West.

At first, individuals settled on the streams and water holes and dammed up the flow for their own use. Then, because of the expense involved, water companies were formed and using loopholes in the Timber Culture Act of 1873 and the Desert Land Act of 1877, they were able to get monopolies on much of the available water in the West.

They could waste it, use it for hydraulic mining, sell it to the highest bidder, or use it to force settlers out of a given region. With irrigation districts, and water rights inhering to the land, in Powell's view, this was not likely to happen."

And so Major John Wesley Powell started to look closely at Bear Lake. It became part of his vision for the American West.

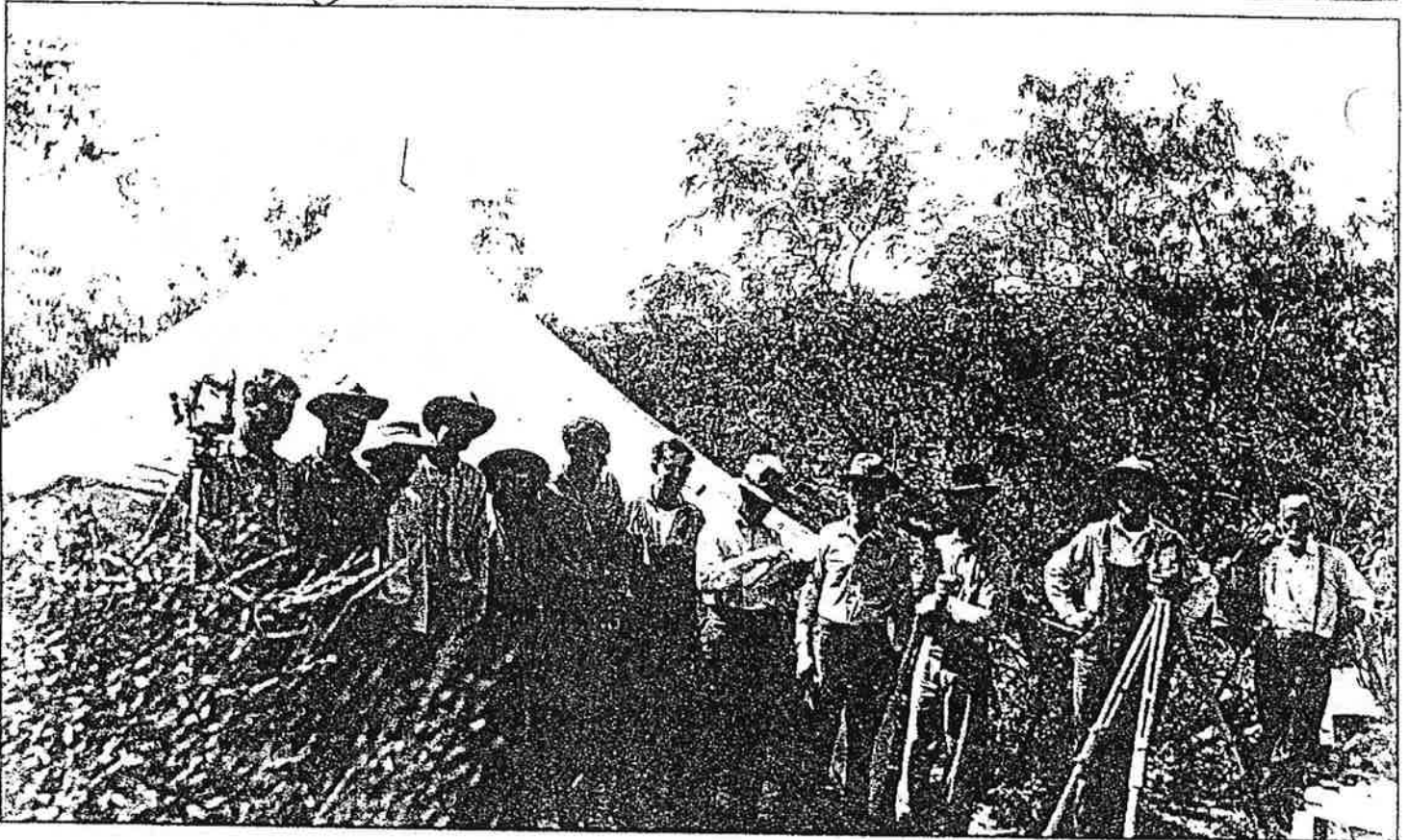


An 1870s engraving of John Wesley Powell.



A photograph of John Wesley Powell in the 1890s.

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Surveyors who worked for speculators followed the Powell teams around the American West.

Federal government acquires the lake

Editor's note: This is the fourth part of a series about Bear Lake.

We can all be forgiven for being so close to our surroundings to see that they might have value to others. There is the classic (and probably apocryphal) tale of Ebenezer Bryce in Garfield County who exclaimed when being told of the scenic magnificence of his rangeland that is today Bryce Canyon Park, "It may be pretty, but it's a helluva place to lose a cow!"

Well, it is pretty; and I very much suspect that it is a "helluva place to lose a cow." That's what I mean by being too close to something to recognize that it might have other values for other people. Some saw Bryce Canyon as a magnificent land formation. Ebenezer Bryce saw it as a "helluva place to lose a cow."

The people who saw the lake as the backdrop to the settlements that they were building on its shores didn't ever contemplate the value or the goals that someone like Major John Wesley Powell saw in the lake.

Powell's interests were spurred by his appointment to a survey of the mountain and plateau region. That survey led to Powell's famous study on the Lands of the Arid Region. And that report led to Powell's eventual appointment on March 12, 1881, as the second director of the United States Geological Survey. The charge of the survey was to map the entire western United States and to make such recommendations to Congress as the survey felt appropriate for Congressional consideration.

One of those things that Powell felt important for Congressional consideration was the need for irrigation in the arid West, and his reports reflected that. So did his lobbying with various members of the Congress. Again and again he returned to his standard theme: the West could be effectively settled if the land could be irrigated, and, in order to insure that it was irrigated, some steps had to be taken on a national level to make certain that lands and waters were preserved for the purpose of irrigation.

In 1888, as a rider to the general appropriation bill, Congress authorized the director of the Geological Survey to withdraw from possible alienation by sale or homesteading, any area of the West that might be appropriate for use as an irrigation reservoir or any lands that might be irrigated once the canals and ditches were built. It was a triumph for Powell. The members of his Washington staff poured over their maps and reports, and then over the tract books in the General Land Office to find suitable areas that were not already in private ownership. It was a proud day for Major Powell when, in his first action under the 1888 Act, on April 6, 1889, the major withdrew from private ownership all of Bear Lake. But the withdrawal did more. It also withdrew into permanent federal ownership as a reservoir site for irrigation water, all land within two miles of the highwater mark of the lake! Now, that was a reservoir.

Since a reservoir site inevitably meant that land downstream from the reservoir might be soon irrigated, it was an irresistible draw for speculators. People in Bear Lake County, Idaho, soon noticed them. Men were staking out land west of Montpelier that might be irrigated from the Bear Lake Reservoir.

In July 1889 the Idaho Constitutional Convention, formally meeting in Boise to write the constitution for the state that would be admitted to the Union the following year, formally complained to the commissioner of the General Land Office that speculators had followed members of the survey party sent out by Powell and that they had staked claims within the bounds of the reservoir site. As Wallace Stegner, Powell's biographer, described the next round:

"The Acting Commissioner, William M. Stone, thought things over for a few weeks and on Aug. 5 directed local land offices to cancel all claims filed after Oct. 2, 1888, on reservoir, ditch, or canal sites. That is, he retroactively ordered the closing of the public lands."

The unintended effect of Stone's action was to suspend all the land laws in the American West until Powell's survey determined what sites were suitable for reservoirs and what areas were suitable for irrigation. Until that was done, no land would be patented west of the 100th meridian. The howl from the West was quick and loud. It was loud enough that Congress decided to revisit the act of 1888, which it did in a rider to the appropriations bill of 1890.

The 1890 rider repealed most of the provisions of the far-reaching bill of 1888. Henceforth, only actual reservoir sites could be withdrawn. If the reservoir was an existing body of water, the withdrawal could only be below the high water mark. But the high water mark was as fixed as the limit of the federal reservation. Private individuals could homestead land down to that high water mark; but they couldn't own below it. Below that point was forever withdrawn and reserved for irrigation use.

These acts and the controversy that surrounded them got a considerable amount of attention in the west. There was some work being done in both Cache and Box Elder valleys toward the construction of major canals that would irrigate the huge tracts of land that Major Powell had first envisioned. Some private investors were looking very hard at the sites that Major Powell had designated as reservoirs, and some armchair geographers were also taking a look at the sites and writing about what might be done with them.

And, in a more formal way, the Senate of the United States appropriated money for an intensive series of hearings on irrigation and reclamation that were to be conducted in each of the western states and territories during the summer of 1889. Bear Lake, which had been little more than a backdrop during all the years since its margins were first settled in 1863, was suddenly going to be the center of a move to irrigate much of northern Utah.

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Bear Lake: Mr. Bothwell's reservoir

New York financier taps into water source

At the same time that the clerks in Major John Wesley Powell's office were looking over maps and tract books of the western United States, private investors were also considering the best way to utilize the water resources that the largely arid land provided.

In 1888, while Congress was still debating the Federal Irrigation Reservoir provisions of the later act, the Malad City correspondent of the Salt Lake Tribune noted that because of its position and its elevation, Bear Lake was a natural reservoir that could be used to store water for later release downstream to irrigate the lands in Cache and Box Elder valleys.

That corresponded with the beginning work done by New York financier John R. Bothwell who had incorporated the Bear Lake and River Irrigation Company.

Bothwell's plan (later realized as the Bear River Canal) was to irrigate much of Box Elder County by means of twin canals taking water from the river in Bear River Gorge in Cache County. One of the canals would carry water to the west side of the valley, and the other was projected to extend as far south as Ogden on the east side of the valley.

Bothwell moved fast to realize his plans. He filed on Bear River and Bear Lake waters, had survey crews stake out the routes of his ditches, and hired a construction crew to build a dam across the outlet of Bear Lake in order to raise the level of the lake by about four feet. Bothwell had enough financial resources behind him, that he either bought the projected flooded land outright or acquired flooding easements on it.

In a brochure that is one of the rarest pamphlets in the collections of Utah State University, Bothwell's publicist explained the work at Bear Lake:

"The lake is surrounded by mountains on the east, west, and south sides. Across the north end an embankment had been formed by wave action, leaving an outlet about 60 feet wide toward the west side.

"A force of men were set to work; the embankment was raised several feet, and a dam was thrown across the outlet. This will be replaced by gates. This action secured to the Company the largest reservoir in the world. The lake has an area of 120 square miles, and its capacity is so enormous that, were all the waters to disappear from Bear River, the

canals could be run full for the whole irrigation season without reducing the water level in the reservoir more than four feet. Thus the question of water supply is entirely eliminated, and at the same time opportunities are opened to the Company for an enlargement of its business in the future by utilizing the surplus water in the reclamation of lands below the lake and above the present point of diversion at the 'Falls.'"

It was after this that Major Powell withdrew Bear Lake as a federal reservoir site.

In testimony given before the Senate Select Committee on Irrigation and Reclamation on Aug. 19, 1889, O.J. Hollister of the Salt Lake Chamber of Commerce discussed Bothwell's actions:

"Deeming appropriation absolutely essential to success, Mr. Bothwell visited Bear Lake with his chief engineer, and finding it admirably adapted to the purposed, appropriated it for storage purposes, and commenced building a dam across the outlet. I do not think he was aware of the law of Oct. 2, 1888. I believe that it has never been published until Secretary Noble sent out a copy in response to Governor Shoup's telegram."

The likelihood is that Bothwell was very much aware of the reservoir law.

He simply intended to use it as the basis for his own reclamation effort — spending his own money rather than waiting for the government to build one. In his testimony before the Senate committee, Hollister and the chairman explored the ramifications of the 1888 law.

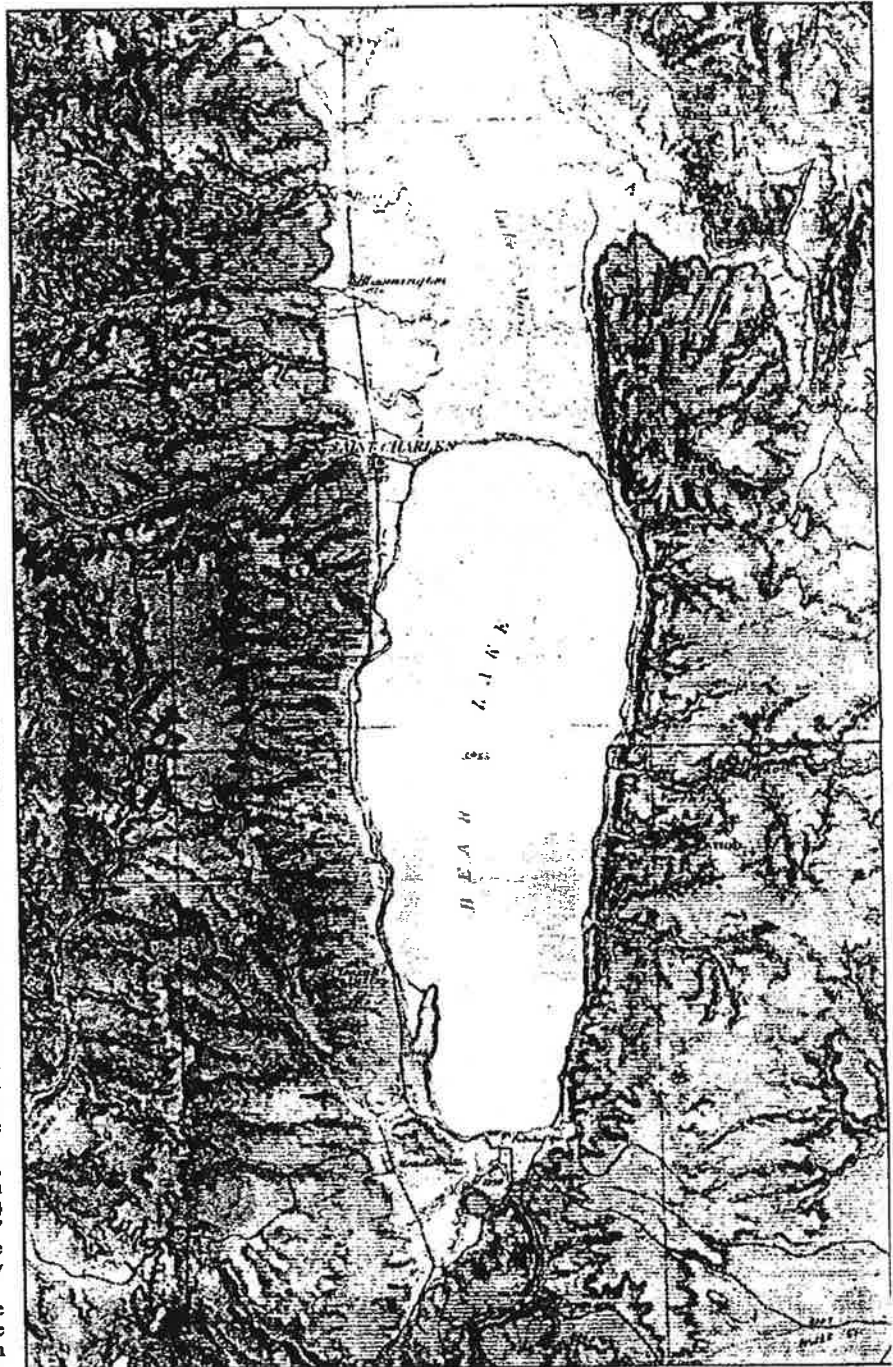
The chairman, Senator Stewart, asked Hollister, "What objection is there to his (Bothwell's) damming the lake and using it?" Hollister replied, "I cannot see any except that it against the law at the present."

Then Senator Stewart got to the heart of the matter, the whole issue of the lake having been withdrawn from any but incidental use and exclusively devoted to irrigation.

He asked Hollister, "Do the people understand that it is reserved as against their use of it?" Hollister replied, "We understand that it is reserved against everybody's use of it — any lands susceptible of irrigation."

There was considerably more testimony about the Bear Lake reservoir.

The upshot of it was that the backers of the Bothwell project wanted the law to be amended so



The first detailed map of Bear Lake and its environs was done by the War Department in 1877.

that Bothwell could proceed with his scheme to use the lake as a reservoir to supply water to Box Elder County.

Congress essentially agreed. In 1890, the former act was amended to allow the government to designate reserves which would be forever held for irrigation purposes, but to delete the provisions about removing irrigable lands from the action of the Homestead and other

land acts.

A further provision granted a right of way over the public domain (including presumably the lake bed which had been so designated) for the construction of all necessary works to facilitate irrigation.

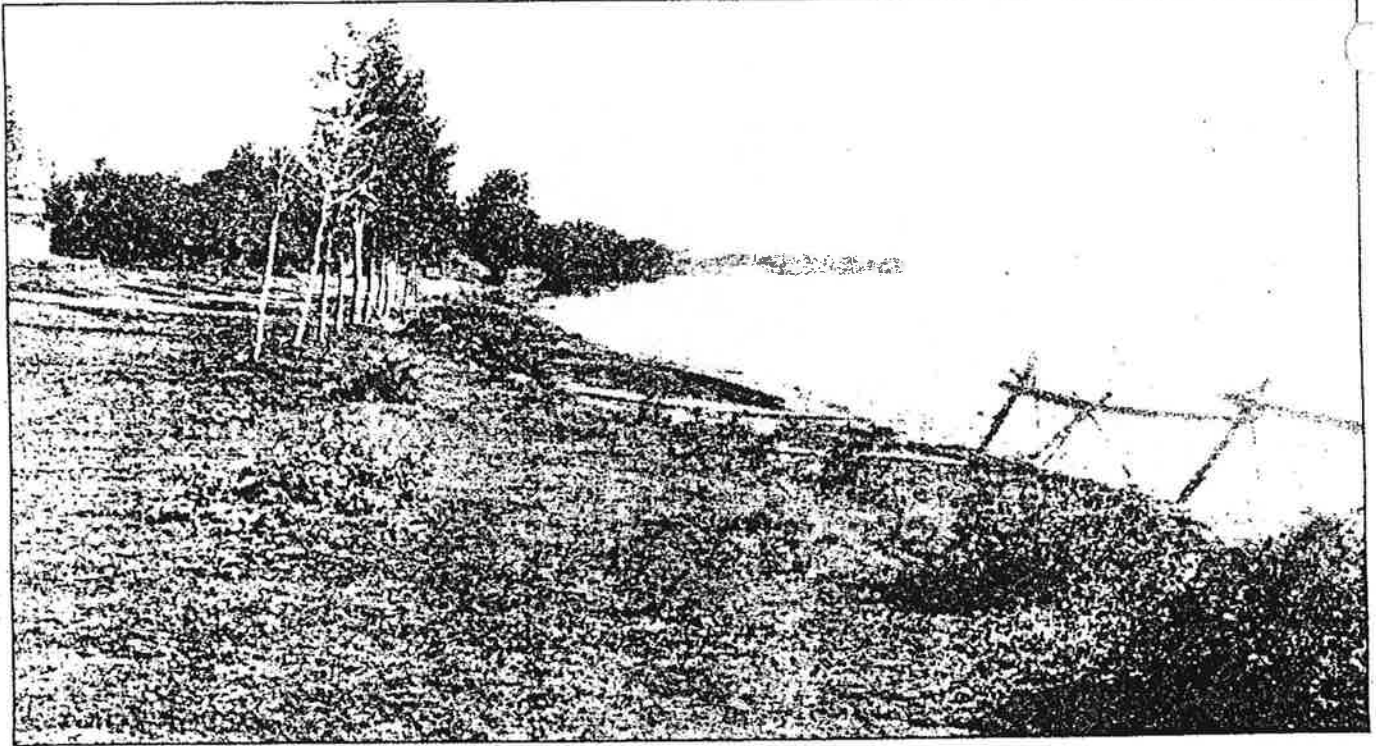
In 1890 the Senate Select Committee on Irrigation and Reclamation of Arid Lands published its report in two massive

volumes, volumes which speak volumes about Congressional intent in the legislation.

And that same year, Mr Bothwell and his backers went to work on the system that ultimately became the Bear River Canal operation in Box Elder County.

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Power co. diverts river to Bear Lake



An early picture of the western shore of Bear Lake, near the Utah-Idaho line.

Editor's note: This is the sixth in a series about the development of the Bear River and Bear Lake.

At the same time the team under Elwood Mead was studying "Water Right Problems on the Bear River" and producing their published report, someone else was taking a look at the lake as a reservoir site.

L.L. Nunn was the mover and shaker behind the Telluride Power Company, the first electric company in the world to transmit alternating current for long distances.

Telluride had started, obviously enough, in Telluride, Colorado, where Nunn's company had generated electricity to power the operations of the mines in the area.

Nunn had gone from a single company in Colorado to welding together a series of small generating companies in Utah. He also cast a covetous eye at the various streams flowing from the Wasatch Mountains that could provide spots for hydroelectric power generation.

And among those spots, none offered more potential than the Bear River. Between Montpelier and Great Salt Lake, the Bear River dropped some 1,700 feet in a little over 150 miles. By comparison, in its whole length across the United States, the Mississippi River drops only 1,463 feet. Nunn was excited about using the Bear to generate power.

But generating power meant that the flow of the river had to be kept at a minimum level. The vast fluctuations between spring run-off and summer low had to be somehow evened out. And L.L. Nunn was convinced, as the U.S.D.A. scientists were convinced, and as John R. Bothwell had been convinced, that the answer to stabilizing the flow of the river was in using Bear Lake as a storage reservoir.

In 1898, just as Mead's crew was taking

a look at Bear River and Bear Lake, Nunn sent the Telluride Power Company's chief engineer, W.B. Searle, to examine the lake and the river and make recommendations for their development as a source of hydroelectric power.

Searle's examination recommended exactly the same solution as Mead's: install some headgates to keep the lake high, and dig a canal from the river to divert surplus waters into the lake. The difference was that whereas Mead could recommend projects to the government, Nunn had the money to do them out of hand. And that is what he did.

But Engineer Searle's report to Mr. Nunn was a two-parter. His first recommendation was to tap the lake at Garden City by means of a tunnel under the crest of the Bear River Mountains.

The water from the lake was to flow through the tunnel and then be emptied into the Logan River and then down to the Bear in Cache Valley. Searle's initial estimate was for a tunnel of some three and a half miles. A.L. Woodhouse, who later became Superintendent of the Utah Division of Telluride Power wrote of Nunn's initial enthusiasm for the plan and the final outcome:

"Mr. Searle also studied the feasibility of drilling a tunnel through Logan mountain to tap Bear Lake a few feet below normal level and use the difference in elevation between Bear Lake and Cache Valley to divert the flow down Logan River, which would eliminate the cost of an outlet canal, three separate power plants and many miles of transmission line.

"It was a fine dream, but actual survey showed the tunnel would be 14 miles long instead of three and a half as Mr. Searle had estimated. Also, irrigation rights for

200 miles along Bear River would result in litigation."

Mr. Nunn fell back on Searle's second recommendation, to fill the lake by means of a canal from the river; and to control the height of the lake by headgates at the outlet. On March 24, 1902, and again on April 12th, Nunn filed on flood, waste, surplus and unappropriated water in Bear River. The filings were made under the provisions of the "Right-of-Way" Act of 1891, one of the Federal laws that stemmed from the investigations and recommendations of Major John Wesley Powell.

Nunn began work immediately, building the first dikes north of the lake and the inlet canal in 1902. Headgates and other works were added between 1902 and 1911 as were dikes and levees around Mud Lake — the lake just north of Bear Lake where the inlet canal from the Bear River deposited its water.

Apparently, the so-called Dingle Canal was not engineered very carefully, for it never delivered the water that could have been diverted into the lake and ultimately had to be replaced by another canal — the so-called Rainbow Canal that does have the capacity to divert virtually the entire flow of the river into the lake during the high water runoff in the spring.

The first water was diverted from the river to the lake on May 24, 1911. Just two months later, on July 11, 1911, the first stored water was released from the lake through temporary headgates at the head of the outlet channel.

Improvements were made during the succeeding years. A rock dam was constructed in the Bear River at Wardboro, Idaho, to aid in the diversion of water, and a new inlet canal, the Rainbow Canal, was dug in 1914. At the same time, the outlet

channel was widened and straightened to facilitate the movement of stored water out of the lake.

Though the Telluride Company did much of their work before 1907, it was not until April 1 of that year that the U.S. Secretary of Interior approved the building of various irrigation works on the public domain in Dingle Marsh.

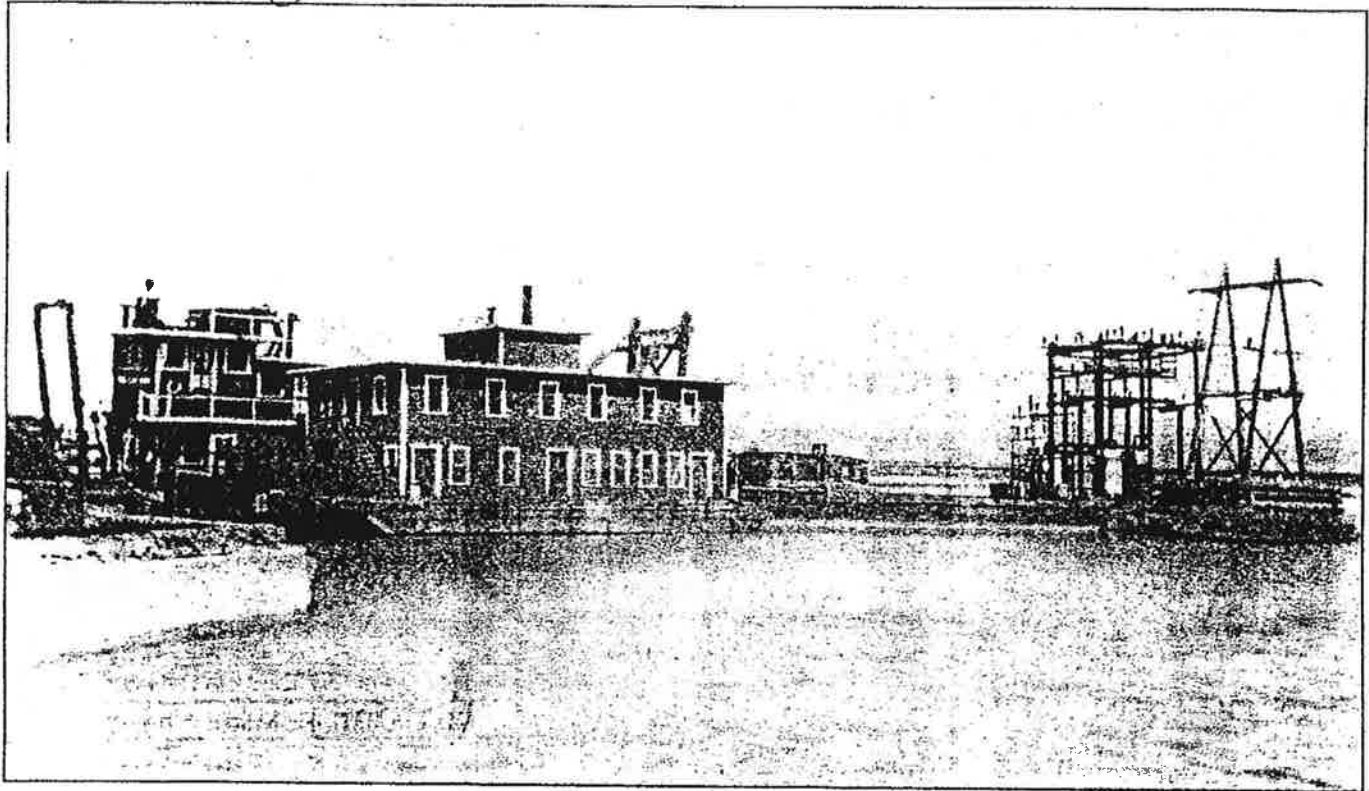
Until that time, Nunn operated on the supposition that the Act of 1890 allowed him to build such works on the public domain.

Ultimately, Secretary J.R. Garfield granted Nunn's application for canals into and from the lake. But he did so with a proviso. The history of Utah Power & Light Company (written by the company 1937) recorded that Nunn had made certain promises to the Department of the Interior in keeping with the provisions of the various reservoir and reclamation acts. The history states:

"On April 1, 1907, the Secretary of Interior granted Mr. Nunn's application with the provision that if he did not live up to his promises the Government would step in and develop the reservoir itself."

Clearly, all the time from the first reservation of the lake on April 6, 1889, to the approval of the Interior Department in 1907, there was an unstated promise that the Federal Government might be the ultimate developer of the lake. The 1907 agreement between the Department of the Interior and Telluride Power seems to have merely suspended potential Federal interest in the lake, it did not eliminate it.

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A 1919 picture of the dredge barge used at Camp Lifton by Utah Power & Light to maintain the outlet canal.

BL pumping results in water wars

Editor's note: This is the seventh in a series about the development of the Bear River and Bear Lake.

When the Telluride Power Company began building its diversion works at the north end of Bear Lake, it did so with the expectation of managing the flow of the river for its own benefit. It had to cut a deal with the Federal Government in 1907, since the lake was reserved exclusively for irrigation use. But the use of flowing water did not eliminate its final use of being placed on fields in Gentile, Cache, and Box Elder Valleys. To tap that flowing water, Telluride proposed a series of hydroelectric plants.

In 1912, the Telluride Power Company was absorbed into a new company, Utah Power and Light, and it was Utah Power which built all but the first of the plants. UP&L placed generating stations on the river at Grace, Idaho, in 1907, at Oneida Dam in 1915, Cove Station (south of Grace) in 1917, Soda Springs in 1924, and finally Cutler Dam in 1927.

But by the time the Telluride Company was planning to use the stream flow for generating electric power, the stream flow had been effectively tapped for irrigation. First use was the Bear River Canal system in Box Elder County. The first water was delivered to the fielding area in 1892, and in the succeeding six years — with considerable slowing because of the ups and downs of the national economy in the 1890s — the various main canals were

completed until by 1899 water was being delivered to most of the irrigable land in Box Elder County west of the Bear River. Between 1904 and 1907 the 'East Side

Canal was built to irrigate Collinston, Honeyville, and Deweyville.

In Cache Valley, the West Cache Canal was begun in 1898 to bring water from Riverdale north of Preston to irrigate farms in Cornish, Trenton, Amalga, and Newton. By 1905, lands in Trenton were irrigated, though the completion of the lower branches waited until 1907 and 1909. In 1902, the first phases of the Last Chance Canal Company system around Grace, Idaho, was diverting water from the Bear River in Gentile Valley.

These were all gravity operations — essentially involving nothing more than re-channeling a river and putting it where you wanted it. But the building of power plants and their linkage with electric transmission lines changed the irrigation equation somewhat. With that resource available, electric power could be used to raise water from the river into canal systems.

In 1916 the Cub River Irrigation Company installed pumps on the Bear River west of Fairview to augment their water from east side valley streams. Private owners also installed pumps directly on the main stem of the river in Lewiston, Cornish, Trenton, Amalga, Smithfield, Benson and Newton. An even more elaborate pumping system was installed at Cache Junction to deliver water south throughout Petersboro. Though the canals were built at enormous expense, and the pumps filled them from the river beginning July 5, 1920, the system ultimately failed because of the rise of salts and alkali in the land.

All of these varied uses, whether for electric power generation or for irrigation, were based upon the assumption that the

use of Bear Lake as a reservoir would enable the users to stabilize and rationalize the flow of the river. No more highs and lows. With Bear Lake as a control — receiving water from runoff and releasing water during the dry season — the river was seen as providing ample water for diversion as well as for power production.

Ultimately, people changed their minds about that, but in the heady days of new irrigation and electric power, there was considerable enthusiasm for development of the river. The first release of stored water from the lake was on July 22, 1911. But the demands on the river for both power and irrigation quickly revealed some problems with the existing storage facilities.

A new inlet canal was dug in 1916. The outlet presented additional problems. There wasn't much of a difference in elevation between the lake and the mouth of the outlet. Water moved sluggishly, even with the force of stored water behind it. In 1917 Utah Power and Light straightened and enlarged the outlet channel. And to get more current between the lake and the river replaced the headgate on Bear Lake with the Lifton Pumps, electrically driven pumps that would force water from the lake into the outlet channel and thence into the Bear. In order to keep the water at the outlet deep enough for the pumps, Utah Power and Light built a dredge barge and stationed it at Lifton. Since 1917 the dredge and its successors have performed the duty of keeping the channel from the main body of the lake to the pumps clear of the sand that forms the bottom of the north end of Bear Lake.

When one thinks that in 1890 the Bear

River had not been tapped anywhere below Bear Lake for any use at all and that by 1917 there were four major canal systems drawing water from it and three hydroelectric plants (the third was at Wheelon in Bear River Canyon near Cache Junction), and that at least thirty farmers had installed or had plans to install pumps directly on the main stem of the river, it is clear that the Bear River had been rapidly discovered and just as rapidly used by people along its banks.

When one considers that in the same time period many of the tributaries that flowed into the Bear, particularly in Cache Valley, had also been tapped for irrigation and power generation, there was the feeling that the river could be overcommitted at some time. To guard against that happening, Utah Power and Light Company instituted two major lawsuits against every water user on the river between Bear Lake and the Box Elder County line. Ostensibly, the suits were to be "friendly" and just to settle claims. Inevitably, they became nasty — especially in Idaho where Utah Power and Light sought to decrease the water available to the Last Chance Canal System. The two suits resulted in the two decrees that still govern much of what is done with the river and lake: The Dietrich Decree in Idaho and the Kimball Decree in Utah — both of them named for the judges who heard the cases.

The Dietrich Decree was issued on July 14, 1920, and the Kimball on February 21, 1922, and the water users settled down to see how things were going to work.

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The river and the lake

On Friday, July 21, on page 11 of The Herald Journal, there was an article discussing the possibility of introducing the chinook salmon into Bear Lake. It was written by Robert Merrill, who is not only a good journalist but also a cousin of mine (I'm not sure just what is the degree of consanguinity, but we share the same great-grandparents, Sylvester Silas Hulet and Mary Elizabeth Dalley).

I don't have much trouble disagreeing with relations. Since I must be related to a substantial part of Cache Valley, it must be obvious that I don't have much trouble disagreeing with relations.

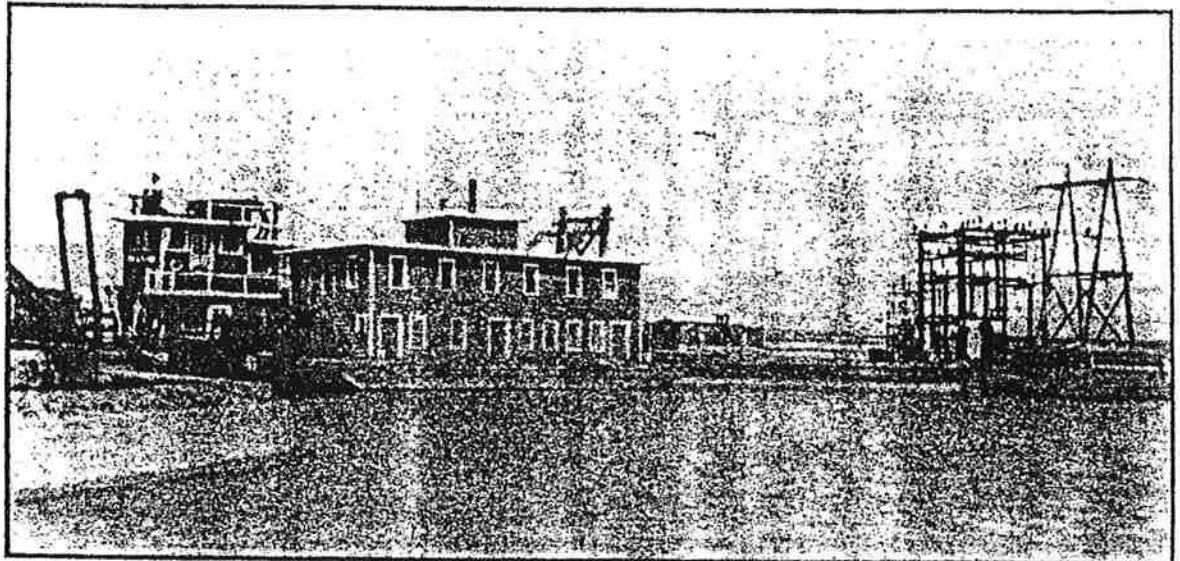
But there was a paragraph in Merrill's article that I find a bit troubling in light of all the stuff Bear River water users have experienced this year regarding downstream use of Bear Lake waters.

It was the fourth paragraph in the article on the chinook salmon proposal:

"Bear Lake straddles the state line across southern Idaho and northern Utah. It is unique because it was isolated from the Bear River approximately 28,000 years ago and has been fed from streams and springs within its own basin."

I accept a part of that paragraph. But I don't accept all of it. And because the plumbing of the Bear River is so important to Cache Valley and to its energy and agricultural base, it behooves all valley citizens to understand the Bear River and its natural reservoir in Bear Lake.

Clearly, the Bear River has not flowed through Bear Lake for at least the last 12,000 years. Twelve thousand years ago Lake Bonneville filled much of Cache Valley. Twelve thousand years ago, as the Logan River flowed into Lake Bonneville, it deposited the sand, clay and gravel that today comprise the lake terrace upon which Utah State University is built. At the same time,



A dredge barge used by Utah Power & Light Co. to maintain the Bear Lake Outlet Canal.

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flowing into the same lake, the Bear River deposited Preston's sand. Weston Creek deposited the stuff where Weston is built; and the Little Bear River built Hyrum.

In that list of places, Preston is the operative area. There probably wouldn't have been enough sand carried in the Bear River to Preston had the river flowed through Bear Lake 12,000 years ago. Had it done so, that sand would have dropped into Bear Lake. But, before 12,000 years ago, the river did flow through the lake; and it dropped enough stuff in the lake to create the marshlands between Bloomington and Montpelier. The river was effectively excluded from Bear Lake by the very fact of dumping enough gravel, clay and sand into the north part of an Ice Age Bear Lake to fill it up.

But it wasn't a total fill. There was always a natural connection between the river and the lake — at least until 1917 when the

natural connections were superseded by the artificial connection imposed by Utah Power and Light Co., when the intake and outlet canals were dug and the Lifton Pumps installed to move water from the lake back into the river.

An 1877 map published by the War Department clearly shows a labyrinth of channels connecting Bear Lake and Bear River in the marshlands west of Montpelier. The function of those channels was explained in a publication of the Department of Agriculture in 1899:

"The next tributary below this is the slough which drains Bear Lake. This is a sluggish stream about 18 miles long, which, for a considerable portion of its course, winds its way through a marsh of cattails and flags. The difference between the mean elevation of Bear River and of Bear Lake is only about 2 feet, so that when Bear River is high the current is toward Bear Lake, and

the flood waters of the upper river discharge into the lake. Later on, when the stream gets low, the current reverses its direction. This causes Bear Lake to be in effect a regulator of the river, receiving its floods and augmenting its low water discharge.

Clearly then, while the connection may not have been as visible as a trenched channel, there has historically been a connection between the river and the lake, and the downstream flow of the river was effectively regulated by the lake being a natural reservoir.

It was a plumbing system that worked quite well naturally, but was "improved" in the early years of this century by the dredging of channels to connect the river and the lake and to facilitate the diversion of river waters into the lake and by the outlet channel and the Lifton Pumps at the north end of Bear Lake where lake waters are

discharged back into the river. However, while the natural system worked all by itself, the new system requires the help of man to manipulate the headgates and turn on the pumps.

In examining the maps of Mud Lake and Bear River areas north of Bear Lake, from the first maps in the 1870s until the most recent publications of the U.S. Geological Survey, it becomes very clear that in reworking the plumbing of the lake, the old channels have been lost — filled with debris, not washed out as in prior years by the annual movement of water.

I have a sneaking suspicion that the inlet and outlet canals and the Lifton Pumps changed the natural hydrology of the area. When the canals and pumps changed the pattern of flow between the lake and the river, the old channels that had previously worked, no longer worked because the waters that had filled them were purposely channeled elsewhere.