



California State Parks

Video Transcript



A Tour of Bale Grist Mill State Historic Park

Good afternoon, everyone, and welcome to the Bale Grist Mill State Historic Park. My name is George Stratton. I'm the miller here, and I'll be guiding you through a little bit of the history of the mill and then how it works. Up behind me is the largest wooden historic waterwheel in North America, 36-1/2 feet across. Mexico, United States, Canada—that's it, the very largest. The hub of the wheel is as old as the wheel. It was first put up there in 1851 when the mill was rebuilt after the Gold Rush. Most of the iron that you see as we go through on our tour of the building, whether it's inside the building itself or on the periphery, is new as far as history is concerned. During World War II they came through the mill and took iron for the war effort, as scrap iron was a vital part of fighting that war.

This is a water-powered mill. It's called an overshot mill, which, compared to an undershot mill, is much more efficient. This takes, perhaps, between 500 and 600 gallons of water per minute to operate. When you compare it to an undershot mill where the water zooms underneath the mill, that takes between 4,000 and 5,000 gallons a minute; and that's why out here in California what you see are overshot mills. We don't have 5,000 or 6,000 gallons of water per minute most of the time—once in a while in the wintertime, but most of the time we don't. And so we have the overshot wheel.

The waterwheel develops about 40 horsepower. One more 40 to deal with and that is the ratio. There are four gear changes as we go inside, and each one multiplies the speed of the machinery so that by the time we hit the millstones inside, they're turning 40 times for every time this big wheel turns once.

The mill is called the Bale Grist Mill because it was built by Dr. Edward Turner Bale back in the 1840s. Dr. Bale was a surgeon trained in London, but he didn't practice there. Instead he signed on as the ship's doctor on a whaler, went out into the Pacific Ocean to hunt whales. Whether they got any or not, we don't know. We don't have any record of it. But we do know that in October of 1836 they landed in Honolulu. They spent the winter in paradise, and then early in the spring of 1837 they set sail for California. They landed at Monterey in May of that year. Dr. Bale left the ship—a lot of stories about how he left. Probably the most accurate are the ones that concern the captain's good right leg assisting him from the ship.

He went into Monterey. At that time Monterey was just a tiny, bitty little village, but it was the most prominent and most important tiny little village on the west coast. It was the capital of Mexican California, of Alta California—that great Mexican state that included what's today New Mexico, Arizona, Nevada, California, parts of Utah and Colorado, Texas—and it was governed from Monterey. So Bale was invited to be their doctor—nobody there with medical training. So he did. He hung out his shingle and began to practice. In that practice he met General

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Mariano Vallejo who was the Commandante of the Mexican armed forces. That was a pretty good thing for Bale to meet Vallejo; but even better he met the General's niece, the lovely Maria Soberanes de Guadalupe. They began keeping company, and after a courtship of two years duration they were married.

In order to be married, he had to join her church, the Catholic Church. And immediately after the wedding he accepted Mexican citizenship. So here he was, a citizen of the right country, belonged to the right church, married in the right family—all of this made him eligible for a land grant. Bale was given a little plot of land out here. About 19,000 acres—a little plot of land—every part of the Napa Valley from down in Rutherford on up through Calistoga. This became his rancho.

In 1841, a couple of years after he and the lovely Maria were married, they came up here to live on their land. One of the first things he had to do was figure out how to make a living. This was the boundary between the European civilization and the Native American people. The Wappo people began from here, the Pomos next, and on up clear up into Oregon before you met any more European civilizations, the English on the Columbia River.

He looked around and he saw that if you needed a nice smooth board, you had to go out in the back yard, chop down a tree, and start from there. Now that's a slow way to build anything. So he decided on a sawmill, and he built it three miles south of here where we're standing. Today, that's part of the Charles Krug Winery.

I've never told you about when Bale and his wife arrived here. One child had already been born and another was on the way. Well, that oldest child was a girl. When she grew up, she married an immigrant from Germany by the name of Charles Krug, and his dowry was 600 acres and that sawmill. This is where he got the land to plant the grapes, and the rest is history.

Now the mill itself is about twice the size as it was when it was first built back in the 1840s. They started building it in 1844. They were ready to mill about Christmas of 1846, but there aren't any crops ready to be milled at Christmas time, so it was actually the summer of 1847 before they did start milling.

Now the summer of 1847 doesn't sound like much historically speaking, but if you add six months to it, you come to January of 1848. And, of course, it was January 25th of 1848 that a fellow by the name of James Marshall found these shiny little flakes of stuff in the tailrace of a mill he was building for Captain Sutter up on the South Fork American River. And the world turned upside down, or at least California did. There was gold.

Well, shortly enough, Dr. Bale and a couple of his cronies decided they had enough of living down here, so they took off for the Sierra where they were going to pick up nuggets from the ground and, you know, get pockets full of nuggets and get rich. Once you pass 4th grade, you have to understand that's not the way it worked up in the mines. First place, you had to work hard. Second place, you had to have luck.

We don't know about how hard Dr. Bale worked when he was up there, but we know that down here he was a hard working man. So we presume that he was up there. What we do know is

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about his luck. He had two kinds: bad and worse. Instead of getting rich, he got sick. Came back down to the valley here, and by October of 1849, he was gone, leaving behind the lovely Maria. She was now 27 years old. There were six children, from nine on down to little Andrew, who was still a babe-in-arms at the time. Left the lovely Maria with a pile of debts and a pile of troubles. Can you imagine living right here at the edge of civilization, the widow, 27-year-old widow, with six children and what to do?

Wheat, rye, oats, barley, corn, anything that could be made into food or drink for man or beast was being grown just as fast as they could grow it and brought into these little mills and sent up to the mines as fast they go. We think of 1849 as being the year of the Gold Rush. Well, it was. A hundred thousand people came to California in 1849, and yet that's the smallest year of the Gold Rush. By 1851 there was up to 300,000 people. In the middle of the '50s, there were 2-1/2 million people in California, and all of them hungry. So feeding that mob was really where the gold was. And this was part of it. The price of flour in 1848, the year gold was discovered, was a penny-and-a-half a pound. By 1851 there are reports it was as high as a dollar-and-a-half a pound. We don't even pay that for it now, and we're talking about 1851 dollars. So a pound of flour was worth about \$25 dollars up in the mines.

Almost all the mills shut down within a year or two; and one of the reasons for that, and probably the most important reason, was the industrial revolution. Already back east, great big steam-driven roller mills were turning out in about 18 to 20 minutes what a mill like this can do in a ten-hour working day—every hour they could replace three mills of this size. So almost all of them were shut down. Not only shut down, but torn down because the dressed lumber was worth more up in the mines than down here on an empty building.

This mill hung on for a couple of reasons. One was the farmers, being good farmers—if something goes wrong like the arrival of the hard red wheat, they don't simply roll over and die, they switch crops. And they did here. Now everybody knows they switched to grapes out here, and everybody's wrong. That didn't happen for another 100 years. Actually, what they switched to were tree fruits—basically prunes in this valley and walnuts and apricots and a few of the others—and they began to make a go out of that. This mill hung on as a feed mill, but it gradually got slower and lower and lower and lower. Toward the end, you had to go across the creek to the owner, to his house and get him up and have him come over and open up the mill. Finally about 1903-1905, depending on which history you read, they put a padlock on the building, and it went out of the mill business.

It simply sat here by the side of the road as kind of a nifty place to come have a picnic or let the kids run off some energy on your way up to the lake or up to the river. That's the way it was, through private ownership and semiprivate and public ownership, until finally all of us people here in California, we acquired the land and the mill in about 1974. It took five or six years to work our way up through the chairs in Sacramento. We finally got started on rebuilding it, putting it back together, in 1979. It took nine years to do a five-year job because of a shortage of funds, which finally came through. It was 1988 when we did our first milling—October of '88. And we've been doing that ever since. All right, we're going to go inside now, unless there are questions, and we'll see how the mill works. So if you'll follow me.

We're inside a typical 1850 mill. What I have here are the wooden patterns that were used to replace the old gears that were taken out during World War II for the war effort. These were

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sent to a foundry to be cast into the gears. Sixteen of these were cast to make out the big ring of gears around the outside of the big wheel. This one is right outside the wall down in the tailrace. There is a shaft operating; comes into this point where there's another set of beveled gears that turns the power in underneath. There are two more changes underneath. The final one comes up through the center of the millstones, wheat over there, corn over here.

We're inside a typical American grist mill of the 1850s. This is what's called an Evans Mill. The very first patent ever granted by the American government was to Oliver Evans for an automated grist mill, and it's signed with a flourish by G. Washington. Actually, there were three that tied for first, and the mill was one of them. But we always say our mill was first. So this is an Evans Mill. It took three men, the miller and two assistants, to do everything on the property. All of the business end of it, maintaining the water flow, milling the grain, sacking it, all of that done by three people. They could produce approximately 4,000 pounds of flour every day or 6,000 pounds of cornmeal every day. There are two sets of stones—corn's done over here, all the wheat products were done over here. I'll be milling a soft white wheat for pastry flour today.

The stones are inside here. They weigh a ton. The runner stone's on the top, the bed stone is on the bottom. Now I want to show you a little bit more about the millstones over here. This is a set of stones that are quite a bit coarser than the ones I'm going to be using today. These are called barley stones and are used for milling oats and barley. With those two particular grains, you don't do as much with them. You simply take the bran off the outside and break down the inside a little bit, but this is what they're used for. You notice that they have lines cut across the face of the stones. As a matter of fact, there are about 30 lines on this set of stones. That's why I called it crude because my wheat stones over here have 480 and the corn stones have 360. They're very fine; very close together; very, very sharp.

The way they operate is this. Coming up through the center of the bed stone—this is the bed stone, it doesn't move, it's fixed—coming up through the center is the last shaft that would be turning, the one that's going 40 times as fast as the wheel. I'm going to let my mill pick here represent the shaft for a minute. This stone, the runner stone, is lifted up by the crane that's on the top and comes down over the top, and the weight of it rests right here. This shaft is adjustable. I can lift it up or down so that the millstone, it goes down close to, but not touching. The reason we don't want it touching is that, can you imagine this is going 80 times a minute when we're milling? Imagine what's going to happen to the face of those stones. Imagine what's going to happen to your teeth from getting all that grit inside the flour. So the stones don't touch each other.

These lines and cracks that go across the face of the stone are used like scissors. It's like having a thousand pairs of scissors in there cutting the grain as we go. There isn't any grinding or any squashing or any of those good terms, but cutting. There is a piece of iron called the dog that fits down over the shaft and that has ears on it, sticking out at the bottom, and the ears on the dog fit in the wings of the stone. Great terms that they used in those days. As this turns, then, that's where the power comes from, from the ears on the dog turning that stone, and around and around it goes.

The stone is very hard. The millers all called it French quartz. Actually, it's quartzite. If it were really quartz, we'd all have short teeth for sure. But this is quartzite. You know about the

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diamond scale, which is the hardness of minerals going from one, which is talc, up to ten, which is diamond. Granite, which is a common American stone, you see it all over everywhere, is about five on the diamond scale. These stones, the quartzite stones rank about 7-1/2. They're about the same hardness as emerald. So they're very, very hard. A good set of quartzite stones will last 125 years in full-time use.

Now our stones that we will be working today have had about 50 years of full-time use equivalent, and we don't ever expect to wear them out. They're the original stones. They were delivered here in the summer of 1847 and put into the mill at that time. And we're nowhere near wearing them out. But they do have to be dressed, or sharpened, every once in a while. The granite stones, they used to have to stop their mill and sharpen their stones about once every ten to twelve days. With quartzite stones, it's every ten to twelve weeks. So they could do their entire wheat crop and then sharpen their stones, then they do their whole rye crop and sharpen their stones, and the whole corn crop and sharpen their stones, and that would be it for the year. Whereas, if they were using granite stones, let's say every two weeks they'd have to stop and dress their stones no matter what they were milling.

The dressing of the stones is kind of fun. It takes 30 hours to dress a set of stones, and the work is done like this. It's very, very exciting. That's it for 30 hours. What I'm doing here is to change the rounded edges of those lines or cracks into straight lines so that the scissoring action is better. Most of the wear of the stones comes from this, not from the grain that goes through there. Very little. What happens is it builds up a patina like you have on your silver, and it rounds off the edges, so they have to be squared up again. And that's how those work. Okay, let's go back over here.

Now before I can go any further, I have to engage the gears underneath, and to do that, I'll need a friend. John, my friend, will work on the other end of this crank right here. This axle is attached to a crank, and there is a chain wrapped around the axle with a hook on the end of it, and the hook is holding this gear, the last gear called the stonenuit, holding it up in the air. He'll turn the crank and lower it down, and I will see that the gears mesh. All right, down. Up. That's great, good. Okay, now we're ready to do the actual milling. First thing I'm going to do is to lift my millstones one full turn from where they were before so that I get a nice smooth even start. I don't want any jerking around and turning those things. So I'll open the gate.

[Sound of flowing water]

[Sound of millstone turning]

This will produce about 4,000 pounds of flour a day, and a day is a ten-hour shift. Things are a little different nowadays. The only odor coming out now is of fine flour. No burning. The big wheel outside is almost impossible to balance perfectly, so it slows down and speeds up. In order to get a higher quantity, I would be spending more time with this wheel, adjusting it each turn of the big wheel so that I kept it going more constant, at a more constant speed. But this is perfect. This is the way it's supposed to be. I don't always make it that way.

You can feel the flour. This is run-of-the-mill flour. Okay. Feel it? Yeah, okay. Now to get it off your hands, there's two ways to do it. One is you can put the stuff in your pockets, or you hold it out this way, turn your hands over, and then you strike the palms of your hands together very rapidly. Thank you, thank you very much. I appreciate your coming to see us today.

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Thank you very much for visiting the Bale Grist Mill today, and please come back. We're open every weekend for milling, and we'd enjoy having you again.

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