

The background of the entire image is a grayscale topographic map of a mountainous region, likely in the western United States. The map shows intricate details of mountain ranges, valleys, and river networks. A large, solid black rectangular area is centered on the map, serving as a backdrop for the title text. Within this black area, there is a thin white rectangular border that frames the text.

PHOTO ESSAY

**of
FOUR
UTAH**

EARTHQUAKES

1921 - 1962

PHOTO ESSAY of FOUR UTAH EARTHQUAKES

1921 - 1962

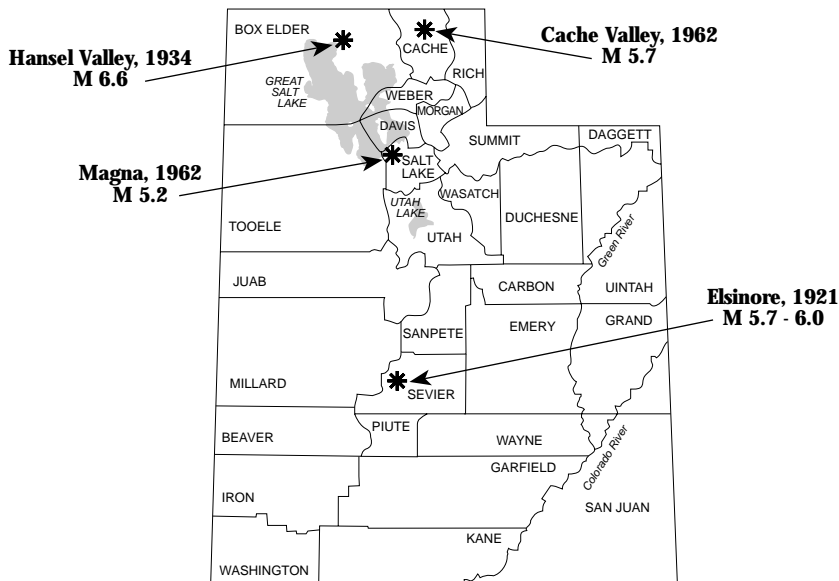
by Sandra N. Eldredge and Edith H. O'Brien

This photo essay contains selected photos, brief text, and newspaper excerpts for four significant earthquakes in Utah, illustrating what happened and what could happen during an earthquake.* Original photos were compiled by Edith H. O'Brien, Earthquake Education Services, University of Utah Seismograph Stations (UUSS), Salt Lake City, Utah as part of an earthquake education project funded by the U.S. Geological Survey under the National Earthquake Hazards Reduction Program (Susan J. Nava, co-project investigator). The project, *Personalizing the Earthquake Threat in the Intermountain West*, is a collection of photographs, newspaper articles, and personal accounts of 48 earthquakes in Montana, Wyoming, Idaho, and Utah.

The newspaper articles and most photos can be viewed on the UUSS web site: <http://www.seis.utah.edu/lqthreat/perseq.shtml>.

The complete manuscript of photos and newspaper articles will be donated to the University of Utah Marriott Library, Salt Lake City, Utah.

A traveling exhibit, *Earthquakes in the Intermountain West*, is also available for free from the UUSS. For information, visit <http://www.seis.utah.edu/lqthreat/exhibit.shtml>, or call 801-585-7972.



*Not all Utah earthquakes are included; many have inadequate photo coverage, and information on more recent earthquakes is readily available in numerous places. For further information on earthquakes contact the UUSS; the Utah Geological Survey 801-537-3300, <http://www.ugs.state.ut.us>; or the Utah Division of Comprehensive Emergency Management 801-538-3400, <http://www.cem.ps.state.ut.us>.

Elsinore Earthquake

Salt Lake Telegram; September 29, 1921

It was with difficulty that (the people) maintained their feet, as the disturbance caused by the faulting earth rocked them backward and forward. Chimneys crashed to the ground. Buildings of fragile construction collapsed. In the Hotel Johnston lobby the rocking chairs rolled over backward from the motion and in the dining room those at early breakfast had their meals precipitated into their laps.

Date: Thursday, September 29, 1921, 7:12 a.m.
Thursday, September 29, 1921, 7:30 p.m.
Saturday, October 1, 1921, 8:32 a.m.

Magnitude: 6
Magnitude: 5.7
Magnitude: 6

Epicenter: Elsinore, Sevier County, Utah

Geologic effects:

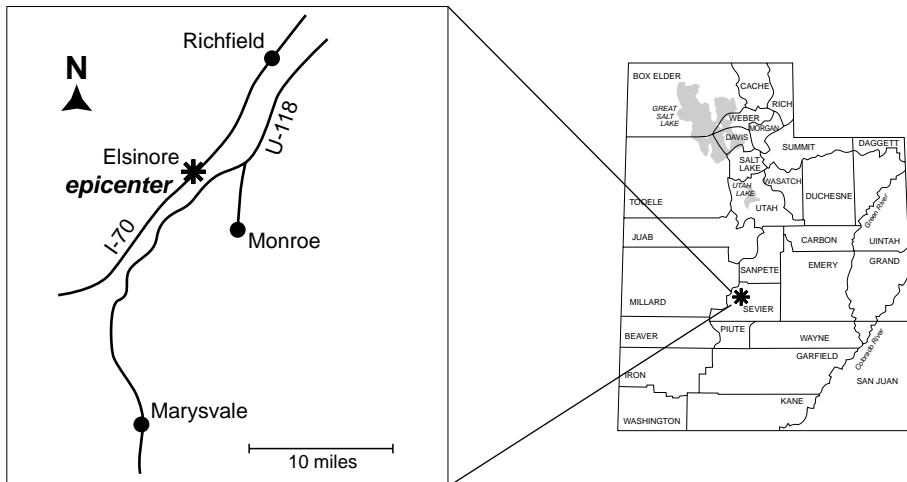
- Rock falls along the mountains east of Monroe, in Monroe Canyon, in Sevier Canyon, and elsewhere.
- Water from the Monroe Hot Springs turned a red color for a day or two.
- Ground shaking.

Damages:

- Moderate to severe building damage in Elsinore (at least 10 brick, rock, or adobe homes were irreparably damaged and had to be razed; virtually all other buildings had some damage).
- Cracked walls and fallen chimneys in Monroe and Richfield.
- Some cracked walls in Joseph.
- Chimney damage in Marysvale.

Other:

- The three major shocks and numerous smaller shocks created panic among the citizens of Elsinore and Monroe. Most of the people in Elsinore moved out of their homes for days.



The Nielson (rock) building, used as a paint shop, on Main Street in Elsinore was damaged by the first shock and the entire front threatened to collapse. The front was then propped up with timbers. Two days later, the October 1 earthquake caused the whole front wall to topple.



Photo from F.J. Pack Collection; courtesy of Special Collections Department, University of Utah Libraries



Photo from F.J. Pack Collection; courtesy of Special Collections Department, University of Utah Libraries

Left: Virtually all of the buildings in Elsinore were damaged. This photo shows typical damage incurred to Elsinore houses that were made of brick.

Bottom: The earthquake damaged Elsinore's new two-story brick schoolhouse. The four-to five-foot-high fire wall was shattered and tons of brick, cement, and mortar were thrown to the ground along three sides of the building. Fortunately, the earthquake occurred when children were not on the playgrounds next to the walls.



Photo published in the Bulletin of Seismological Society of America (1921); courtesy of the Seismological Society of America

Hansel Valley Earthquake

Deseret News; March 13, 1934

Yesterday when the earth shook in this Rocky Mountain region the works of man came to a sudden halt. Jurors hearing cases at court unceremoniously left the box. A teacher, standing before his class, became livid with the sickening sensation. A janitress on the high floor of one of the bank buildings was found stretched out unconscious. A young matron in Ogden, feeling the gentle swaying of her bed, was told that it was an earthquake and she fell back dead - the victim solely of her fear.

Date: Monday, March 12, 1934, 8:05 a.m.

Magnitude: 6.6

Large aftershock at 11:20 a.m. (magnitude 6.1)

Other large aftershocks: March 15 (5.1), April 14 (5.6), May 6 (5.6)

Epicenter: Approximately seven miles north of Great Salt Lake, Hansel Valley area, Box Elder County, Utah. Near Kosmo, a former potash plant operation and railroad spur.

Geologic effects:

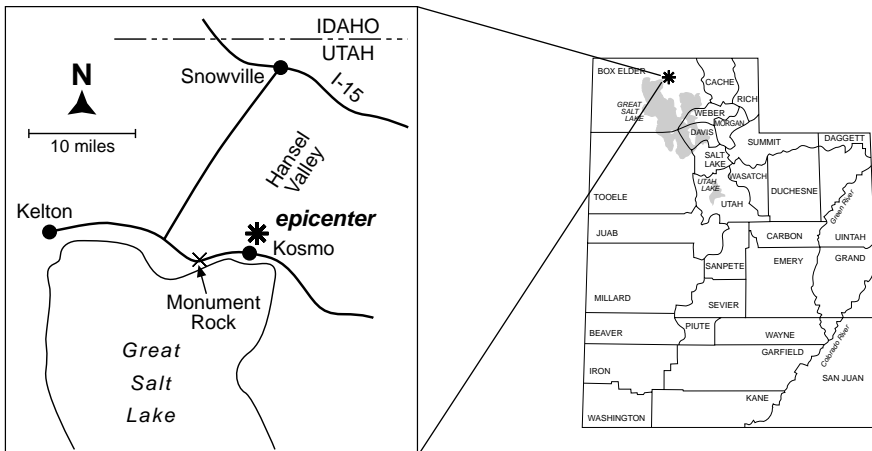
- Surface faulting
- Liquefaction and sand blows
- Appearance of new springs
- Ground shaking

Damages:

- Buildings were damaged in several towns, including Snowville, Logan, Tooele, and Salt Lake City.
- In Salt Lake City (about 80 miles distant), two adjacent tall buildings swayed enough to make contact.
- In Salt Lake City, the City and County Building's mechanical clock equipment fell from the main tower and crashed down through the building.

Other:

- Utah's largest historical earthquake to date.
- Utah's only surface-faulting earthquake in historical time.



Surface fault rupture happens when movement along a fault is great enough to reach and rupture the ground surface (requires about magnitude 6.5 or greater). A fault scarp (steep break in slope) is created. At Hansel Valley, several short fault scarps were created having scarp heights up to 19 inches. Upper left photo shows a car straddling a one-foot-high fault scarp.



Photo reprinted with permission of the Salt Lake Tribune, Salt Lake City, Utah



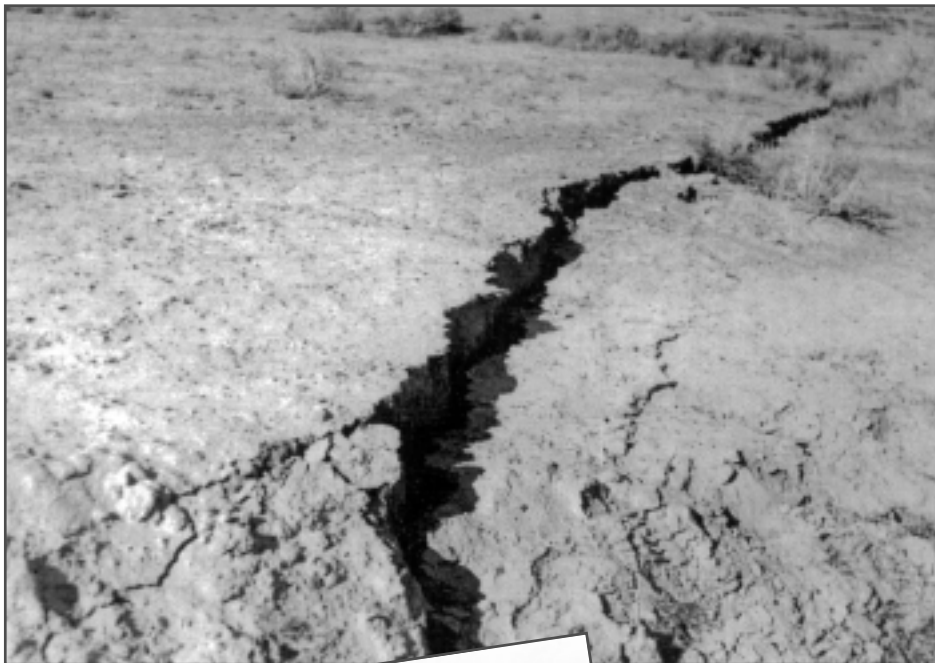
Photo courtesy of Special Collections Department, University of Utah Libraries



Photo courtesy of Special Collections Department, University of Utah Libraries

This scarp was measured to be 10 inches high.

Photo reprinted with permission of the Salt Lake Tribune, Salt Lake City, Utah



Fault scarp height varied over short distances.

Photo courtesy of Lloyd. B. Hust, Salt Lake City, Utah



Water issued from a fault scarp on the salt flats northeast of Kosmo.

Photo from Phillip Shenon report; courtesy of Robert B. Smith, University of Utah Department of Geology and Geophysics





Top: Many new springs appeared; those near Monument Rock in Hansel Valley created wet and boggy ground over a large area.



Left: Along this fault scarp, springs were rejuvenated.

*Photos from Wilbur Smith collection; courtesy of Robert B. Smith,
University of Utah Department of Geology and Geophysics*



Approximately 50 sand blows formed in areas that liquefied. Ground shaking liquefied the buried water-soaked sands and silts, and water was forced to the surface along cracks in the overlying soil. The water flow brought up sand that was deposited in "cones."



*Photos courtesy of Special Collections
Department, University of Utah Libraries*

About 2,000 automobile parties visited the site during the week after the earthquake.



*Photo from Phillip Shenon report; courtesy of Robert B. Smith, University of Utah
Department of Geology and Geophysics*

The wooden cornice over the front door of this school-house in Snowville was cracked and loosened, and plaster fell from its interior walls.



*Photo from Phillip Shenon report; courtesy of Robert B. Smith,
University of Utah Department of Geology and Geophysics*

Cache Valley Earthquake

Deseret News; August 30, 1962

The sharp earthquake which shook northern Utah and Idaho early Thursday left the Logan area with cracked walls, collapsed roofs and broken windows. Major damage occurred at the Model Billiards on West Center Street, where the swaying movement appeared to spread the walls apart as the roof crashed to the floor. No one was injured although the lunch counter in the front of the building was occupied.

Date: Thursday, August 30, 1962, 6:35 a.m.

Magnitude: 5.7

Epicenter: Richmond, Cache County, Utah

Geologic effects:

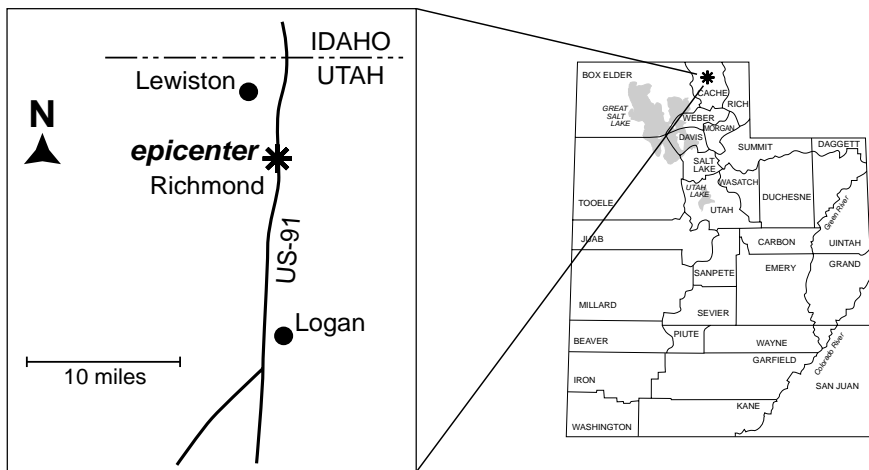
- Landslide in Logan Canyon covered part of US 89.
- Landslide in Cherry Creek Canyon east of Richmond.
- Ground shaking lasted about 35 seconds.
- Spring flows were altered (increased, reduced, or rejuvenated); Logan municipal spring flow increased.

Damages:

- Major damage in three Utah communities: Richmond, Logan, and Lewiston. Masonry fell both inside and outside of buildings, glass windows were shattered, and loosened plaster dropped from ceilings.
- Three-fourths of the houses in Richmond were damaged; at least nine homes needed rebuilding.
- Minor damage in other nearby communities in southern Idaho and northern Utah.
- Power was out for several hours and water lines were damaged in Logan. Tall buildings swayed in Salt Lake City.

Other:

- Damage costs of \$1 million in 1962 dollars make this the most costly earthquake in Utah to date.
- Felt in six states: Utah, Idaho, Wyoming, Nevada, Montana, and Colorado.





Ground shaking rejuvenated several springs. This spring appeared on the Logan-Cache Airport property.



Many headstones in the Richmond cemetery toppled or were twisted during the ground shaking.

Building materials and construction are important factors in earthquake resistance. Unreinforced brick buildings in Richmond suffered moderate to severe damage.



Cracked walls and fallen porch contributed to the decision to tear down this home.



The brick veneer fell off part of this house.



These brick porch columns were cracked and tilted.



One wall of this brick home collapsed.

Photos courtesy of Ariel D. Benson, Richmond, Utah



This brick garage collapsed onto a car in Richmond.

Photo courtesy of Ogden Standard Examiner, Ogden, Utah

Bottom two photos show inside buildings where plaster cracked and fell, as did bricks and furnishings.

Left: A chimney fell through the roof and landed on this man's bed just as he was getting up. Notice the plaster and wood damage.



Right: Brick and plaster fell on this bed. The woman, who was in bed at the time, fortunately escaped with only a bruise.



Photos courtesy of Ariel D. Benson, Richmond, Utah

Plaster was knocked from the ceiling onto the seats in the Benson Stake Tabernacle in Richmond. Structural damage from the earthquake caused this building to be torn down.



Photo courtesy of Ariel D. Benson, Richmond, Utah

Bricks and plaster rained onto these desks in North Cache High School in Richmond during the earthquake. Luckily the quake hit at 6:35 a.m. before school opened.



*Photo courtesy of Ogden Standard Examiner
Ogden, Utah*



Left: Grocery stores in Cache Valley required several hours of clean-up after the earthquake.



Right: The walls spread apart inside the Model Billiards building in Logan, allowing the roof to fall.

Below: A few bottles of liquor fell from the shelves and broke in the State Liquor Store in Logan.



Many large plate glass windows were broken throughout Cache Valley, including the Keith O'Brien store in downtown Logan.



Left: An alley in Logan was littered with bricks that fell from a 40-foot-long wall of the Smith Printing Company building.

Photo courtesy of Deseret News, Salt Lake City

Below: Arrows show the path of bricks that tumbled from the parapet of the Lewiston Drugstore onto the roof of the City Café.

Photo courtesy of Deseret News, Salt Lake City



Above: Ground shaking caused part of a brick parapet of an adjacent building to fall through the roof of the City Café in Lewiston. Luckily, the café was not open at the time.

Photo courtesy of Salt Lake Tribune, Salt Lake City



Repair work continued for weeks after the earthquake.

Right: Logan Junior High School was severely damaged by the earthquake, but was repaired and allowed to reopen within two weeks. The arrow shows where a reinforced concrete bond beam was cast around the walls at the roof line, and steel tie rods were installed. Structural engineers reported that this work would make the school more safe than it was before the earthquake. This photo shows the brick replacing the original loosened parapet wall.



Left: At North Cache High School in Richmond, cranes were used to remove the 600-pound capstones that were loosened during the earthquake.

Right: Three weeks after the earthquake, scaffolding is moved along Main Street in Logan as workers repair buildings.



Photos courtesy of Deseret News, Salt Lake City, Utah

Magna Earthquake

Deseret News; September 5, 1962

A rolling earthquake rocked Salt Lake Valley at 9:05 a.m. Wednesday, closing several schools and causing widespread structural damage. No serious injuries were reported, but residents were jittery inasmuch as it was the second major quake in one week. Another quake centered in Cache Valley jolted the area only last Thursday.....Both Granger and Cyprus high schools were dismissed for the day because of damage to the buildings.

Date: Wednesday, September 5, 1962, 9:05 a.m.

Magnitude: 5.2

Epicenter: About one mile west of Magna, Salt Lake County, Utah, near the northern tip of the Oquirrh Mountains.

Geologic effects:

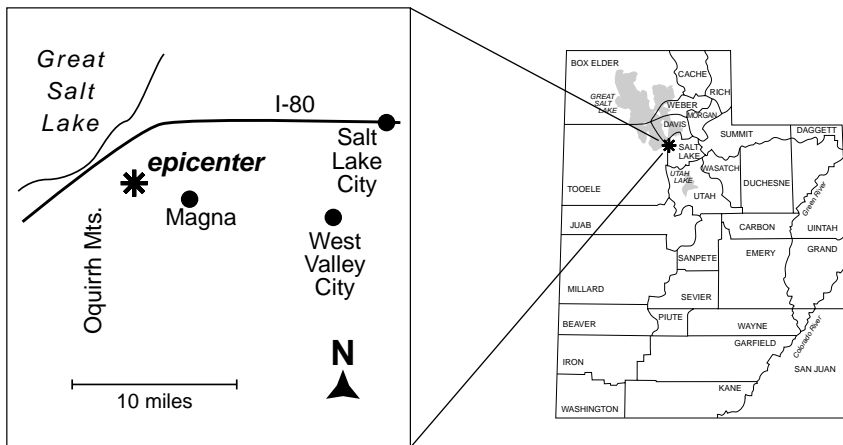
- Ground shaking

Damages:

- Shattered windows, collapsed walls/ceilings, cracked/fallen plaster, fallen light fixtures, homes shifted on their foundations, chimneys damaged.
- Most damage was in the areas of Magna, Granger, Hunter, and northwest section of Salt Lake City.

Other:

- The earthquake was felt as far south as Spanish Fork and as far north - although barely noticed - as Logan.
- Ground shaking appeared to be stronger in the valley than on the east benches in the Salt Lake City area. However, in Provo, the shaking appeared stronger along the bench areas than in the valley.
- Two extremely light aftershocks were recorded in the next two days.
- The Cache Valley earthquake, magnitude 5.7, six days earlier could have possibly "triggered" the Magna earthquake.





Merchandise in grocery stores
fell from the shelves into the
aisles.

Cleanup at Grand American
Market, 3400 South State
Street, Salt Lake City.



Cleanup at Colosimos' Standard
Market, Magna.

*Photos courtesy of Deseret News, Salt
Lake City, Utah*

Some older homes in Salt Lake City suffered severe damage. A ceiling and part of an inner wall fell in and covered this bed with bricks and other debris at 17 North 500 West.

Photo courtesy of Deseret News, Salt Lake City, Utah



Part of the inner brick wall fell through the ceiling of this home in Salt Lake City.

Photo by Brandt Gray; courtesy of the Salt Lake Tribune, Salt Lake City, Utah



Filing cabinets were thrown open and tipped in the Beneficial Life Insurance Company offices at 47 W. South Temple, Salt Lake City.

Photo courtesy of Utah State Historical Society; photo from Salt Lake Tribune collections; file#5335

Bottom right: At Cyprus High School in Magna, windows were shattered and cracks developed on walls of a dozen classrooms.

Photo courtesy of Deseret News, Salt Lake City, Utah

Bottom left: Communications, gas lines, and electrical service were generally not interrupted by the quake, but electric clocks all over town stopped, showing the time of the earthquake as 9:05. *Photo courtesy of Deseret News, Salt Lake City, Utah*



The gas pipe at 3000 West and 300 North in West Point, Utah, developed a high-pressure leak at the same time the earthquake hit. Due to the coincidence of timing, Mountain Fuel Company officials assumed that the earthquake was responsible for the leak. It took more than five hours for these men to complete the repairs.



Photo courtesy of Deseret News, Salt Lake City, Utah



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