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LIGHTHOUSES AND THE GREAT SHAKE OF 1886

Part II of II

By Ellen Henry,
Curator, Ponce de Leon Inlet Light Station

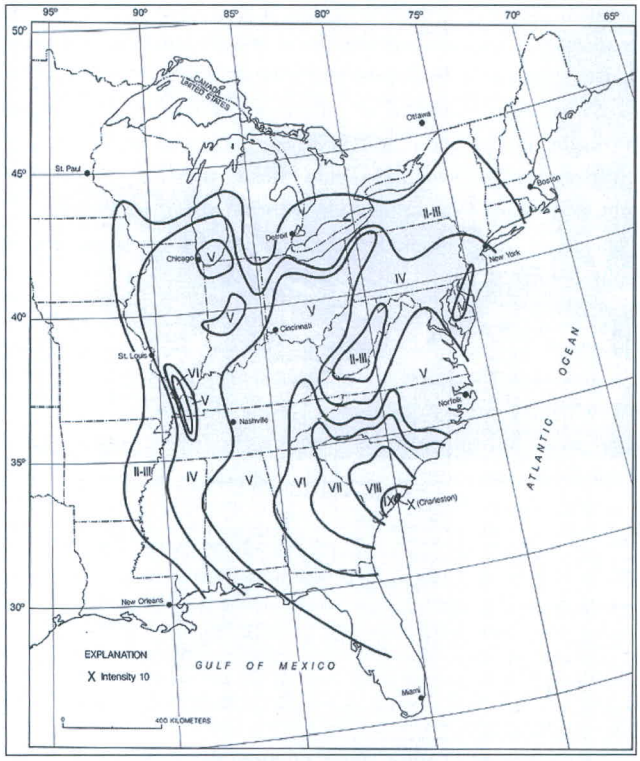
On Tuesday, August 31, 1886, the Great Charleston Earthquake rocked the East Coast at 9:51 p.m., creating shocks that were felt from Toronto to Key West. It was estimated to have been a 7.3 magnitude quake on the modern Richter scale, with an intensity of X on the Modified Mercalli scale, which ranges from I (barely felt) through XII (total destruction). This was possibly the most powerful earthquake ever to strike east of the Mississippi River. It hit the village of Summerville, South Carolina, full force, leaving every house uninhabitable. Virtually every building in the nearby city of Charleston was damaged or destroyed, and hundreds of people were killed or injured. Some victims were so panic-stricken that they committed suicide or died of fright. Most residents were left homeless. Aftershocks continued for months after the August 31 quake. The frequency of these gradually declined, but seismic activity in the Charleston and Summerville areas has continued to be reported up to the present day.

In the preface of his book *City of Heroes*, Richard N. Côté writes:

> Ten seconds after it started, at 9:51 p.m., Charleston was in chaos. Within forty-five seconds, most of the damage was done. Within minutes the entire population…save for the dead, injured, or those too infirm to move, had fled into the streets. Within a few days after the first shock, at least 40,000 of the city's 60,145 residents were sleeping in the streets and public parks every night.

The Great Charleston Earthquake made its presence felt far from that city. At the Fort Columbus Fog-Signal Station on New York's Governor's Island, a shock was felt at 9:55 p.m. and lasted four minutes. The shock was a noiseless and fairly light tremor. On the Hudson River, the keeper at the Coxsackie Light Station felt a moderate shock at 10:10 p.m. railway time.

At New Jersey's Absecon Light Station, the keeper was on the gallery outside the watch room of the tower at the time of the first shock, 9:52 p.m. Pennsylvania Railroad time. The up and down motion of the tower's vibration was so severe that he found it difficult to walk back inside the tower. Objects inside the watch room rattled violently. A series of shocks lasted about 60 seconds. The keeper telephoned his wife to find out if she was experiencing the same phenomenon, and she reported that she had not noticed anything amiss. The keeper was so certain that an earthquake had occurred that he immediately entered his experience into the station's log. The chief clerk of the Light-House Board was sent out to investigate newspaper reports claiming that the Charleston earthquake had rattled the Absecon tower. The clerk found no damage to the lens, storm panes of the lantern room, or tower interior. He did record the keeper's log entries of the event, which included the observation that "During the time of the shock about fifty birds came to the light, thirty-two of which were the red-eyed vireo; staid [*sic*] about till morning."



Isoseismal damage map showing the level of destruction of the Great Charleston Earthquake of 1886. Image courtesy St. Louis University Department of Earth and Atmospheric Science website.

The chief clerk of the Light-House Board was also sent to the Barnegat Light Station on the south side of New Jersey's Barnegat Inlet. He interviewed the first assistant keeper who was on duty in the watch room during the evening of August 31. The keeper felt a series of severe shocks, and the tower's up and down motion made it difficult to walk, just as it had for the keeper at Absecon. The lens seemed to run very fast during the event, and the keeper claimed that some cracks had appeared in the tower. The chief clerk was doubtful that the cracks had been made by the earthquake, and he likewise found no damage to the lens.



Barnegat Light Station. U.S. Coast Guard photo.

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Virginia's Cape Charles Light Station was slightly shaken by an aftershock that occurred at 12:20 p.m. on November 5. The tower rocked for about 15 seconds, and a feather duster hanging in the tower swung back and forth. The event was not noticed by those on the ground. A slight shock was also felt at the Thimble Shoal Light Station at about 2 p.m. on the same day.

At the Old Point Comfort Light Station near the entrance to Hampton Roads, Virginia, the keeper felt the August 31 quake at 9:55 p.m., standard time. Tremors lasted about two minutes, and a rumbling noise was heard. The waves began to rise rapidly. Three distinct shocks were reported as occurring at 9:50 p.m. on August 31 by the keeper at Point of Shoals Light Station, a screw-pile structure in the James River.

In the Chesapeake Bay, the Hooper Strait Light Station near Tangier Sound experienced a shock at 9:55 p.m. on August 31. A second shock was recorded at 10 p.m. Both shocks caused windows to rattle and were accompanied by a rumbling sound. Aftershocks were reported on October 22. At the Cove Point Light Station on the west side of the Chesapeake Bay, the keeper was sitting on his doorstep on the night of August 31. He felt a light shock and tremor and the dwelling shook. The time was about 10 p.m.



Currituck Lighthouse, June, 1893. U.S. Coast Guard photo.

In North Carolina, lighthouse keepers also recorded the earthquake's effects and subsequent aftershocks. At the Light-House Buoy Depot in Washington, North Carolina, on November 5 the keeper noticed his house shaking at 12:32 p.m. while the family was at the noon meal. The shock was enough to fling water out of a glass on the dining table. Likewise, at Currituck Beach Light Station nothing was reported until November 5, when several light shocks rattled the tower. Things were more exciting at the Cape Hatteras Light Station on August 31. The first shock came at 9:50 p.m. Three more followed with the last taking place at 10:29 pm. These shocks were strong enough to cause suspended objects to swing and to overthrow light objects. The keeper stated, "Then the tower would tremble and sway backward and forward like a tree shaken by the wind. The shock was so strong that we could not keep our backs against the parapet wall. It would throw us right from it. The swinging was from northeast to southwest." A slight aftershock was felt on September 3 at 11:05 p.m.



Laurel Point Lighthouse, early 1900s. U.S. Coast Guard photo.

In the Albemarle Sound, bounded by the Outer Banks of North Carolina, the Laurel Point Light Station's keeper recorded a series of light shocks on August 31 beginning at 9:50 p.m. More shocks were felt on September 3 and October 22. At the Frying Pan Shoals Lightship, moored off Cape Fear, a tremor was felt on August 31 at 9:50 p.m. The keeper was awakened by the tremor and a noise "like a train of cars in motion." The vessel felt as if it were scraping along a rocky bottom, but no damage was noted. The keeper reported another tremor on September 25.

The Cape Fear Light Station's keeper recorded two earthquake shocks at 9:50 p.m. meridian time on August 31, with aftershocks on September 3 and September 5. The August 31 shocks were strong enough to break glass lamp chimneys in the tower and to stop the tower clock. The time of the Cape Fear event was considered significant to the investigation of the quake's causes, and the U.S. Geological Survey office requested a confirmation of this time along with information about when the lighthouse clock had last been compared to a standard time clock.

At the Oak Island Range Lights near the mouth of the Cape Fear River, a strong shock on August 31 at 9:36 p.m. rocked the dwelling, stopped a clock, and moved the lower steps of the main light. Several lighter shocks followed. George Walker, the light keeper wrote:

> We had a very bad earthquake shock lasted about thirty seckonds [*sic*]...the house rocked very badly...it stoped [*sic*] the clock and loosed the lower steps to main light—I have fixed them all right—that is all the damage done at this station. We had two other very light shocks two minutes after the first one I think they came from the North West.

The keeper at the Hilton Head Range Light Station was in bed when the first shock came. His clock stopped at 9:54 p.m. local time. Ironically, he was talking to his wife about friends in Summerville, the suburb of Charleston that was virtually at the epicenter of the quake, when the doors and windows began to rattle as the whole house shook. Looking up at the tower, he saw that the light appeared to go out and flare up again. The shocks continued and water was thrown out of the cistern. The plaster in the house cracked, and some brick piers were knocked out of place. He also experienced the early morning tremor of October 22, which he recorded at 5:20 a.m. meridian time, and the one which followed at 2:45 p.m. On November 5, another noticeable shock occurred at 11:40 a.m.

Patrick Comer, keeper at the Daufuskie Island Lighthouse (Range Lights) near Hilton Head, reported his experiences on the night of August 31. At 9:25 p.m. local time (his clock had never been compared to standard time), he experienced a noise like a roaring fire and felt a 50-second shock. The first shock was most severe and a total of eight more shocks came that night, including one early on the morning of September 1. The clock was stopped at the first shock. Comer made his way to the lantern room just in time to prevent the lens from falling off its pedestal. The keeper recounted a

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poignant story of a pet goat that was kept under the house:

> About 40 minutes or so previous to this strange rumbling, the goat came from under the house and into the house, this being a very unusual thing, we thought the insects worried him. He was put back and made fast to his little wagon. No sooner made fast than he began to bleat, most piteously. Someone said what must be the matter with the goat, when all at once came this strange noise. The goat was neglected. Everyone was frightened and the whole house began to shake. The goat could never be got to go underneath the piazza again. He pined away and died on the 27th September.

The October 22 shakes were also reported by Comer, who recorded the first at 5 a.m. and the second at 2:23 p.m. These were accompanied by a rumbling noise and rattled the windows. He reported another tremor occurring at noon on November 5.

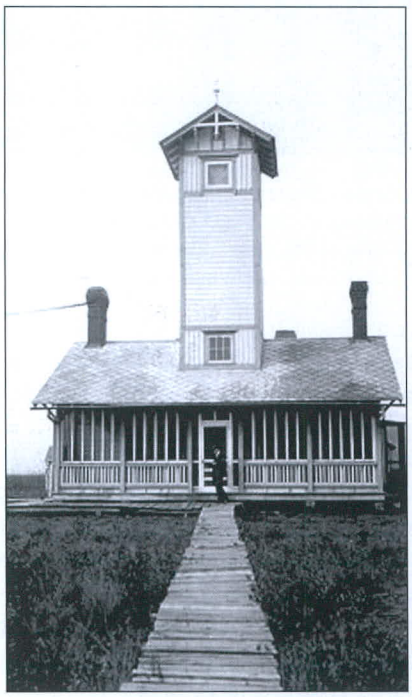
The Bloody Point Range Lights, located at the southeast end of Daufuskie Island, were also shaken. Inside the keeper's house, items bounced off shelves as the house shivered and seemed to jump up from the foundation. The sounds were at first like heavily shod feet stomping about, and these sounds eventually transformed into booming noises like heavy cannon fire. Keeper John M. Doyle recorded five strong shocks during the night. Plaster in the dwelling was cracked, small objects overthrown, and pictures on the walls were tilted at all angles. Brick walls, however, remained unscathed. He reported another minor shock on October 31 saying, "Possibly these light shocks are constantly occurring here, but the conditions for observing them are not favorable." During the night of November 4-5, Doyle heard nearly constant rumbling noises, and on November 5 at noon a light shock passed under the house. At 1 p.m. on November 7, two severe vertical movements occurred, first at one end of the house and then at the other, causing pictures on the walls to swing. On January 4, 1887, at 6:25 a.m., a moderate shock woke everyone in the keeper's dwelling.

Many cities felt what would eventually be called the Great Shake of 1886. Residents of Savannah first felt the August 31 quake at 9:25 p.m. About 10 buildings were destroyed and 240 chimneys were brought down. The keeper of the range lights in Savannah Harbor reported another significant tremor on October 5 at 11:40 a.m., causing the windows and crockery in his house to rattle. Columbia, Charlotte, Asheville, and Augusta all were affected on August 31, and numerous aftershocks were felt throughout the region in October and November.

At the Tybee Island Light Station, the first event was felt at 9:30 p.m. local time on August 31. It continued for about 90 seconds and was accompanied by a heavy rumbling noise like thunder. Three more strong shocks came before 10 p.m. The appendix to the Light-House Board's *Annual Report* of 1886 states:

> The (tower) wall was cracked about midway. It is about 6 feet thick where the crack occurred. It moved the lens, which weighs about one ton, 1 ½ inches to the northeast. It shook the signal office building, which is 35 feet high with a wall of concrete 10 feet thick, in the old Spanish fort, known as the Martello tower, sufficiently to throw crockery, etc., from stationary cupboards, and toilet bottles, etc., from bureaus.

(Note: the "old Spanish fort" was actually a fortification built by the U.S. government in 1815 using a British style derived from a 1565 defensive tower built at Mortella Point on the Island of Corsica. The British called their short, round, and thick-walled towers "martellos". These were usually constructed of stone or brick, but the one at Tybee was tabby and wood. It is no longer standing.) The damage at the Tybee main light was enough to cause the keeper to request the services of the Sixth District's lampist as the lens had shifted off the center of its pedestal. John Johnson, keeper of the range lights at Tybee Knoll Cut, reported another aftershock on September 6.



Tybee Knoll Cut Range Lighthouse circa 1923. U.S. Coast Guard photo.

At Georgia's Saint Simon's Island, the light station there was rocked by strong shocks. Keeper Isaac L. Peckham reported that chimneys were tossed down and walls were damaged. One of the red flash panels in the Fresnel lens of the St. Simons Lighthouse was broken during the first shock which was experienced at 9:30 p.m. sun time. The clockwork machinery to the lens was thrown out of gear and many small pieces were broken out of the lens. The keeper was able to make suitable repairs almost immediately.

The Little Cumberland Light Station near Brunswick, Georgia, also reported the earthquake. On August 31, at 9:30 p.m., a five-minute tremor shook the tower and stopped the clock. Three more shocks were felt that night, and a light shock was reported on September 1. No damage was done to the tower on August 31, although some storm panes were loosened. Plaster was cracked in the dwelling. The keeper wrote:

> I was standing on the Balcony of the tower when I felt it began to trimble [*sic*] and in a second the damper was shaked [*sic*] across the flaim [*sic*]. Then the lens was shaking as tho [*sic*] it would fall to pieces, at the lens it appeared to be of a horizontal movement. It went from East to West while on the Balcony and in the dwellings it appeared to be more of a vertically [*sic*] tremor.

At the Sixth District's Amelia Island Light Station, two shocks were felt on the night of August 31 at 9 p.m. standard time. These were moderate to light and the lighthouse clock was stopped at 9:17 p.m., which the keeper had determined to be about 22 minutes ahead of standard time. No damage was done to the tower or keeper's dwelling.

The St. Johns River Light Station in Mayport, Florida, experienced five distinct shocks on August 31, beginning at 9:20 p.m. sun time. The first shock was moderate, the next two light, and the fifth was very light. No damage was done. The keeper also reported another event on November 5 at noon.

Joseph Champagne, keeper of the Dames Point Lighthouse, a screw-pile structure in

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Amelia Island Lighthouse. Courtesy Amelia Island Lighthouse and Museum.

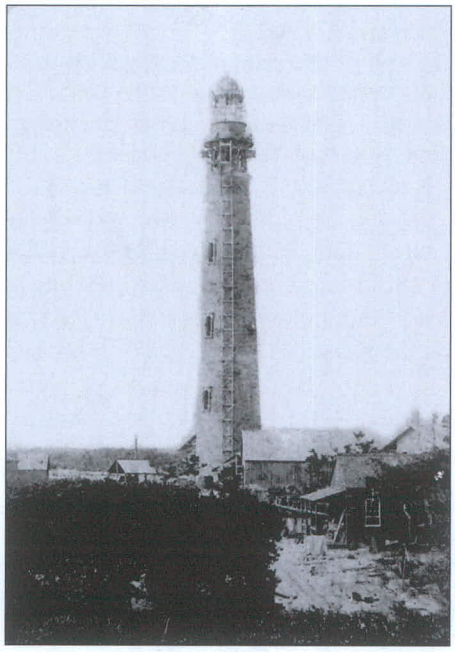
the St. Johns River near Jacksonville, felt the first shock at 9:24 p.m. on August 31. It lasted about seven seconds and was followed by three other shocks in succession until about 9:35. There was a rushing sound like the wind blowing through a forest, although the night was calm. The shocks cracked the plaster and stopped the lighthouse clock. "The first tremor raised the house and then shook it east and west hard enough to splash the water out of the iron tanks."

Principal Keeper William A. Harn of Florida's St. Augustine Light Station wrote on September 30, 1886:

> In reply to your circular of September 10, I would inform you that three distinct shocks of earthquake passed under this Station on the night of August 31st at 9:25 p.m. local time. The first shock was quite severe lasting about 30 seconds followed by two lighter ones which were just perceptible. The clock in the tower which is a pendulum one stopped at 9:25 p.m. Just preceding the shock was a noise like a strong wind. The first impression of every one was that a squall had arisen until looking out it was found to be perfectly calm, scarcely a breath of wind blowing. The shocks were felt by all persons residing on the island. The windows and doors rattled loudly and bird cages swung violently. The motion was undulatory just before the shock the chickens cackled as if disturbed and just after the first shock all the dogs in the vicinity of the Station barked in an alarmed manner. The sky was clear and the stars shining brightly. The sea was very quiet, several persons were made sick by the motion. I was in the watch-room of the tower at the time sitting down.

To the south between St. Augustine and Cape Canaveral, the Mosquito (now Ponce de Leon) Inlet Light Station was still under construction. The tower was somewhere between 51-100 feet high and work had been going slowly as the result of difficulties between the foreman and the work crew. The supply of brick was running low and additional supplies had not been ordered until August 4, following a congressional appropriation of funds for lighthouse construction. No report of damage at Mosquito Inlet was made in the Light-House Board's appendix 3 or in the Sixth District reports.

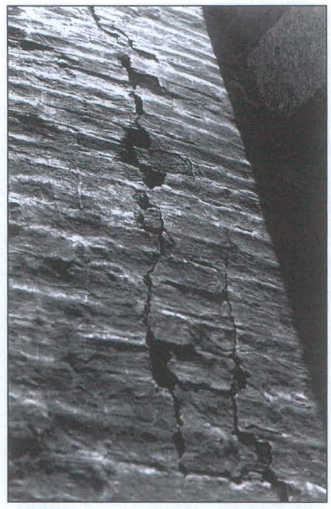
Cracks uncovered during restoration work on the Ponce Inlet tower were suspected as being possible results of the quake. Mosquito Inlet was in the zone of mild to moderate damage, so it is difficult to estimate the level



Mosquito (Ponce) Inlet Lighthouse, shown here in early 1887, was under construction at the time of the quake. Photo courtesy Ponce de Leon Inlet Lighthouse and Museum.

of injury that might have occurred. However, it is also likely that if significant damage had resulted from the quake, a report would have been made to the district inspector or engineer and an examination of the structure would have been made. No documents describing damage or inspections have as yet been found.

On October 7, 1886, the keeper at the Cape Canaveral Light Station reported his August 31 experiences. A shock accompanied by a noise like underground thunder came at 8:58 p.m., noted by comparison with a standard clock at Titusville. The Light-House Board went to some pains to confirm this time, as it was considered important to the investigation by the U.S. Geological Survey into the causes of the quake. In his September 20, 1886, letter to B. B. Smith of the Sixth District, Canaveral's acting keeper had stated, "We experienced quite a shock on August the 31 at 9:30 p.m. causing the lens and tower to shake so much so as to shake out quite a lot of putty out of the frame of the lens stoping [*sic*] the time piece in the tower and the one in the Dwelling but doing no other harm." Apparently, the 9:30 p.m. time was the most accurate. Another shock was felt on September 3 both in the tower and dwellings.



Cracks in the Ponce Inlet tower, uncovered in the 1990s, may have been the result of the Great Charleston Earthquake. Photo courtesy Ponce de Leon Inlet Lighthouse and Museum.

The Charleston quake was also felt at Florida's Cedar Key Light Station, at about 9:11 p.m. sun time. Several moderate shocks were felt. The first shock came as a jarring motion and the second was an undulation, moving from east to west. At Pensacola, moderate shocks occurred at 9:07 p.m. sun time. Clocks were stopped on the station.

The East Coast was not the only site of seismic activity in the fall and winter of 1886-1887. At the Fort Point Light Station near San Francisco, a shock came on the evening of October 13, 1886, and more shocks followed in October and in January of 1887. At Mare Island, shocks were felt on October 15, shortly after 10 p.m. Another was reported on January 19, 1887, in the late afternoon. Humboldt Light Station was also active in

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South Carolina's Bulls Bay Lighthouse. National Archives photo.

January as were Cape Mendocino, Pigeon Point, and Point Arena.

The Light-House Board's *Annual Report* of 1887 again described damage and repairs at facilities in the Fifth and Sixth Lighthouse Districts on the East Coast. In the Fifth District, the light station at Bulls Bay, northeast of Charleston, sustained more damage than any other in the district.

> The lens was thrown entirely out of position and the light extinguished for one night—a misfortune which occurred nowhere else. The walls were seriously cracked, those of the kitchen irreparably so, and the floors in some of the rooms so disjointed as to require renewal. The illuminating apparatus was restored without delay, and in March all the other injuries were repaired and the station was put in good order.

At the Morris Island range lights and Charleston main lighthouse, the earthquake

> threw the lens out of position and cracked the (main) tower extensively in two places, but not so as to endanger its stability. The upper and most serious crack extends somewhat spirally almost through a full circumference of the tower, but the sides of the crack are in very close apposition, and there has been no lateral displacement. The lens was immediately replaced and the broken parts were repaired without delay. At a later date the piece of the assistant keeper's dwelling and the paved walk were rebuilt, and the verandas were largely repaired. Broken piers were also repaired at the principal keeper's dwelling and 150 linear feet of gutter were put up, and at the front beacon, leaks were stopped in the roof and its brick foundation was repaired.

Examinations were made at various lighthouses to assess and confirm earthquake damage. John Robinson, keeper at Cape Romain, wrote on October 31:

> I[n] compliance with your communication of the 11th instant, I have personaly [*sic*] examined the tower on the outside in a boatswains chair for cracks, and find the following—on the s.e. side between the second and third landings a horizontal crack eleven feet long 1/16 of an inch wide, another horizontal crack on the s.e. corner above the upper landing two feet long and less than 1/16 inch wide, another on the s.w. corner the same as the later [*sic*]. Three cracks in all, the point of a knife could not be pushed ½ inch into any of them. There are none visible on the inside, and none visible on the outside from the ground.

Cape Romain continued to report tremors, including one on November 28 at 3:20 p.m., and another significant one on March 23 at 11:05 p.m. The March 23 event stopped the tower clock and about two hours after the quake 20 feet of plaster fell from the dwelling ceiling.

Damage at the Daufuskie Island Range Lights had included the loss of most of the plaster in the keeper's house which supported the wooden tower. The plastering was all removed and replaced with ceiling boards, and repairs were made to both beacons. A plank walkway was constructed to connect the boat house and landing to a spot near the beacon. Aftershocks, including the November 5 event, did not cause further damage.



Charleston Main Light (Morris Island), early 1900s. U.S. Coast Guard photo.

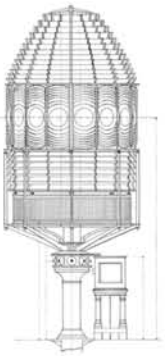
At Tybee Island, the earthquake extended some existing cracks in the tower and made some new ones, but these cracks were not deemed to be dangerous. The lens was displaced by the quake and the attachments to its upper ring were broken. The lens was repaired immediately, although in a letter of September 3 to James Gregory, Assistant District Engineer B. B. Smith wrote that he feared the Tybee light to have been out since the first quake on August 31. By September 4 his fears were relieved by a report that the Tybee light had never gone out or had been repaired almost immediately. At Saint Simon's Island, the quake broke some of the red flash panels of the lens, which were also repaired quickly.

Fort Sumter was mentioned in the 1887 *Annual Report*, but no further earthquake damage was reported. Apparently, the fort was in very bad condition as a result of a cyclone in 1885. This damage was never repaired and had continued to progress. Some repairs were done following the earthquake to make the light keeper more comfortable.

Aftershocks continued for many months after the August 31 quake. At Summerville, tremors were felt almost daily through the following March. The frequency of these events gradually declined, but seismic activity in the Charleston and Summerville areas has continued to be reported up to the present day. The effects of the Charleston earthquake were devastating, but the city's recovery from the destruction of the earthquake was a model for efficient and effective disaster response. Within less than a year much had been rebuilt and there were signs of growth all over the city.

It was eventually determined that the quake had been caused by the buildup of pressures along the Woodstock, Ashley River, and the Sawmill Branch Faults in an area known as the Middleton Place-Summerville Seismic Zone. Hundreds of quakes have taken place in this zone since 1886 and the rate of seismic activity in the zone is now increasing. Eight earthquakes of more than magnitude 7 have occurred there in the last 6,000 years, and another one is considered inevitable by many seismologists.

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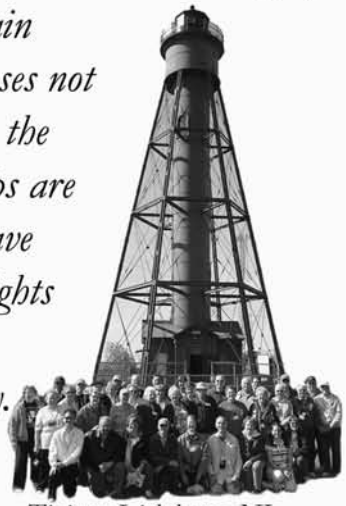
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