Roderick Mackay

Born 1880. Life story compiled by Alex Reid. Available online at www.livesretold.co.uk

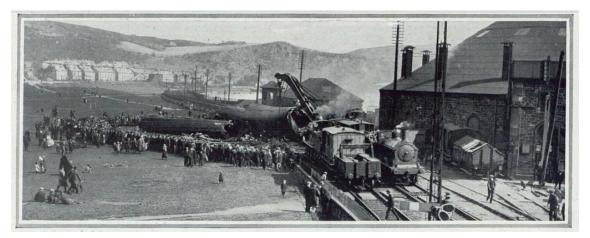
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The sources for this life story, which are acknowledged with thanks, include the Water and Power Associates website at <u>www.waterandpower.org</u> the Burntisland Heritage Trust website at <u>www.burntisland.net</u>, and the publication Memories from the Cambridge firm of D.Mackay, byDonald Mackay.

1. Early Life

Roderick Mackay was the second son of Duncan Mackay of Elgin, Morayshire, Scotland. Roderick had four brothers and three sisters. His father had moved to Burntisland, Fife, to take up a job with the North British Railway. He moved his family into the gatekeeper's cottage at Burntisland Station, of which he later became station master.



Bruntisland Railway Station after the accident to the Royal Scot in 1914.

Young Roderick and his brothers were able to observe from Bruntisland the Forth Railway Bridge being built in the 1880s. It was completed in 1890.

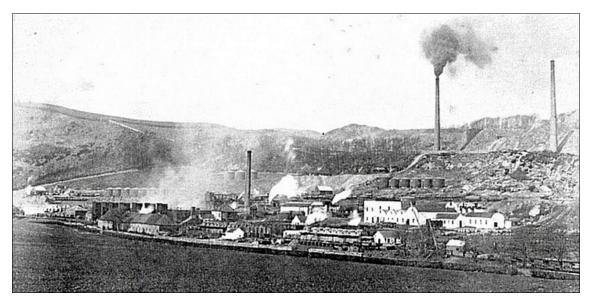


Forth Railway Bridge under construction in the 1880s.

2. Burntisland Gasworks

After leaving school, Roderick got a job at the Burntisland Gasworks. He was evidently very capable, and rose to be the manager of the gasworks at a very young age.

From 1878 to 1893 Burntisland had been a considerable industrial centre, based on the processing of oil from shale mining. At its peak, the Burntisland Oil Company gave employment to almost 1000 men. They mined the shale down to a depth of 365 feet below sea level. At its peak the company mined 500 tons of shale a day, processing it into 15,000 gallons of oil. The crude oil was refined on site, and the main products were burning and lubricating oils, paraffin candles, paraffin wax, and sulphate of ammonia for fertiliser.



The Burntisland Oil Company works in the 1880s.

Around 1900 Roderick emigrated to the United States of America to seek his fortune, along with his brothers James and Alex. He developed a career as a civil engineer, and we next meet him when he was Chief Construction Engineer for the Los Angeles Aqueduct, then the largest and most ambitious construction project in the USA.

Roderick's brother Donald escaped from depressed economic circumstances in Scotland not to the USA, but to Cambridge. There he founded, with his son Duncan, the engineering firm of D. Mackay. The company flourished and continues as a family firm today, run by Duncan's grandsons Neil and Duncan Mackay.

3. Construction of the Los Angeles Aqueduct

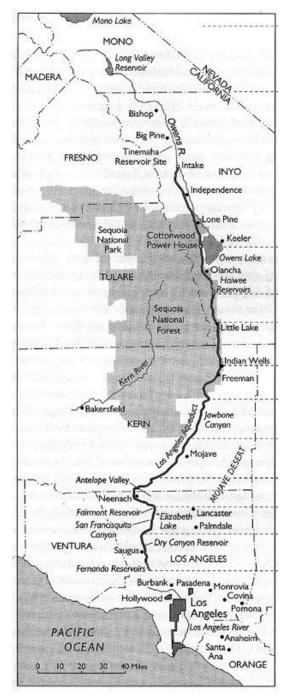
The Los Angeles Aqueduct aqueduct was designed and built by the city's water department, at the time named the Bureau of Los Angeles Aqueduct, under the supervision of the department's Chief Engineer William Mulholland. Roderick Mackay worked on the project, rising to Chief Construction Engineer.

Built between 1908 and 1913 at a cost of \$23 million, the LA Aqueduct tapped into the waters of the Owens River and delivered water 233-miles south to Los Angeles.

When completed in 1913, the Los Angeles Aqueduct was considered to be a great engineering accomplishment only second to the Panama Canal. A century later, it continues to be a marvel in modern engineering.

The LA Aqueduct brought water from the Owens Valley hundreds of miles away to a growing area in need of additional resources to sustain its people and their endeavors, helping spur an economy that today rivals that of many nations. A century later, this gravity-fed system continues to be a major source of water for Los Angeles — on an average year supplying 29% of the water needs for four million people.

In March of 1905, William Mulholland recommended to the Board of Water Commissioners that the Owens Valley was



the only viable source of supplemental water for the City's fast growing population. The following year the City submitted an application for rights-of-way across federal lands for the purpose of constructing an aqueduct. The application was approved and in 1907 Los Angeles voters approved a \$23 million bond issue for the construction of the Los Angeles Owens Valley Aqueduct. Work began on the aqueduct in September and the City began to purchase private property and water rights in the southern pert of Owens Valley.

Seeking to diminish as much criticism as possible prior to the \$24 million bond election, the Los Angeles Water Commissioners appointed an Aqueduct Advisory Board, comprised of three nationally known civil engineers: John R. Freeman,

James D. Schuyler and Frederick P. Stearns. They made an independent evaluation of the proposed aqueduct. The board reviewed the project's design feasibility, constructability, pricing and logistic requirements. The Board found the aqueduct "admirable in conception and outline" in their report released during the fall of 1906. Few engineers dared to criticize the project after the panel's review was released, due in large part to the clout and credibility of John R. Freeman, one of the principal consultants for New York's New Croton Aqueduct.



Roderick Mackay is second from left in front row. Mulholland is third from left in the front row.

Roderick MacKay had general supervision of the operation of the cement mill and of the selection and advisory of the heavy mechanical equipment. . He rose to became the Chief Construction Engineer, reporting directly to Mulholland.

The most difficult part of the construction of the LA Aqueduct was tunneling. There were 142 tunnels, totaling forty-three miles in length, that had to be dug during the five years of the aqueduct's construction. The Elizabeth Tunnel was the longest with a length of over five miles.

In the first 11 months of work, 22 miles of tunnel were driven. The Elizabeth Tunnel set the world record for hard rock tunnel driving: 604 feet in one month. The Board of Engineers had estimated it would take five years to finish the five-mile tunnel. The men beat their deadline by 20 months.

"It crawls like a caterpillar." And caterpillar is its name to the present day. The descriptive remark is attributed to William Mulholland while watching the first formal demonstration of the new type of tractor just purchased for hauling materials across the desert during the building of the aqueduct.

It was hoped that the Caterpillar tractor would be a mechanical substitute for the mule – a departure from traditional construction methods that could lower costs and

speed the progress of the great water way to Los Angeles. However, things didn't quite work out that way.



The first caterpillar tractors ever built were used in 1907 on the Elizabeth Lake tunnel.

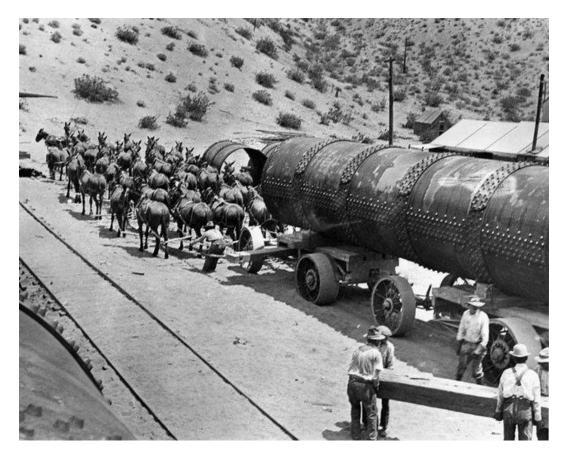
The Mojave Desert proved too much of a challenge for the caterpillar traction engines. They were plagued with frequent breakdowns and their use was soon abandoned in favor of mule teams. Some of the Holt caterpillars were used as forms when the concrete lining of the aqueduct was poured. City crews reverted back to using mules after maintenance and repair of the caterpillar tractor proved too costly. Cement bagged at the Monolith Mill was shipped by train to the nearest railroad siding, then loaded onto wagons and transported by mule team to aqueduct construction sites.



Electric dredger.

Concrete was the most prevalent construction material for the Aqueduct, although in some cases the engineers might have preferred steel pipe. The use of steel pipe was limited by its tremendous cost, a result of having to transport it to California from its place of manufacture in Pennsylvania.

Two hydroelectric plants, Division Creek and Cottonwood, were built to provide electric power for construction work along the aqueduct from the intake to Mojave. Something like this had never been done before in one project. The power was used in many facets of the construction, none more important than electric dredges and the cement mills in Monolith. The 15,000 tons of pipe was manufactured on the East Coast in 36-foot-long sections, each weighing more than 25 tons. The sections were transported by train to Cinco. From there, they were loaded onto huge wagons and carted the final four miles by teams of 52 mules. The town of Cinco was founded as a work camp in the early 1900s for workers on the Los Angeles Aqueduct.

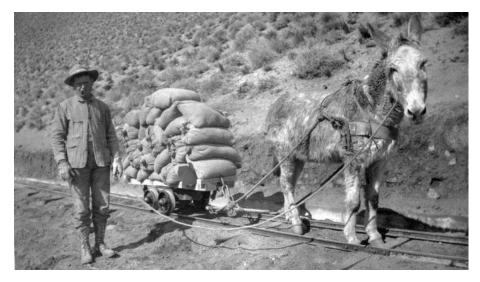


⁵² mules pull a 30-ton section of pipe.

The construction of 12 miles of steel siphon in the Aqueduct provided some of the greatest challenges. In a canyon 120 miles north of Los Angeles, the aqueduct's engineers designed an 8,095 foot steel pressure siphon across desolate Jawbone Canyon. The Jawbone Sag Pipe was designed to handle 368 pounds per square inch of pressure at the bottom of the 1,000-foot deep canyon. The longest siphon on the aqueduct is the pipe crossing Antelope Valley. It is 21,767 feet in length, and up to heads of 80 feet is built of concrete, the remaining 14,497 feet being steel pipe. The concrete and steel pipes are both 10 feet in diameter. The maximum head on this siphon is 200 feet, and the weight of the steel is 3,511 tons.



The Jawbone Siphon almost completed in 1913.

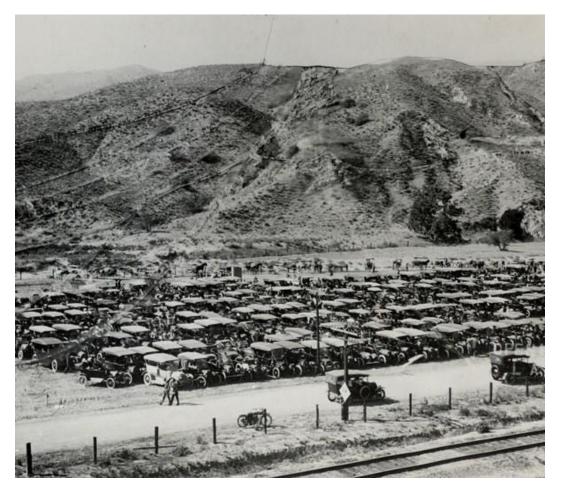


Narrow gauge mule railway carrying cement.



Due to the extreme pressure caused by water running down the canyons, the sag pipes needed to be supported by huge concrete pillars.

4. Opening of Los Angeles Aqueduct



It is estimated that over 30,000 people attended the opening day ceremonies of the Los Angeles Aqueduct on November 5th 1913. They came to watch the Owens Valley water cascade into the San Fernando Valley. All morning long they came – out to where the Newhall hills rise above the northeastern edge of the San Fernando Valley. On foot, on special Southern Pacific trains (\$1 roundtrip from the Los Angeles terminal), in automobiles, wagons and buggies – on horseback they came. By noon, 30,000 persons had stationed themselves around the natural amphitheater that centered at the concrete canal called the "Cascades."

This was the day Los Angeles had long awaited. Wednesday, November 5, 1913, the day Owens River water, diverted 233 miles in the north by the new Aqueduct, would come roaring into the San Fernando Valley.

A carnival atmosphere was prevalent throughout the crowd. Pennants (10 cents each) were selling briskly. The San Fernando Chamber of Commerce was distributing small souvenir bottles of Owens River water from a nearby booth.

The motorcade containing the official welcoming party of civic leaders and Aqueduct "brass" arrived on the scene shortly after noon. As William Mulholland made his way through the throngs of jubilant well-wishers with his daughters, Rose and Lucille – Mrs. Mulholland was ill at home – the band played "Hail to the Chief."

The small speakers stand was filled by 12:10 pm when order was called by Joseph D. Radford, chairman of the Aqueduct and Exposition Park Celebration Commission. It was indeed a week for Los Angeles to remember for on Thursday – tomorrow, the celebration would move to Exposition Park in central Los Angeles where the dedication ceremony for the Los Angeles County Museum of History, Science and Art would take place.



After a batch of the inevitable speeches ending with the remarks of Mayor H. H. Rose, it was "The Chief's" turn to step forward.

Mulholland spoke briefly and eloquently without a prepared address. He spoke of his gratitude and appreciation for the loyal support of his assistants and the citizens of Los Angeles. He spoke of responsibility:

".... You have come here today to ask us to render an account of our stewardship, and we come ready to do it. If the project fails, we are to blame. We took this responsibility for failure willingly and gladly and have done the best we could"

".... If there is a 'father' of the aqueduct, it is the man who went out and found the supply, who made the preliminary plans and who turned the project over to the city – former Mayor Fred Eaton, the pioneer of this project. He planned it – we simply put together the bricks and mortar"

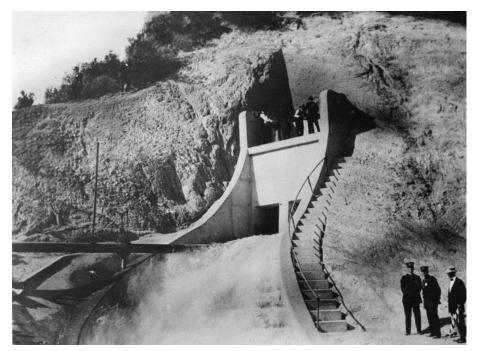
".... This rude platform is an altar, and on it we are here consecrating this water supply and dedicating this aqueduct to you and your children and your children's children – for all time."

The "Chief" paused for a moment as if in contemplation of his words. Then satisfied, he abruptly said, "That's all," and returned to his seat amid a tremendous roar from the crowd.

When the din subsided Mulholland was recalled to the podium. It was 1:10 pm - time to bring forth the water. And who else was more suitably qualified to usher this

vital liquid into the sight of the assembled masses but the great engineer and leader of men, the Aqueduct builder himself, Bill Mulholland.

The crowd, good natured but extremely noisy, grew quiet as Mulholland unfurled the Stars and Strips from the speakers stand flagstaff. This was the signal to General Adna R. Chaffee to have the gate valves above the "Cascades" opened. Chaffee was given this honor in recognition of his valuable service to the City as president of the Board of Public Works during the Aqueduct building period.



Roderick Mackay (in the party above the aqueduct) had the honour of opening the sluice.



The water gates are now opened to full capacity. The gatemen were rather "highpriced" help themselves, including Mulholland's top assistants: Roderick Mackay, chief construction engineer; H. A. Van Norman, Owens Valley division engineer; D. L. Reaburn, Saugus division engineer; A. C. Hansen, Jawbone Division engineer. The fifth man was Adna R. Chaffee, Jr., U. S. Army.

"THERE IT IS" – The trickle was now an 18-mile per hour torrent racing wildly to the San Fernando Reservoir and any semblance of order in the crowd was lost.

People watch in amazement as the Los Angeles Aqueduct water starts flowing down the cascades into the San Fernando Valley. The smoke in the background is from canon fire upon the gates opening. The dedication program called for Mulholland to formally turn the Aqueduct over to Mayor Rose who would accept for the citizens of Los Angeles. Mulholland seeing the audience last and unable to compete with the band or the artillery pieces turned to Rose standing beside him and raising his hand toward the canal shouted:

"There it is, Mr. Mayor. Take it!"

"Thank you, Chief," laughed Mayor Rose.

"The speech I was going to deliver is printed in the afternoon papers, and I congratulate you quite as much as missing it from my lips as on having such a great project so successfully completed as the Aqueduct."

Arm-in-arm the Chief and the Mayor left the grandstand to get a drink – of Aqueduct water, naturally. Owens River water, the nectar Los Angeles worked and waited so patiently for and invested so much in, had officially arrived.

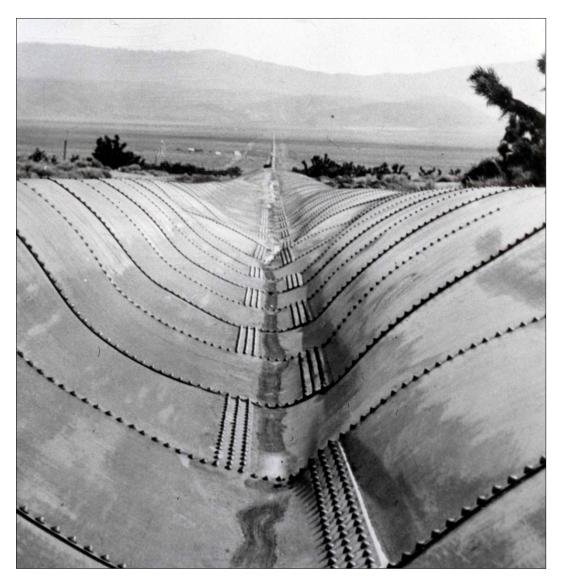


The Los Angeles Times' the following day read:

"From the mountain fastnesses of the snow-capped Sierras, through the world's longest man-made conduit of steel, cement and solid granite, sparkling water poured in a mighty torrent from the aqueduct's mouth...

...It gurgled and splashed its cheerful message of good health, great wealth, long life and plenteous prosperity to Los Angeles and her people."

5. Flooding Damage and Dynamite Attacks



The 1914 flood damage, three months after the aqueduct opened.

In February, 1914, the rainfall in the Mojave Desert region exceeded by nearly fifty per cent in three days the average annual precipitation. Where the steel siphon crosses Antelope Valley at the point of the greatest depression, an arroyo or run-off was indicated that fifteen feet was the extreme width of the flood stream, and the pipe was carried over the wash on concrete piers set just outside the high water lines.

The February rain, however, was of the sort known as a cloud-burst, and the flood widened the wash to fifty feet, carried away the concrete piers, and the pipe sagged and broke at a circular seam. The steel pipe collapsed like an empty fire hose for nearly two miles of its length. In some places the top of the pipe was forced in by atmospheric pressure to within a few inches of the bottom. Many engineers pronounced the collapsed pipe a total loss, and advised that it be taken apart, the plates re-rolled and the siphon rebuilt.

The damage to the Antelope Siphon was repaired by the simple expedient of turning the water on after the break was mended, relying on the pressure to restore the pipe to circular form. The hydraulic pressure, under gradually increasing head, restored the pipe to its original shape without breaking any of the joints or shearing the rivets, and a month after the collapse the siphon was as good as new. The total cost of repairing the siphon was only \$3,000. It would have cost about \$250,000 to take it apart and rebuild it.

In the mid 1920s Owens Valley residents began to fight the City's water export, leading to the 'California Water Wars'. Confrontations escalated to several dynamitings of the Aqueduct. The result of one such dynamiting is shown below.



The scene at No Name Canyon after a dynamite attack destroyed 400 feet of pipe on May 27th, 1927.

6. The Sad End of Mulholland's Career

The completion of the Los Angeles Aqueduct, on time and on budget, was a triumph for William Mulholland. He was a great figure in Los Angeles, with Mulholland Drive named after him. After the Los Angeles Aqueduct Mulholland went on to design other major civil engineering projects including dams. His reputation continued to grow, and his offices were, at one point, on the top floor of Sid Grauman's Million Dollar Theatre, below. He was even a favourite to become Mayor of Los Angeles – a prospect he dismissed saying 'I'd rather give birth to a porcupine backward'.



Sadly Mulholland's career was to end in tragedy and ignominy. Disaster struck on March 12, 1928, when the St. Francis Dam failed twelve hours after he and his assistant, Assistant Chief Engineer and general manager Harvey Van Norman, had personally inspected the site. Within seconds after the collapse, only what had been a large section of the central part of the dam remained standing and the reservoir's 12.4 billion gallons (47 million m³) of water began moving down San Francisquito Canyon in a 140-foot (43 m)-high torrent at 18 miles per hour (29 km/h). In the canyon, it demolished the heavy concrete Powerhouse Number Two (a hydroelectric power plant) and took the lives of 64 of the 67 workmen and their families living there.

The waters traveled south and emptied into the Santa Clara riverbed flooding parts of present-day Valencia and Newhall. Following the river bed, the water continued west, flooding the towns of Castaic Junction, Piru, Fillmore, Bardsdale and Santa Paula in Ventura County. It was almost two miles (3 km) wide, and still travelling at a speed of 5 miles (8 km) per hour when it reached the ocean at 5:30 am; emptying its victims and debris into the Pacific Ocean near Montalvo, 54 miles (87 km) from the reservoir and dam site. Many of the bodies that had been washed out to sea were recovered from the Pacific Ocean, some as far south as the Mexican border; others were never found.



Cross section of St. Francis Dam after collapse.

The city of Santa Paula received some of the worst damage, especially the low-land areas nearer the riverbed. Here, in many areas, only foundations or rubble marked where many homes had been. Rescue efforts were hampered and walking made hazardous by a thick layer of mud which carpeted the area.

Recovery crews worked for days to dig out bodies and clear away the mud from the flood's path. The final death toll is estimated to be at least 431, of which at least 108 were minors.

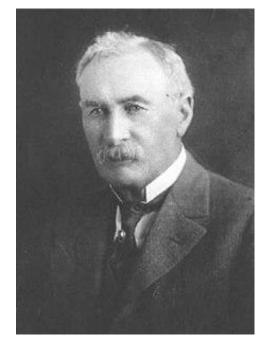
Mulholland took full responsibility for what has been called the worst US manmade disaster of the 20th century and retired in November 1928. During the Los Angeles Coroner's Inquest, Mulholland said, "this inquest is a very painful for me to have to attend but it is the occasion of that is painful. The only ones I envy about this whole thing are the ones who are dead." In later testimony, after responding to a question he added, "Whether it is good or bad, don't blame anyone else, you just fasten it on me. If there was an error in human judgment, I was the human, I won't try to fasten it on anyone else."

The inquest jury concluded responsibility for the disaster lay in both an error in engineering judgment, in determination of the suitability of the area's geology as a stable foundation for the dam, and errors in public policy. They recommended that Mulholland not be held criminally responsible as they stated in their verdict, "We, the Jury, find no evidence of act of criminal act or intent on the part of the Board of Water Works and Supply of the City of Los Angeles, or any engineer or employee in the construction or operation of the St. Francis Dam..."

Nonetheless, his critics pointed out that another dam on which Mulholland had acted as a consultant collapsed and the city abandoned a dam project in San Gabriel before completion. Mulholland had increased the height of the dam by 20 feet (6.1 m) after construction had already started, without a corresponding increase in the width of the base.

Mulholland (right) formally retired in November 1928 and spent the rest of his life in relative seclusion, devastated by the tragedy.

In retirement, he began writing an autobiography, but never completed it.^[44] Shortly before his death, he consulted on the Hoover Dam and Colorado River Aqueduct projects. He died in 1935 and is buried at Forest Lawn



Memorial Park Cemetery in Glendale, California, in the Great Mausoleum, Memorial Terrace, Sanctuary of Meditation, Mausoleum Crypt 6395, alongside Los Angeles Aqueduct chief electrical engineer Ezra F. Scattergood.

7. Oranges and Avocado Pears

Roderick Mackay's career had by contrast a happy ending. Working way out in the Mojave Desert, where it was difficult to spend money, he invested his savings in the place where his project would be delivering the water. He died owning some 80 acres of land, which included part of the Beverly Hills area.



Sunkist Oranges advertisement from 1940.

Roderick's daughter Christine, popularly known as Blossom, inherited a vast fortune. She remained single and was something of a recluse living on part of the

famous Hope Ranch area of Santa Barbara where she grew Sunkist Oranges and Avocado pears on land facing out over the Pacific. Upon her death most of her fortune went to the Shriners Hospital for Crippled Children. Her father Roderick had been a keen member of the Shriners branch of the Masons.

8. The Shriners

The Shriners, to whose children's hospitals Christine left most of her fortune, are an interesting piece of 19th century American social history, and are still thriving today. In 1870, several thousand of the 900,000 residents of Manhattan were Masons. Many of these Masons made it a point to lunch at the Knickerbocker Cottage, a restaurant at 426 Sixth Avenue. At a special table on the second floor, a particularly jovial group of men used to meet regularly.

The Masons who gathered at this table were noted for their good humor and wit. They often discussed the idea of a new fraternity for Masons, in which fun and fellowship would be stressed more than ritual. Two of the table regulars, Walter M. Fleming, M.D., and William J. Florence, an



actor, took the idea seriously enough to do something about it.

Billy Florence was a star. After becoming the toast of the New York stage, he toured London, Europe and Middle Eastern countries, always playing to capacity audiences. While on tour in Marseilles, France, Florence was invited to a party given by an Arabian diplomat. The entertainment was something in the nature of an elaborately staged musical comedy. At its conclusion, the guests became members of a secret society.

Florence, recalling the conversations at the Knickerbocker Cottage, realized that this might well be the vehicle for the new fraternity. He made copious notes and drawings at that initial viewing and on two other occasions when he attended the ceremony, once in Algiers and again in Cairo. When he returned to New York in 1870 and showed his material to Dr. Fleming, Fleming agreed.

Dr. Walter Millard Fleming was a prominent physician and surgeon. Born in 1838, he obtained a degree in medicine in Albany, N.Y., in 1862. During the Civil War, he was a surgeon with the 13th New York Infantry Brigade of the National Guard. He then practiced medicine in Rochester, New York, until 1868, when he moved to New York City and quickly became a leading practitioner.

With the help of other Knickerbocker Cottage regulars, Fleming drafted the ritual, designed the emblem and ritual costumes, formulated a salutation, and declared that members would wear a red fez. The initiation rites, or ceremonials, were drafted by Fleming with the help of three Brother Masons: Charles T. McClenachan, lawyer and expert on Masonic Ritual; William Sleigh Paterson, printer, linguist and ritualist; and Albert L. Rawson, prominent scholar and Mason who provided much of the Arabic background.

On September 26, 1872, in the New York City Masonic Hall, the first Shrine Temple in the United States was organized. Brother McClenachan and Dr. Fleming had completed the ritual and proposed that the first Temple be named Mecca. The original 13 Masons of the Knickerbocker Cottage lunch group were named Charter Members of Mecca Temple (Mecca Shriners). Noble Florence read a letter outlining the "history" of the Order and giving advice on the conduct of meetings. The officers elected were Walter M. Fleming, Potentate; Charles T. McClenachan, Chief Rabban; John A. Moore, Assistant Rabban; Edward Eddy, High Priest and Prophet; George W. Millar, Oriental Guide; James S. Chappel, Treasurer; William S. Paterson, Recorder; and Oswald M. d'Aubigne, Captain of the Guard.

But the organization was not an instant success, even though a second Temple was chartered in Rochester in 1875. Four years after the Shrine's beginnings, there were only 43 Shriners, all but six of whom were from New York.

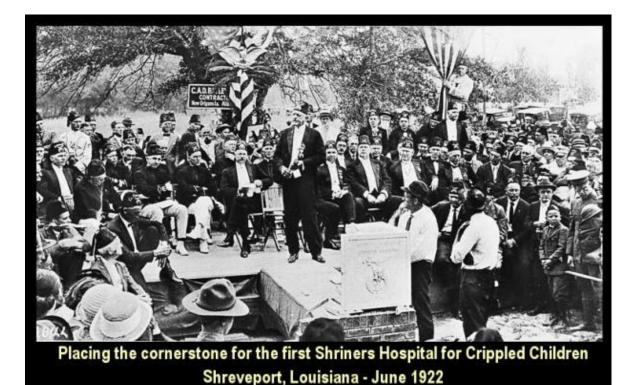
The Shrine grew rapidly during the 1880s. By the time of the 1888 Annual Session (convention) in Toronto, there were 7,210 members in 48 Temples located throughout the United States and one in Canada. The Shrine was unstoppable in the early 1900s. Membership grew rapidly, and the geographical range of Temples widened. Between 1900 and 1918, eight new Temples were created in Canada, and one each in Honolulu, Mexico City and the Republic of Panama. New flourishes were added to a growing tradition of colorful pageantry. More Shrine bands were formed. The first Shrine circus opened in 1906 in Detroit.

During the same period, there was growing member support for establishing an official Shrine charity. Most Temples had individual philanthropies, and sometimes the Shrine as an organization gave aid. After the 1906 earthquake in San Francisco, the Shrine sent \$25,000 to help the stricken city, and in 1915, the Shrine contributed \$10,000 for the relief of European war victims.

In 1919, Freeland Kendrick (Lu Lu Shriners, Philadelphia) was the Imperial Potentate-elect for the 363,744 Shriners. He had long been searching for a cause for the thriving group to support. In a visit to the Scottish Rite Hospital for Crippled Children in Atlanta, he became aware of the overwhelming needs of crippled children in North America. At the June 1919 Imperial Session, Kendrick proposed establishing "The Mystic Shriners Peace Memorial for Friendless, Orphaned and Crippled Children."

As Imperial Potentate in 1919 and 1920, he traveled more than 150,000 miles, visiting a majority of the 146 Temples and campaigning for an official Shrine philanthropy. The climax came at the June 1920 Imperial Session in Portland, Oregon. Kendrick proposed establishing the "Shriners Hospital for Crippled Children," to be supported by a \$2 yearly assessment from each Shriner (now \$5 per year).

Today the Shriners operate 22 Shriners Hospitals for Children in the USA, Mexico and Canada. There are about 350,000 members from 196 temples in the USA, Canada, Brazil, Bolivia, Mexico, Panama, the Philippines, Puerto Rico, Europe and Australia.



True to the original fun spirit of the founders, most Shrine Temples support several parade units. These are responsible for promoting a positive Shriner image to the public by participating in local parades. The parade units often include formations of miniature cars driven by Shriners in matching outfits and powered by lawn mower engines.



A Shriners parade unit.