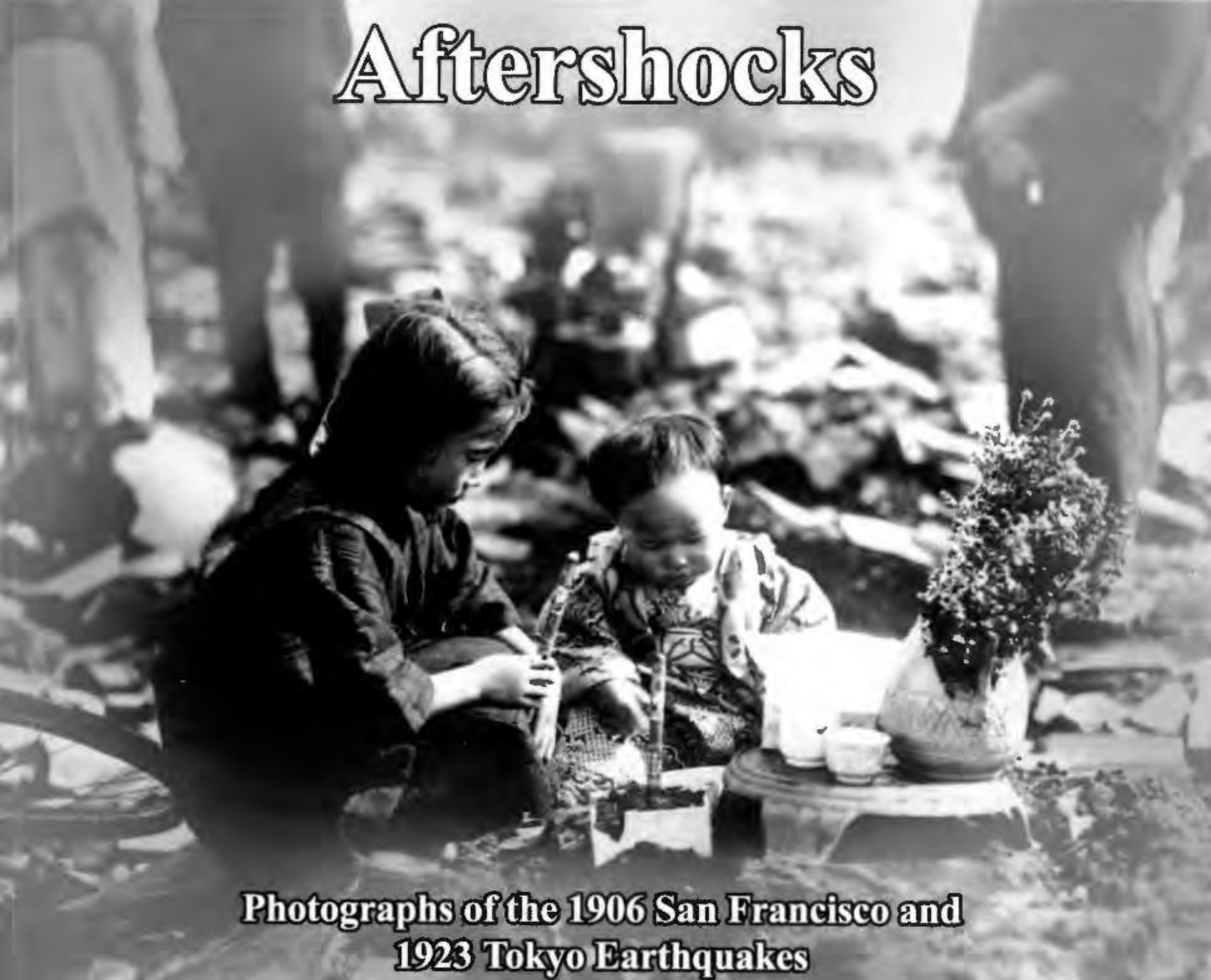
Aftershocks



Photographs of the 1906 San Francisco and
1923 Tokyo Earthquakes

Aftershocks

Photographs of the 1906 San Francisco and 1923 Tokyo Earthquakes

Charles D. James and Susan Fatemi.
Layout by Hoang Le.
Earthquake Engineering Research Center Library.
University of California, Berkeley. 2002.

The images presented here are selected from the EQIIS database developed by the National Information Service for Earthquake Engineering at the University of California, Berkeley. National Science Foundation (NSF) support for the NISEE project at Berkeley is gratefully acknowledged.


The San Francisco Earthquake and Fire of 1906


JESSE
MOORE
A
WHISKEY

Previous Page: Looking east on Pine Street from Stockon St. Building in view from left to right: Kohl, Merchants Exchange and Mills.

Left: People looking at the ruins on Nob Hill. Probably California St. near Powell, looking down towards Union Square. Church-like structure to the left is Emanuel Synagogue at 450 Sutter. Call Building on Market Street at far left.

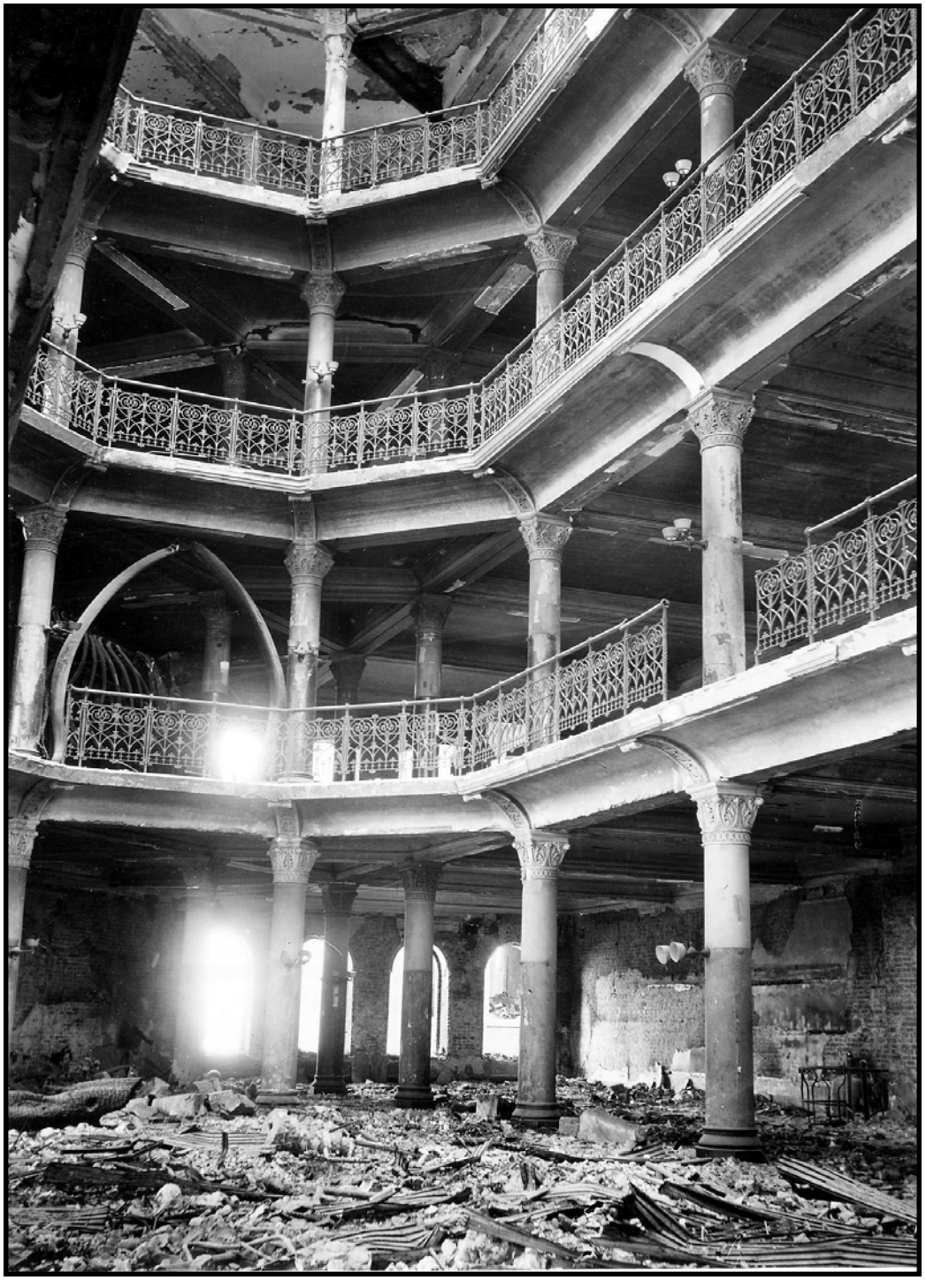
Above: First National Bank after the earthquake. The Chamber of Commerce building is seen in the rear.

Below: Governor Don Luis Antonio Argüello's Tombstone at Mission Dolores church yard.

Left: St. Luke's Church, Clay St. and Van Ness Ave., looking southeast.

Above: Beth-Israel Synagogue, Geary St. on left; Albert Pike Memorial (Masonic) Temple on right. Between Fillmore and Steiner.

Below: St. Dominic's Church on Steiner at Bush St., looking north-west.



Left: Interior of the California Academy of Sciences building adjoins The Emporium on the East. This building was reported in many circles to have been the first reinforced concrete floors built in the US.

Right: Majestic Theatre at the southeast corner of Ninth Street and Market Street.


IN LOVING MEMORY
JANE ANN LATHROP
MOTHER OF LELAND STANFORD

Left: Interior damage of Stanford Memorial Church.

Above: Angel looks down upon ruins of interior of Stanford Memorial Church

Below: Damage to Stanford University Quadrangle.


BULL DURHAM
OLD NORTH STATE
BEAR PHO
S.F.

Left: Waterfront Building in the Islais Creek Region.

Above: Outdoor kitchens after the earthquake.

Below: Schilling’s Tea House.

The Lachman Block, 411 - 501 Market Street.

Children playing in a hole in front of a three story flat at 10th and Valencia Street.


"Old Friends"
sse Moore Whiskey
AIM
TO GET
THE NEW ERA
BUDWEISER
OLD
WHITE HORSE CELLAR
SNIDER'S
CATSUP
SULTAN'S SHOES

Left: Larkin Street between McAllister and Golden Gate Avenue.

Above: Refugees camps near the Presidio.

Below: View of the fires.


JESSE
MOORE

Left: Burning of San Francisco, seen from Hopkins Institute.

Above: Panorama of Hopkins view.

Below: Looking down California Street from the top of Nob Hill.

Left: Praegers at the corner of Jones and Market Streets. The Hibernia Bank is seen on the right.

Above: Crowds watch the fire encroach upon the city.

Below: Union Square looking east from Powell. The frame of the Whittel and Butler Buildings are pictured.


EXPRESSING

Left: Buildings dynamited at Eighth and Folsom Streets.

Right: California Street between Sansome and Montgomery Streets.


RAPHAEL'S
JEWELERS

Left: Kearny Street looking down towards the Call Building. The Chronicle, Examiner, Raphel's Brothers and Mutal Savings Bank Buildings in view.

Above: Looking down O'Farrell Street between Stockton Street and Grant Avenue.

Below: Looking down O'Farrell further back in the street as the fire approaches.

Looking down Battery Street from Market Street.

Looking south on 7th St. from corner of Mission St. Horse drawn fire truck no match for steadily encroaching inferno.


M-J-B Office
WAY!


SHOES
112 GEARY ST
Copyright 1906
by W.H. Worden

“Surely the cutting edge of all our usual misfortunes comes from their character of loneliness. We lose our health, our wife or children die, our house burns down, or our money is made way with and the world goes on its way rejoicing. In California, everyone to some degree was suffering, and one’s private miseries were merged in the vast general sum of deprivation and in the practical problem of general recuperation. The cheerfulness, or at any rate the steadfastness of tone was universal. Not a single whine or plaintive word did I hear from the hundreds of losers whom I spoke to. Instead there was a temper of helpfulness beyond the counting.

It is easy to glorify this as something characteristically American or especially Californian. Californian education has, of course, made the thought of all possible recuperations easy. In an exhausted country, with no marginal resources, the outlook on the future would perhaps be darker. But I like to think that what I write of is a normal and universal human peculiarity…”

W. James, On Some Mental Effects of the Earthquake, 1906

The 1906 San Francisco Earthquake and Fire

In the early morning of April 12, 1906 the citizens of San Francisco were awakened by a deafening rumbling and roar deep in the earth. The noise was followed by a jolting of buildings as the first shock of a large earthquake reached the city. The shaking intensity increased for nearly 40 seconds, then paused for ten seconds of relative calm, only to renew itself for twenty-five seconds of the most intense shaking. Then it was over. City streets filled with stunned citizens and the cries of those injured and trapped in collapsed or damaged buildings.

The 1906 event, an estimated 7.9 Moment Magnitude earthquake, occurred as the Pacific Plate slipped along the North America plate at a shallow depth of about ten to fifteen kilometers. Widespread damage and destruction along a 430 kilometer rupture of the San Andreas Fault resulted. From the south end of the fault in the towns of Salinas, Hollister, Gilroy, Santa Cruz, San Jose, through Palo Alto, Oakland, Berkeley, Point Reyes Station, and Santa Rosa to Mendocino, Fort Ross and Fort Bragg at the northern end, buildings and streets were all shaken and damaged. Lateral ground displacement and landslides were observed in places over a 300 kilometer distance but the ground offset was mostly horizontal. The shaking was felt as far away as southern California, western Nevada and southern Oregon.

The editor of the Mining and Scientific Press awoke in his house in Berkeley across the San Francisco Bay from the city of San Francisco, " … to find the house shaking amid violent creaking and cracking, so loud as to drown out the crash of falling chimneys. Recognizing it was an earthquake one expected it to cease every moment, but after a movement of less violence, the horrible shaking began again, with greater intensity until it seemed the house must collapse bodily." [**2**]

In the city of San Francisco, damage especially extensive in the south of Market Street district of cheap lodging houses and boarding hotels. The wholesale and produce district of the city also suffered severe damage but injuries and casualties were light because of the early morning hour. In the downtown business district, some of which was built over ground made by filling in an old cove and creek bed, ground subsided, sewer pipes and water pipes broke, streets buckled and cracked, and brick buildings were damaged. The landmark San Francisco City Hall, a recently completed 6 million dollar and twenty-year construction extravaganza, was crushed in the earthquake shaking possibly by the inverted pendulum action of its signature rotunda and domed tower.

Aftershocks and the sickening fear of further building collapses kept many citizens on the streets in the morning hours. Despite this initial terror, many people went to sightsee or view the damage to their places of work. Meanwhile rescue work to free those trapped in buildings started in earnest. Telephones and transportation facilities were either destroyed or severely crippled but the telegraph office continued to function. Within a few hours of the shaking, disparate fires were kindled in many parts of the city. Damaged wooden buildings provided ample fuel. By mid-morning on April 18th, San Francisco, and soon after the whole world, recognized that a very large-scale disaster was begun.

The Fire

The small fires that ignited shortly after the shaking quickly raged into large infernos that swept through the city for three days. Broken chimneys in otherwise lightly damaged houses added new fires as residents tried to cook breakfast. The fire department, a professional, paid force since 1866, was completely overwhelmed within hours. A lack of adequate, reliable water supply caused by broken water mains (including the main water supply for the city from San Andreas Lake) made sustained fire fighting nearly impossible. Too few trained men, no centralized direction, and inadequate preparation confounded organized response to the growing conflagration. The city's Fire Chief, who had lobbied for better fire preparation for several years, was a casualty of the early morning's earthquake destruction.

Dynamiting of buildings to stop the progress of the fires by creating fire breaks within the city commenced around 1:00 PM

on the first day of the fire. The desperate dynamiting proved largely futile but continued for the whole night and through the next day without diminishing the fires. In some recklessly dangerous cases, gunpowder was used for dynamite, spreading further fire.

Fire in the south of Market Street district, where people had been trapped in partially collapsed housing, resulted in many deaths on the first day. As the flames grew and spread to more and more districts of the city, buildings were evacuated and residents fled by every means available. Within 30 hours of the earthquake's initial jolt, all the familiar buildings of San Francisco were lost to the fire.

By 2:20 PM on the second day of burning, the telegraph office, which had continued to function after the earthquake and provided a link for pleas for assistance to the outside world, sent a last telegraph:

> *The city practically ruined by fire. It's within half block of us in the same block. The Call Building is burned out entirely, the Examiner Building just fell in a heap. Fire all around in every direction and way out in residence district. Destruction by earthquake something frightful. The City Hall dome stripped and only the framework standing. The St. Ignatius Church and College are burned to the ground. The Emporium is gone, entire building, also the old Flood Building. Lots of new buildings just recently finished are completely destroyed. They are blowing standing buildings that are in the path of the flames up with dynamite. No water, it's awful. There is no communication anywhere and entire phone system is busted. I want to get out of here or be blown up.*
>
> Chief Operator Postal Telegraph Office, San Francisco [**2**]

It wasn't until Saturday, the 20th of April, that the fires were out. The burning had covered 490 city blocks, 2,831 acres in the city. Officially more than 450 lives had been lost in the city of San Francisco but contemporary accounts estimate at least 3,000 lives must have been lost. [7]. At least half the population of the city, more than 200,000 people, were made homeless. An estimated 28,188 buildings were destroyed. Property losses exceeded $524 million (1906 dollars).

Social Impacts

The San Francisco region had previously experienced damaging earthquakes in 1865 and again in 1868. But fear of earthquakes had diminished. In April, 1906 San Francisco's 400,000 residents made it the largest population center in the western United States. Founded by Spanish colonists and missionaries, San Francisco had grown on the gold of the Sierra Mountains. Since 1849 the city had developed farms and agricultural trade. Banks, mills, and businesses of many kinds complemented mining businesses. In ten years of increasing prosperity and burgeoning trade with the Orient, San Francisco had seen the construction of many large office buildings in its commercial district, mansions of stone and brick in residential areas, glamorous hotels, grand restaurants, theaters including an opera, churches, colleges and schools, and parks. The 18 story Claus Spreckels Building, known as the Call Building for the newspaper based in the building, was the largest in the city. On April 17th San Franciscans could have seen a performance of "Babes in Toyland" at the Columbia Theatre, or heard Enrico Caruso's performance as Don Jose in Bizet's Carmen, or seen a young John Barrymore in a theater performance. Turn-of-the-century San Francisco simmered with opportunity and optimists.

In 1904 a group of prominent San Francisco men known as "An Association for the Improvement and Adornement of San Francisco" engaged the well-known architect D. H. Burnham to draw up a long-range plan for the beautification of the city. Plans to change San Francisco from its gold mining beginnings to a city of architectural substance were well advanced by 1906.

In the grip of the 1906 disaster, the mayor formed fifty prominent citizens into the "Committee of Safety" to guide and advise on governing the city through the disaster. The mayor himself called for troops and gave orders to shoot all looters after incidents of looting were reported. He reasoned that there would be no place to keep prisoners. Armed federal troops and reserve cadets were dispatched from nearby forts to help with the fire fighting, the

dynamiting of buildings, and enforcing security and public safety.

As the fire spread across the city, citizens saved what they could carry; often salvaging no more than the clothes they wore. The homeless fled to nearby towns of Oakland, Sausalito, and Palo Alto. Others took shelter in the proud parks of the city. Golden Gate Park would shelter nearly 200,000 homeless in the coming weeks.

As refugees streamed from the residential districts of the city, serious possibilities for typhoid, smallpox and bubonic plague epidemics arose. False rumors spread among the frightened population that the disaster had wiped out Los Angeles, Seattle and Portland, Oregon. Chaos, violence and severe hunger threatened the surviving population. Probably the early arrival of assistance and the selective application of stringent military order averted a worse social disaster.

Assistance poured in. Before the end of the 18th of April, a trainload of food, with doctors, nurses and medical supplies had arrived from the City of Los Angeles. Food, medicines, cots and blankets were part of hundreds of tons of relief supplies reaching San Francisco in the next weeks. $8 million was raised across America in a few days to help San Francisco recover. *Harper's Weekly* observed that "the nation's heart was wrung." So was the heart of other countries. Japan, Canada, China and France all contributed funds to the disaster relief.

After the fire, dozens of insurers refused to pay fire losses or insisted on reduced payment alleging that the earthquake had wrecked insured buildings. In order to collect fire insurance many San Francisco residents insisted that their homes and buildings had not been damaged by earthquake. There was a fear that capital would flee from both San Francisco and the state of California if a threat of destruction by earthquake was perceived as a widespread risk. A desire for immunity from future devastating earthquakes pervaded the population. In the next decades, these social realities and subsequent strong California earthquakes propelled development of engineering seismology and earthquake engineering.

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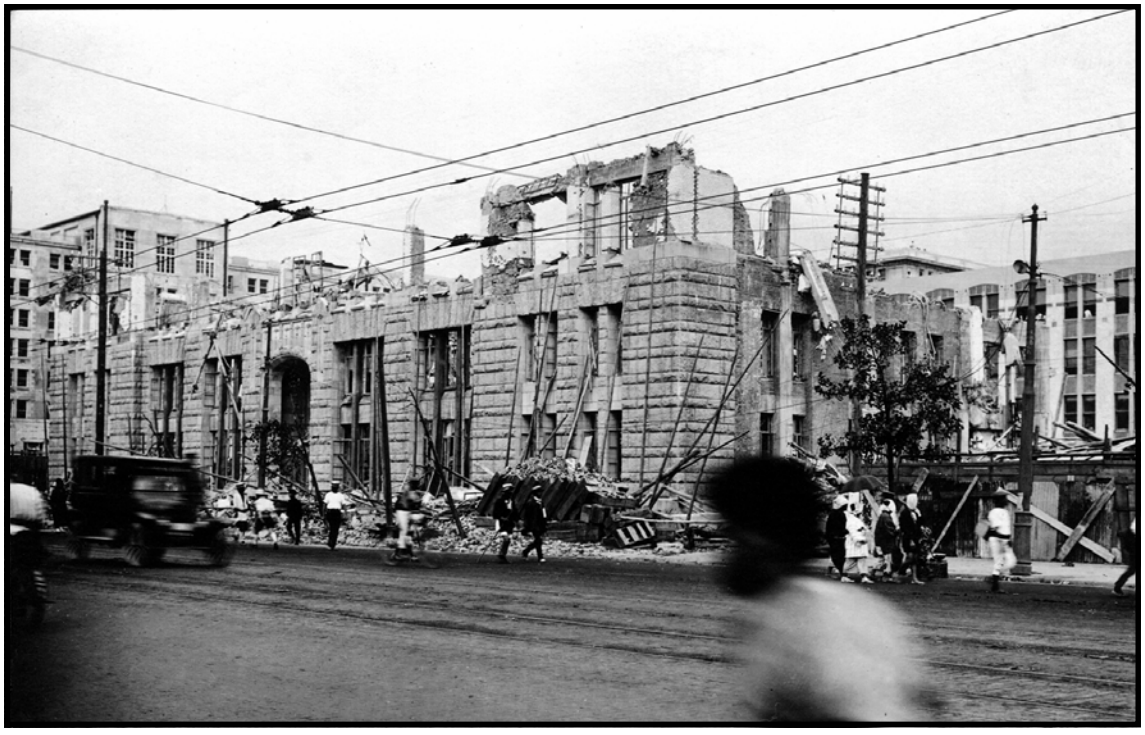
Images of Japan's Great Kanto Earthquake and Fire of 1923



Left: Ginzadori (Ginza St.) looking towards Kyobashi.

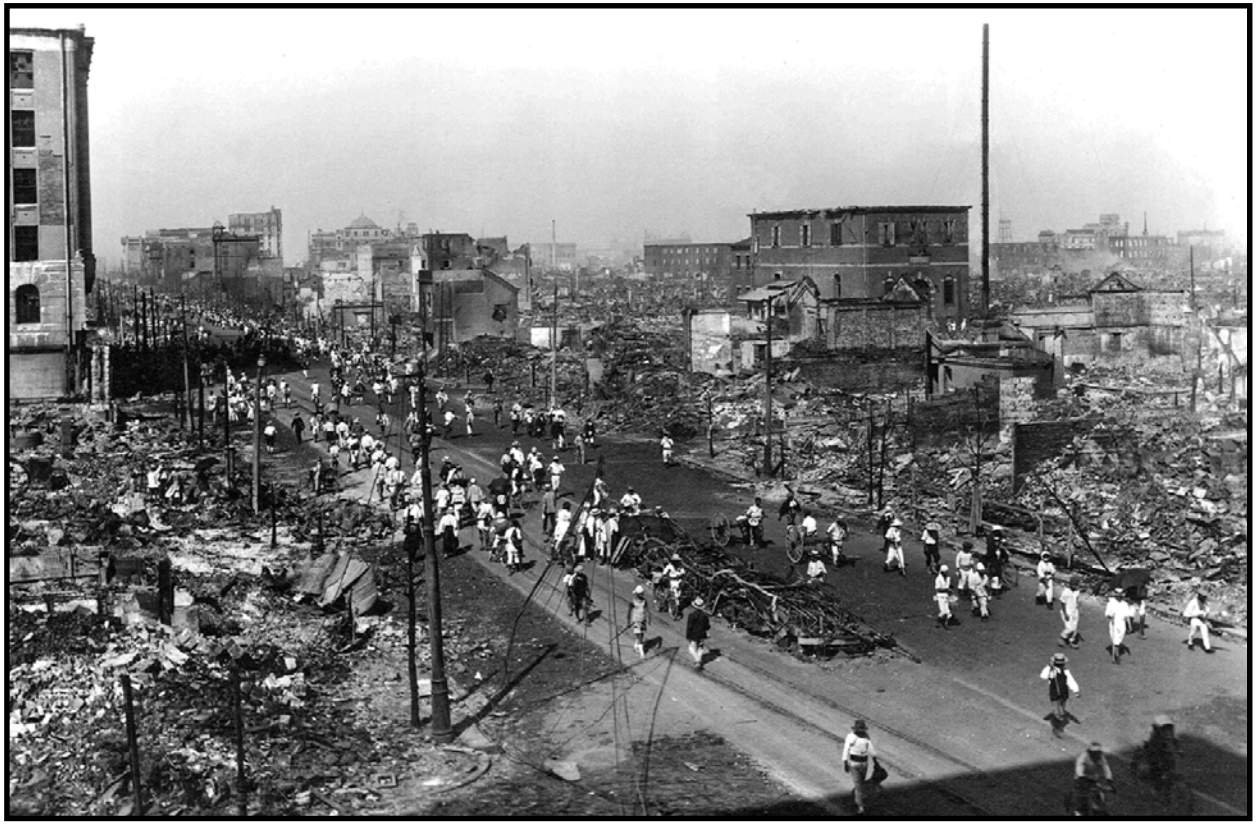
Above: Naigai Building, reinforced concrete frame building under construction. The upper 5 floors collapsed in the earthquake, killing the contractor and 200 workmen.

Below: People climbing on roof of collapsed building, presumably in an attempt to rescue those trapped and/or injured inside.

Left: Above Kyobashi, looking towards Nihonbashi.

Above: Nihonbashi, Mikawashima fire.

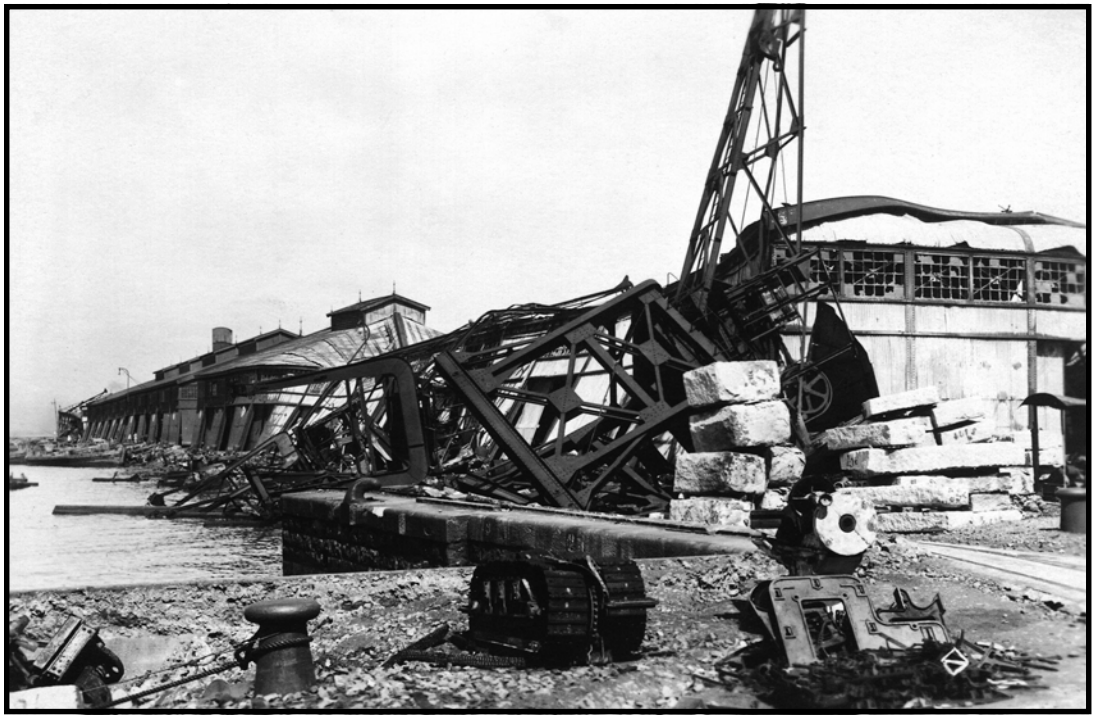
Below: Nihonbashi Street. Many buildings burned to the ground.



Left: Yokohama view from Liyo Zaka.

Above: Wharf destroyed at Yokohama.

Below: Yokohama, The Grand Hotel collapsed (Honchodori St.).



Left: Yokohama, wreckage of the Customs House and main pier.

Above: Yokohama, Warehouses and cranes collapse.

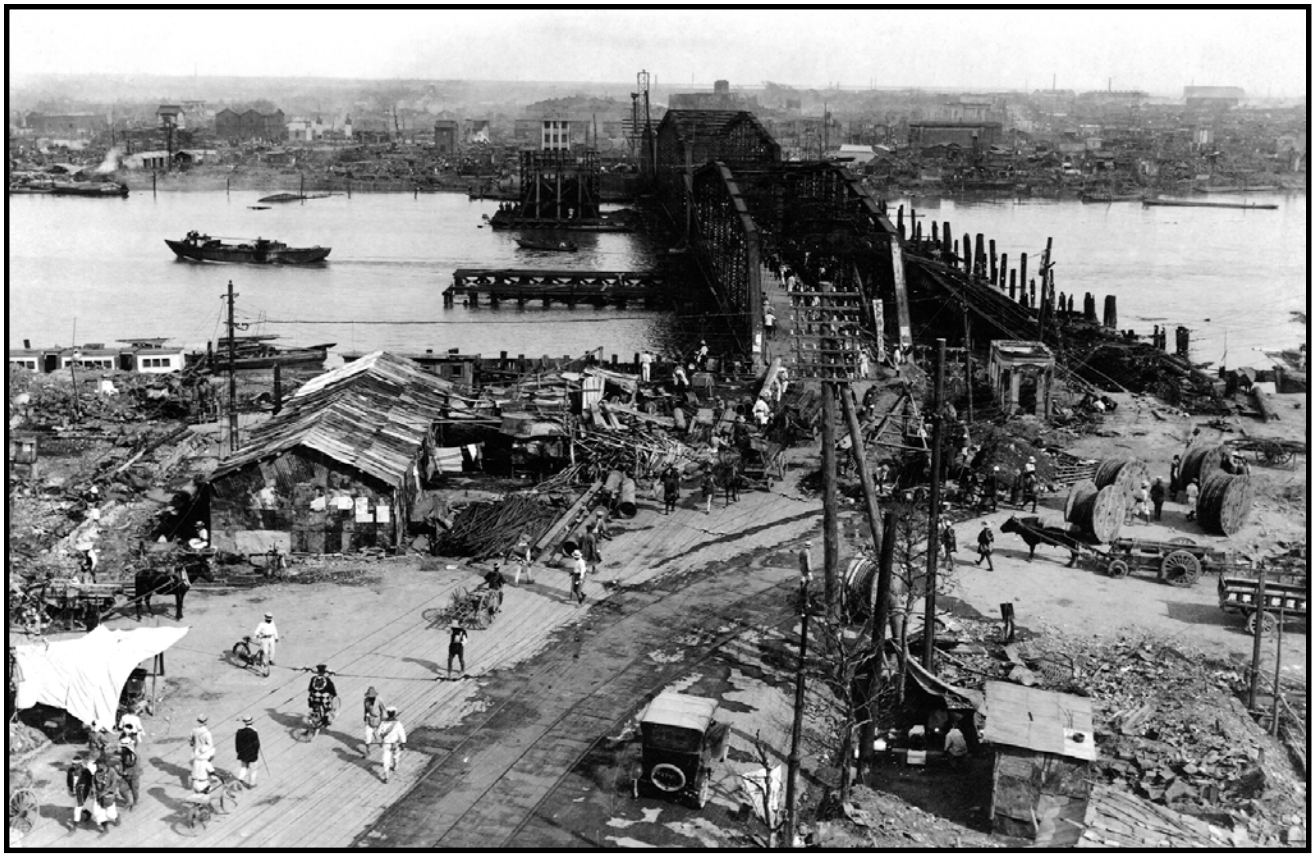
Below: Yokohama, consulate sites in ruins. New Customs wharf in the foreground is still seen standing.

Left: Yokohama, Roof of Mitsui building and Mitsukoshi department store with roof garden and tower.

Above: Yokohama Specu Bank.

Below: Mitsukoshi department store, rear view, and scaffolding for new Yokohama Specu Bank.


日本製



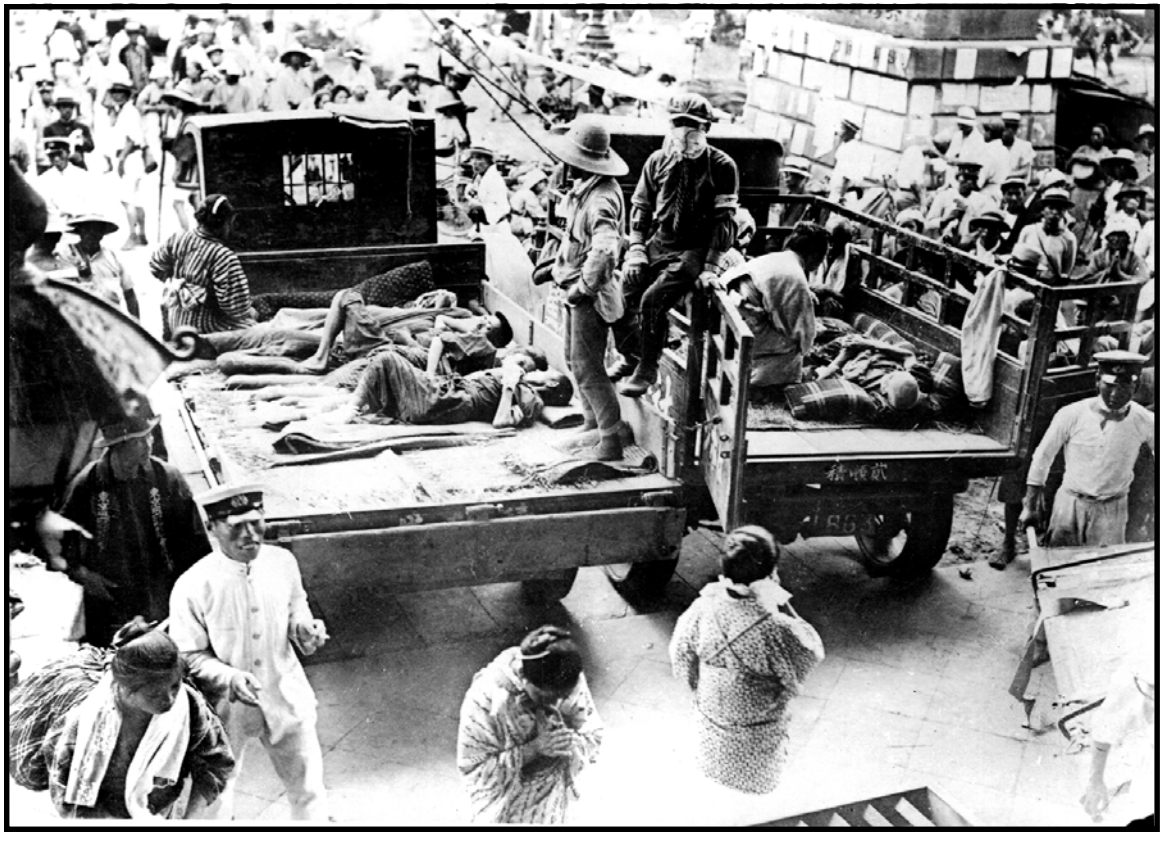
Left: Tokyo, Fukugawa, Sumida River with steel bridge in back ground.

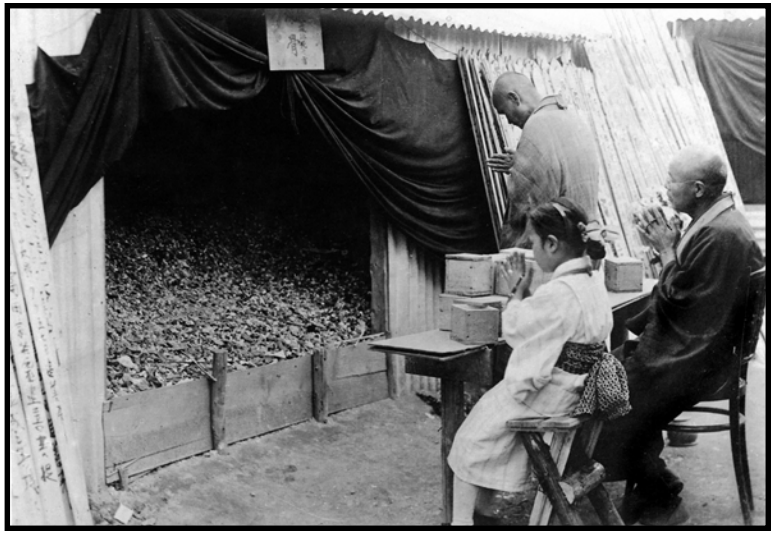
Above: Tokyo, Eitaibashi Bridge over the Sumida River.

Below: Tokyo, Isukiji.

Tokyo, Ningyo Cho (“Doll St ”) looking towards Umayabashi.

Tokyo, fire damage in Ogawamachi.

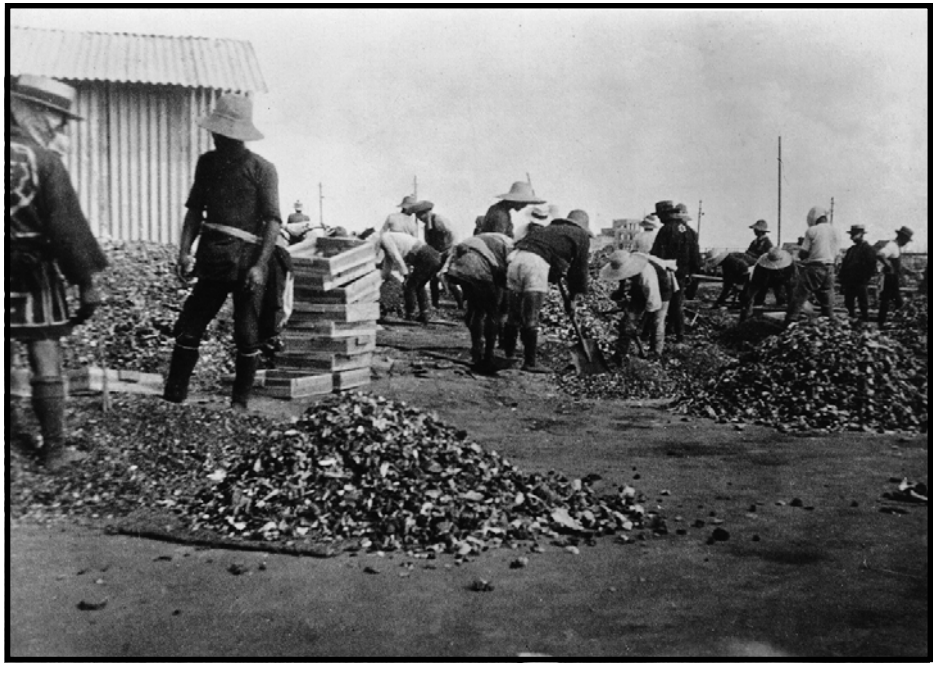




Left: Cremation scene at Hifukusho.

Above: The injured are taken to Kwannon (Goddess of Mercy) temple at Asakusa.

Below: Buddhist priests offer funeral prayers for the dead.



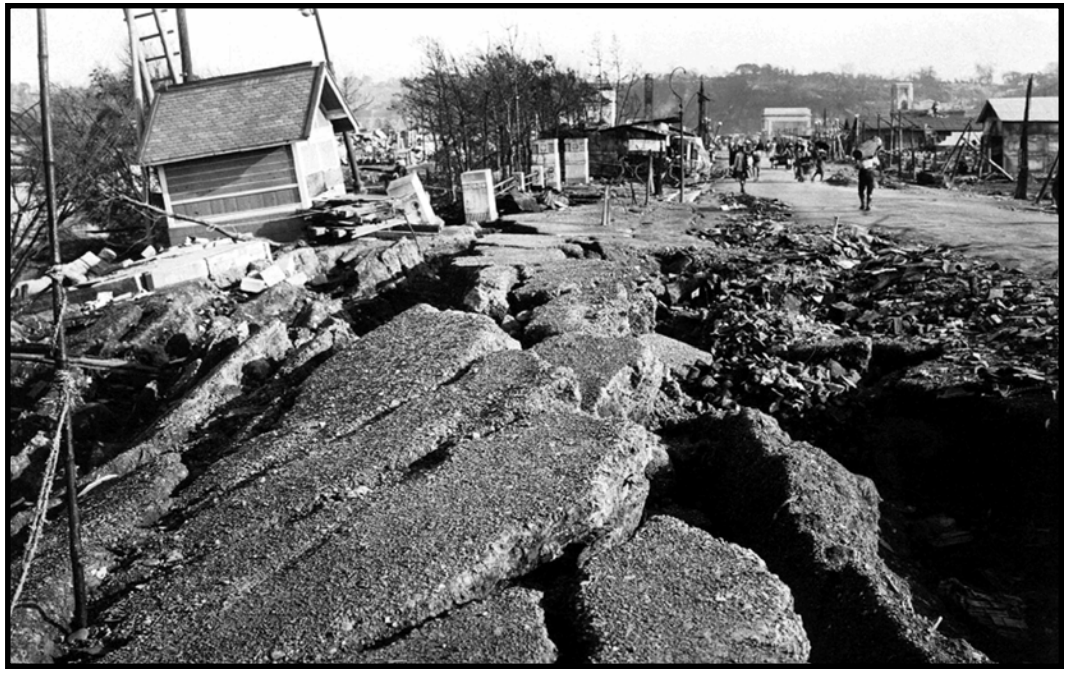
Left: Hifukusho: After cremation, larger bones collected in urns for burial, each part of the ground having bones kept separate.

Above: Tokyo: Ueno Large Butsu loses head in quake.

Below: Yoshiwara District, bones and ashes.

Ashen remains of 40,000 people who died in the inferno at Hifukusho.

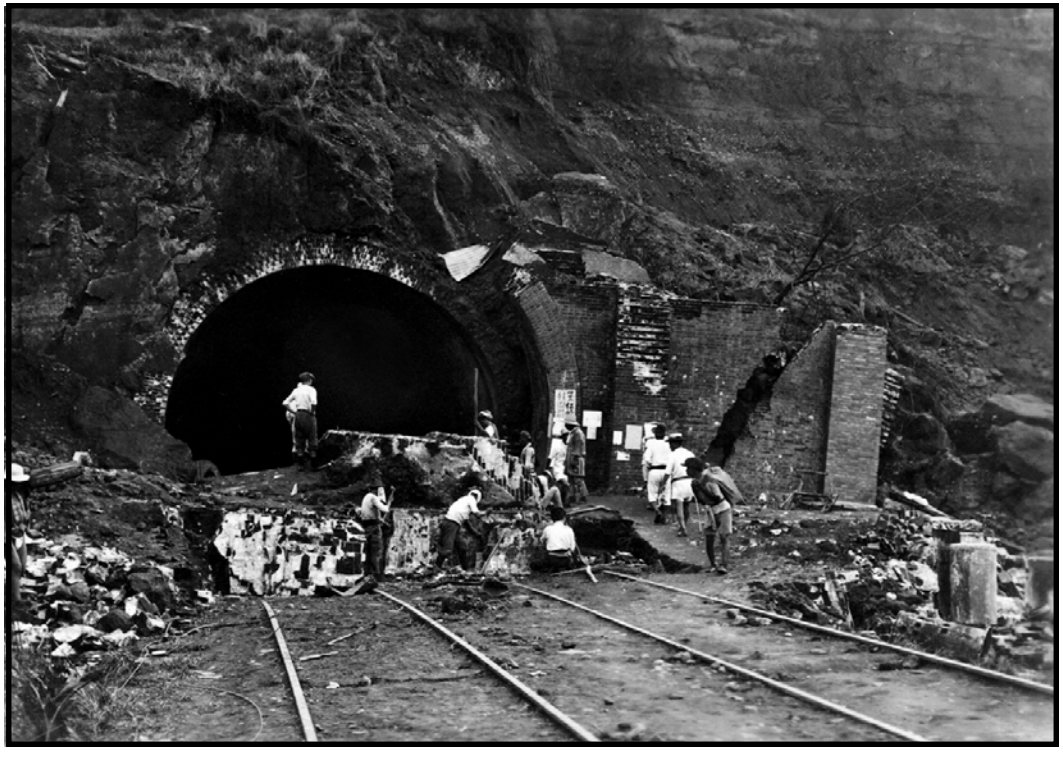
Ponds were full of dead carp floating at the surface after the fire. Several live turtles pictured.



Left: Lateral spread of roadway by riverside.

Above: Yokohama: Yoshidabashi.

Below: Yokohama roadway.

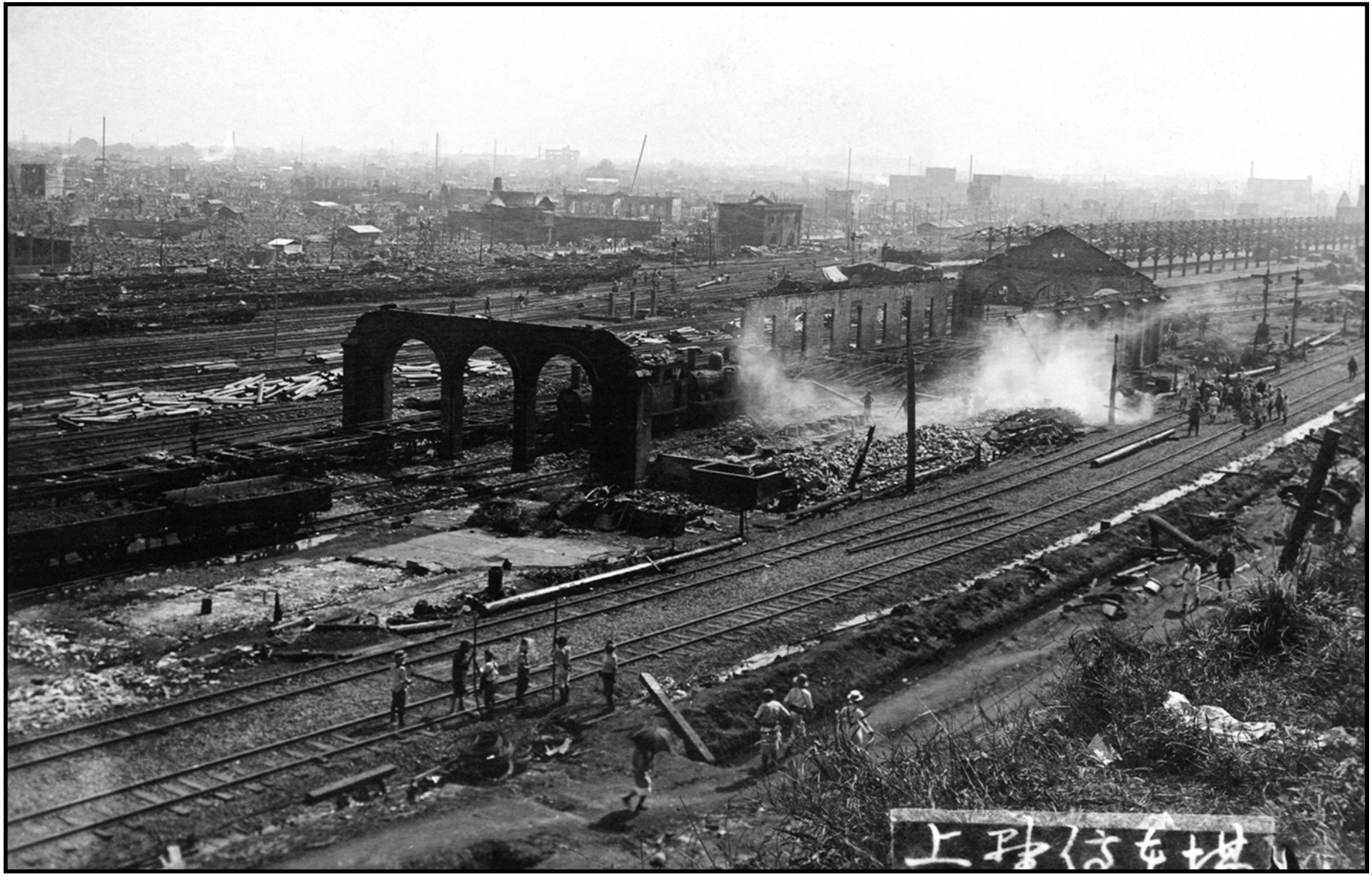


Left: Broken ground, Babasaki Mon (area near the Imperial Palace).

Above: Yokohama: Hashibiki Cho.

Below: Yokohama tunnel for city tramline to Hamaku.

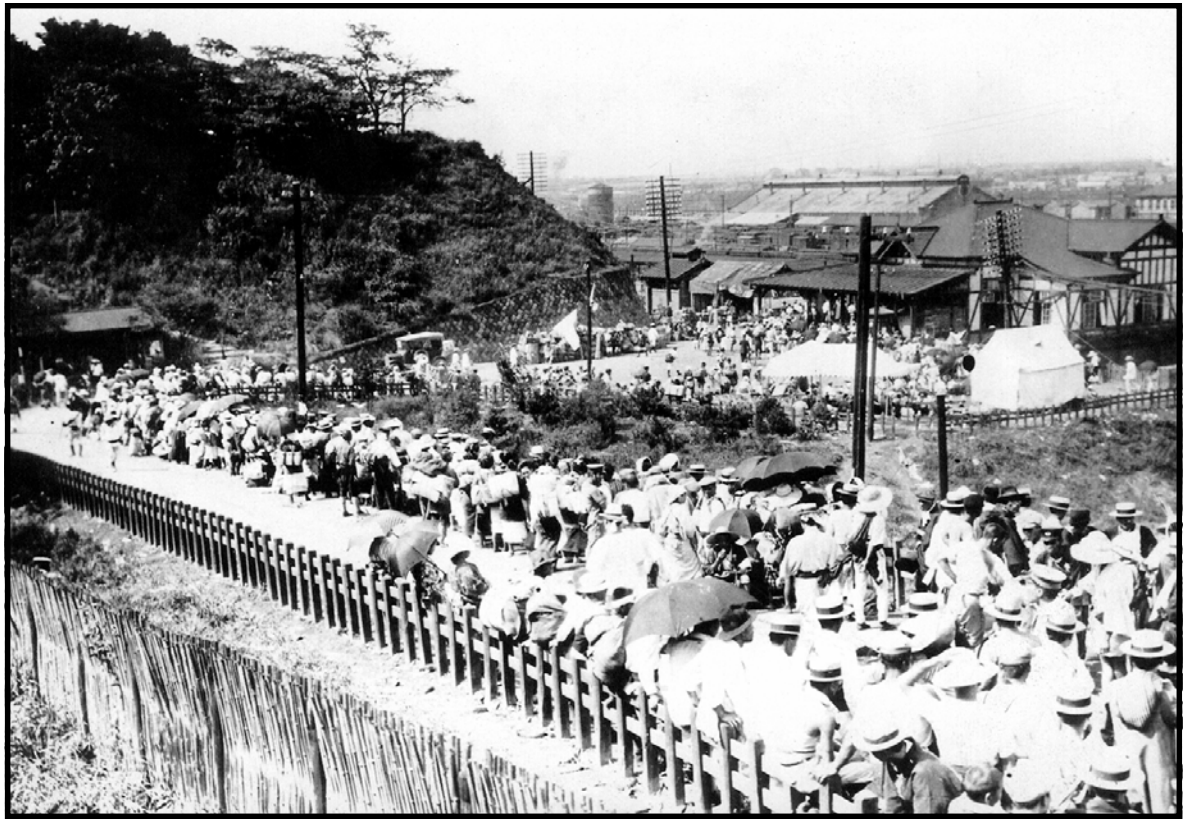
Odwara.



The great Uyeno station after the fire.

Left: Yokohama station platform.

Right: Akitaibashi.



Left: Huge crowds with their belongings seeking refuge formed a very common sight all over the city. Ueno station was crowded with people trying to get to the nearby park.

Above: Ueno Station.

Below: Tabata Station, above Ueno from which trains began to move people out of the city.

Left: Refugees at Nijubashi outside palace.

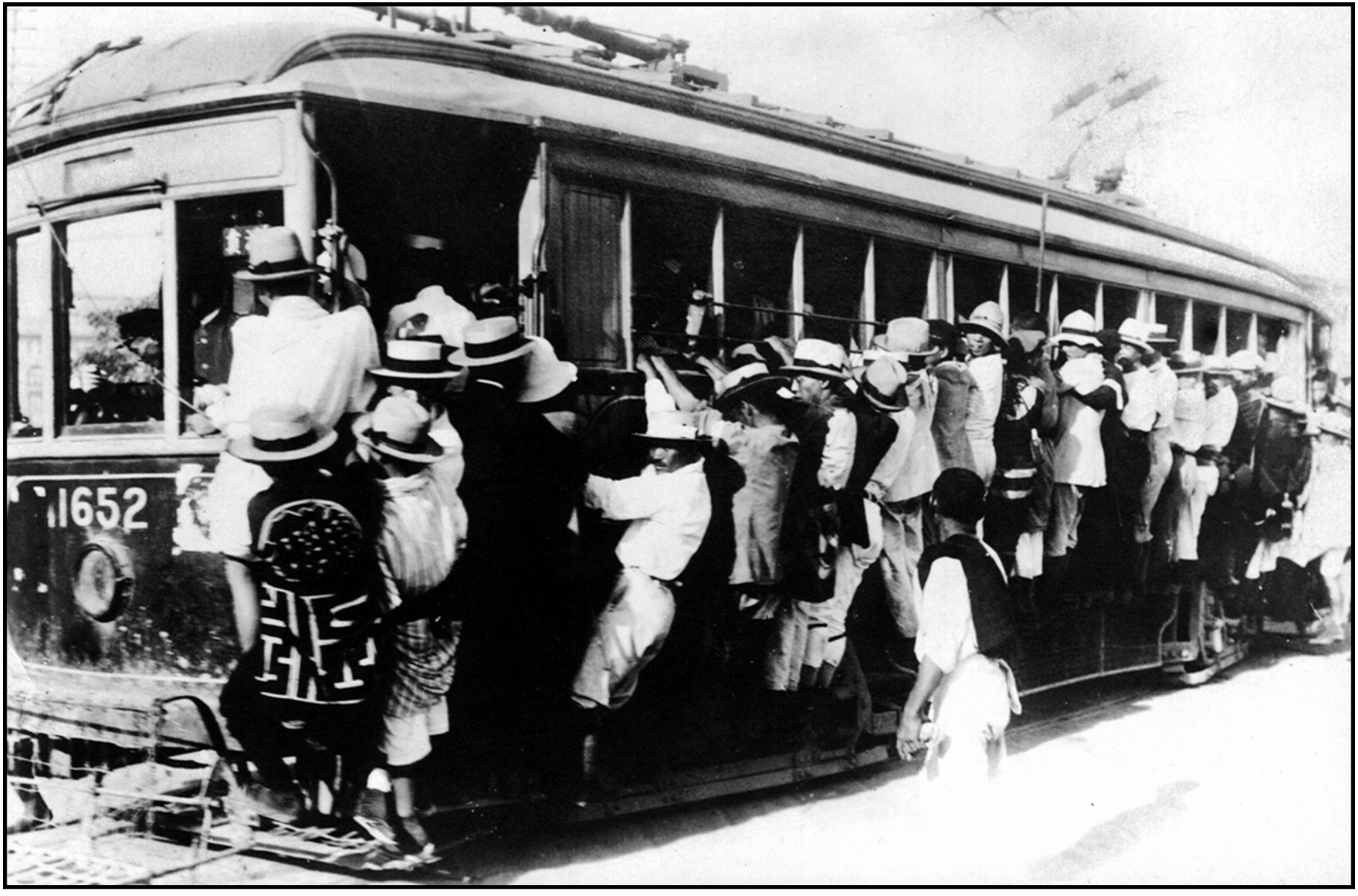
Above: Hifukusho, refugees.

Below: Tokyo: Refugee camp outiside palace.

Left: Nihonbashi Dori showing barrack structures run up and shops doing business before year's end.

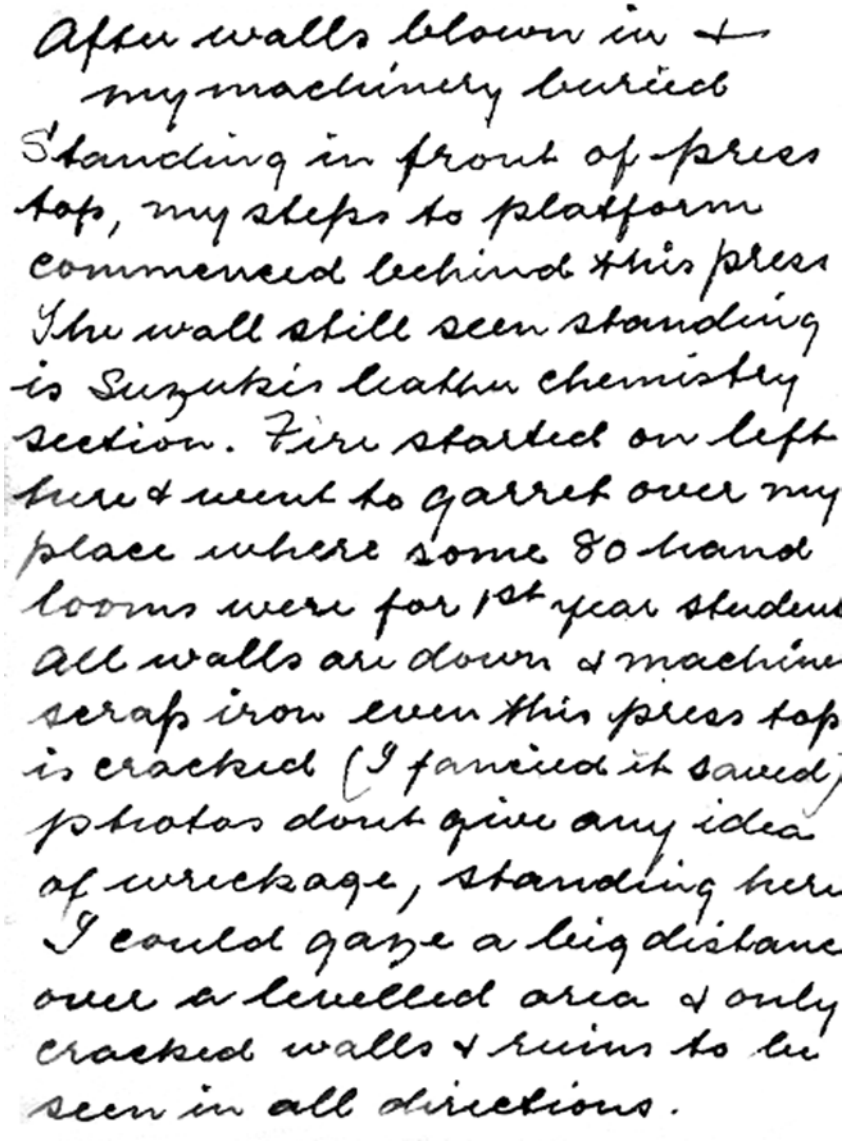
Above: Temporary reconstruction 3 months after the fire.

Below: Barracks built for the homeless refugees in Hibiya Park.



Free rides are offered by the first tramcar service after the earthquake in Tokyo.

Mourning.



- Edgar Sykes, photographer,
about his textile factory in Yokohama

The 1923 Tokyo Earthquake and Fire

Before 1923, the gravest Japanese earthquake was the February 10, 1792 Hizen earthquake, which coincided with the eruption of Unzendake. An estimated 15,000 people were killed. The Shinano - Echigo earthquake of May 8, 1844, caused the death of about 12,000 people. In the Tokyo and Yokohama earthquake and fire of 1923, nearly 142,000 people perished.
Saturday, September 1st 1923 was hot with strong gusts of wind that followed an early morning rain. At 11:58:44 the main shocks of the earthquake arrived just as the citizens of Tokyo and Yokohama, seventeen miles south of Tokyo, were preparing to take their noon meal. Professor A. Imamura, the head of the seismological observatory at the University of Tokyo, was at his desk at the time.

> *When the quake began, Professor Imamura was seated in his study and noted that the first movement was rather slight and feeble, so that he did not take it to be the forerunner of so big a shock. He began to estimate the duration of the preliminary tremors and endeavored to ascertain the direction of the principal movements. Soon the vibration became large, and after three or four seconds from the time of commencement, he felt the shock very strongly indeed. Seven or eight seconds passed and the building was shaking to an extraordinary extent, but he considered these movements not yet to be the principal portion. When he counted the twelfth second from the start, there arrived a very strong vibration which he took at once to be the beginning of the principal portion. Now, the motion instead of becoming less and less, as usual, went on to increase its intensity very quickly, and after four or five seconds he felt it to have reached the strongest [3].*

A lay person's description of the same events are provided by Otis Manchester Poole, General Manager of Dodwell & Co. who was also at his desk in his Yokohama office that morning.

> *I had scarcely returned to my desk when, without warning, came the first rumbling jar of an earthquake, a sickening sway, the vicious grinding of timbers and, in a few seconds, a crescendo of turmoil as the floor began to heave and the building to lurch drunkenly.... The ground could scarcely be said to shake; it heaved, tossed and leapt under one. The walls bulged as if made of cardboard and the din became awful...For perhaps half a minute the fabric of our surroundings held; then came disintegration. Slabs of plaster left the ceilings and fell about our ears, filling the air with a blinding, smothering fog of dust. Walls bulged, spread and sagged, pictures danced on their wires, flew out and crashed to splinters. ... How long it lasted, I don't know. It seemed an eternity; but the official record says four minutes...[9]*

Perhaps one official record claimed four. Others said 10 minutes of felt vibration, and up to two and a half-hours of constant motion. [6] More than 200 aftershocks followed the 7.9 M main event on Sept. 1st. On Sept. 2nd, an excess of 300 shocks was recorded, including a major event at 11:47 a.m. More than 300 additional shocks would follow from September 3-5.
In all, seven prefectures were affected by the quake. These were Tokyo, Kanagawa, Shizuoka, Chiba, Saitama, Yamanashi and Ibaraki. The greatest destruction occurred at Yokohama, which at the time was the premier commercial port of Japan.
The degree of shaking felt in the affected regions varied greatly because of soil structures. The epicenter of the largest quake was close to Oshima Island. This island consisted mostly of lava and scoria and experienced comparatively little shaking or ground level changes. But both the cities of Tokyo and Yokohama are located on alluvium or soft river deposits. An American geologist, T. A. Jagger, observed:

> *"The geology indicates transition from hard andesites at Izu, through indurated Tertiary sediments at Misaki and Boshu, to soft quaternary beds and modern river deltas about Yokohama and Tokyo. The cities were thus on the worst ground, and suffered heavier shaking than the Izu peninsula, although farther away from the seismic*

centers." [7]

An unusual characteristic of the Great Kanto earthquake was the dramatic upheaval and depression of the ground. The earth was lifted as high as 24 feet at Misaki, substantially changing the shape of the shoreline. This uplift lasted only about 72 hours, however, before the ground began to sink, at first by as much as two feet per day. When the settling had ceased, an offset of some 5 feet remained. The dramatic uplifting and depression of the ground resulted in thousands of landslides, the worst of which occurred in Idu province. Here the entire village of Nebukawa was buried by a massive mudflow, killing hundreds. Landslides were also observed on the Miura Peninsula, the southern part of Boso Peninsula, and the mountainous district of southwestern Sagami.

The Central Meteorological Observatory in Tokyo listed the general area of upheaval as the Boso Peninsula and the Shonan district. The epicenters of the numerous shocks that followed the main event were scattered between the southern section of the Boso Peninsula and the coast of Sagami Bay. The Observatory also noted ground upheavals of approximately nine feet near Mera, at the southern end of the Boso Peninsula and eight feet in the neighborhood of Oiso. The Imperial University in Tokyo obtained the only direct measurement of acceleration from the earthquake assessed at 10% of gravity. Maximum acceleration in the alluvial ground at Yokohama was later estimated to be 40% of gravity.

Not long after the earthquake, the Government Fishery Institute and the Hydrographical Department of the Navy undertook missions to survey the sea floor in the area of the quake at a depth of 600 to 800 fathoms. Their findings corroborated the theory that two distinct earthquakes occurred in Sagami Bay. One was centered east of Hatsushima Island and to the north of Oshima Island. The other originated to the southeast of Manazuru point. These missions also revealed new ridges 180 to 300 feet in height on the ocean floor in line with a volcanic chain that extends for hundreds of miles in a south-southeasterly direction. It appears that a collapse into a rift occurred along the line of this volcanic chain.

A tsunami followed the earthquake, but in this, at least, the citizens were somewhat fortunate. There was no large wave inside Tokyo Bay. A substantial wave — up to 39.5 feet — did strike along the north shore of Oshima Island, but comparatively little damage was done. Waves three to 20 feet in height were recorded along Izu peninsula and the Bosshu coastline.

Fire

No less ferocious than the earthquake itself was the conflagration that followed the earth shaking. When the earthquake struck, coal or charcoal cooking stoves were in use throughout Tokyo and Yokohama in preparation for the noontime meal and fires sprang up everywhere within moments of the quake. Improper storage of chemicals and fuel further contributed to the holocaust. In Yokohama alone, 88 separate fires began to burn simultaneously and the city was quickly engulfed in flames that raged for two days. Although the recorded wind speed was lower in Yokohama than in Tokyo, fire-induced wind spawned numerous cyclones, which further spread the flames. In Tokyo, the wind reached speeds of 17.9 miles per hour and became the chief obstacle to containing the fire. Temperatures soared to 86 °F late into the night.

The casualties from the fires are a horrifying combination of people who were trapped in collapsed buildings and those who took refuge in areas that were later surrounded and consumed by fire. The greatest loss of life occurred at the Military Clothing Depot in Honjo Ward, where many of the refugees had gathered. Most of them carried clothing, bedrolls, and furniture rescued from their homes. These materials served as a ready fuel source, and the engulfing flames suffocated an estimated 40,000 people.

O. M. Poole, who had fled his Yokohama office after the main shock to a yacht anchored in the harbor at Yokohama, described the continuing destruction as night fell.

In the enveloping summer night, the relentless roar of flames sounded like heavy surf, with frequent crashes of thunder. We seemed to be in the centre of a huge stage,

illuminated by pulsing, crimson footlights. ...we could see a thin rim of fire all around Tokyo Bay, meaning that fishing villages and small towns were all sharing the same fate; the glare above Yokosuka, where the jaws of the bay come close together, showed that the Naval arsenal was also going up. Northwards over the water there rose on the horizon a billowy, pink cloud like cumuli at sunset, so distant as to seem unchanging and motionless, yet each time one looked it had taken a different shape. This was Tokyo burning, and by the cloud's titanic proportions we knew the whole city must be in flames, as indeed most of it was. [9]

Poole was not alone seeking refuge in the Yokohama harbor. By nightfall the harbor was full of refugees on board ships both foreign and local. The following morning, oil that had been seeping into the water caught fire and there followed a mad scramble to get the ships out to open sea before they were engulfed in flames. Many people were injured when they were caught at the end of a burning pier.

Days passed as the smoldering embers slowly cooled and the aftershocks diminished and finally stopped. In the desolate ruins left behind, it was difficult to distinguish earthquake damage from that which had burned. It is estimated that at least 80% of the total destruction in Yokohama was due to fire. [3]

Social Impacts

The number of houses partially or completely destroyed totaled in excess of 694,000. Of these, some 381,000 were burned, 83,000 collapsed, and 91,000 partially collapsed. These numbers highlight the devastating effects of the fire following the earthquake.

The initial earthquake severed water mains. Potable water shortages became a tremendous problem to the survivors, and there was no possibility of fighting the fire. Also destroyed in the earthquake and fire were telephone and telegraph systems, leaving the people of Yokohama and Tokyo completely cut off from the outside world. There was no way for them to know if the entire country was in ruins or if their own circumstances were among the best or the worst. Travel was made impossible due to the destruction of railroad tracks, damaged bridges, loss of power to electric tramways, and roads choked with rubble. All major newspaper offices were destroyed by fire. Signs were posted informing people of everything from relief efforts and where to contact relatives, to the dire consequences of looting.

On the evening of September 2nd, the Army Aviation Headquarters ordered aviators to Osaka, Yamada, and Shibata to convey news of the disaster. In the first week, more than 500 messages were also dispatched to various cities by carrier pigeon. The steamer *Korea*, which was anchored in Yokohama harbor at the time of the quake, was the first to send out messages seeking help. The first distress signal via the ship's wireless was sent to the Governor of Tokyo. This received no reply, as Tokyo was in the same predicament. A second message was sent to Osaka, where it was converted to a high-power general broadcast. This was picked-up by the American Asiatic Squadron located off the coast of South China. Immediate relief in the form of 2,500,000 yen worth of goods was sent to Yokohama. Similar help came from a number of other ships who happened to pick up the message, including an American steamer loaded with cargo intended for Hankow, which changed course and joined in the relief effort.

News of the earthquake reached the United States on the evening of September 1st, and a humanitarian relief effort was immediately launched. A sum exceeding ten million dollars was raised in just a few days. Similar efforts were mounted by a number of countries.

On Sept. 2, the government proclaimed an emergency requisition ordinance, which allowed the issue of orders for any type of goods considered necessary to the relief effort. Those who failed to comply with the requisition orders were subject to punishment. An Emergency Relief Bureau, with the Prime Minister and the Minister of the Interior acting as President and Vice-president was also established. On September 4th, the Emperor of Japan allocated 10 million yen to be spent to aid in the relief

effort.

At the same time rumors of foreigners planning some form of takeover in the aftermath of the disaster spread among a frightened population. On Sept. 5th the Prime Minister issued a warning to the public that these rumors were without basis and were contradictory to the spirit of assimilation that Japan wished to achieve. Nonetheless, the rumors led to groups of vigilantes who patrolled the streets, and there were accounts of attacks on Korean citizens. This prompted the government to open a shelter where as many as 3,075 Koreans were lodged for their own safety. By Sept. 8, the city of Tokyo was placed under martial law, and the army became instrumental in distributing food and beginning the long reconstruction process. Martial law allowed the government to disperse people, prohibit or suppress newspapers or advertisements, seize property, enter buildings, or take any action it deemed necessary to maintain order. Citizens caught in the act of looting were hanged or shot.

Electric lighting was first provided to Tokyo in the form of a searchlight and 40 other lamps that belonged to the 1st Telegraph Regiment. There was unfortunately no such relief in Yokohama, which remained in darkness for several nights. After electricity was restored in Tokyo, the lights were transferred to Yokohama where they were used until service could be restored there. Engineering corps were dispatched to begin repairs on railways, telegraphs, roads, and bridges, while medical corps worked among the thousands of injured refugees.
As staggering as were the initial losses of life and property, there were more hard times to come. With a huge number of industries destroyed, unemployment was an immediate and lasting problem. The Bureau of Social Affairs [2] listed the percentage of those who lost their jobs at 45.04. In general, the early 1920s had been good times for Japan's growing economy. While most of Europe was laboring under the effects of World War I, Japan was enjoying relative economic prosperity. Prior to the earthquake, Yokohama was a booming international port. Afterwards, recovery was painfully slow, as foreign investors were very hesitant to rebuild there.

About These Images

The images presented here portray the devastation from the 1923 earthquake and fire. Paul Whiting of Australia provided electronic copies of these images to the University of California, Berkeley on a CD-ROM he had produced titled "Images of Disaster." To the best of Mr. Whiting's knowledge, all these photographs were taken by his great uncle, Edgar Sykes, who lived in Japan for many years helping to establish the Japanese wool weaving industry centered in Yokohama. The images were on 1/4-inch glass plate negatives with some damaged prints. Prints were made or scanned, cleaned, and the tonal range of the images was improved. The photographic information is based on original comments written on the back of the prints. The images were most likely sent to Mr. Sykes' brother in England who later moved to Australia.

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