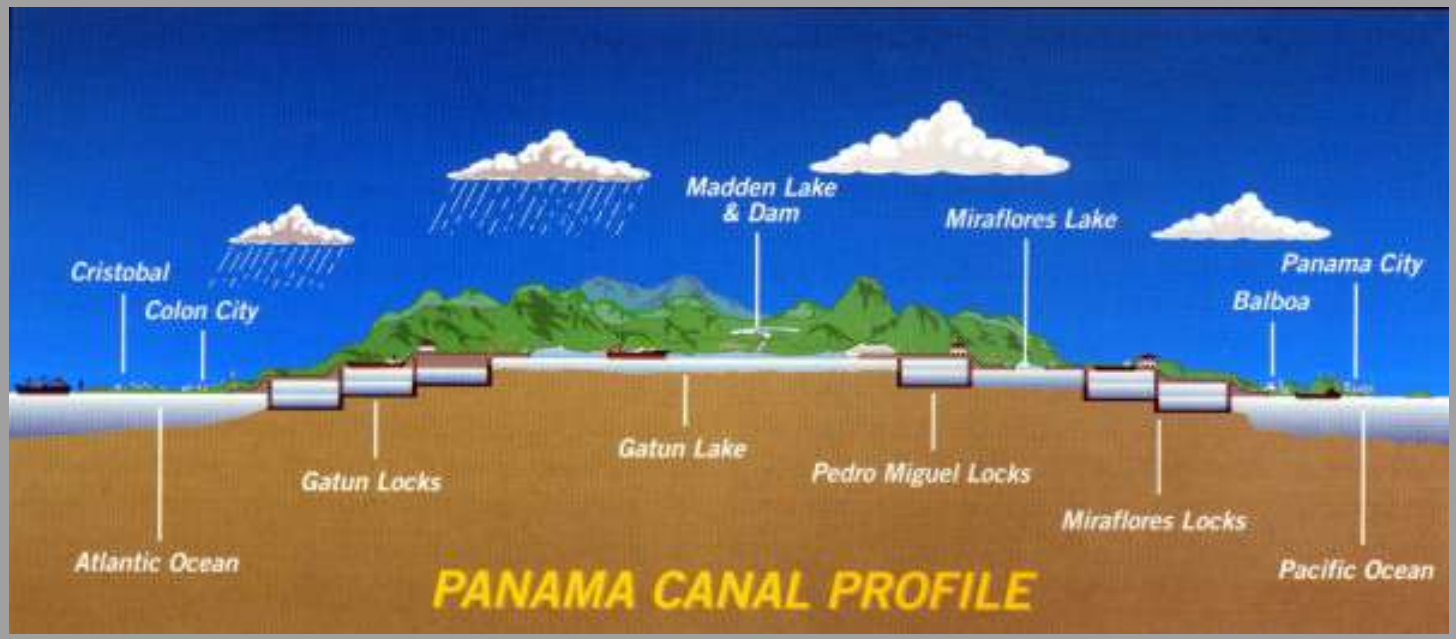
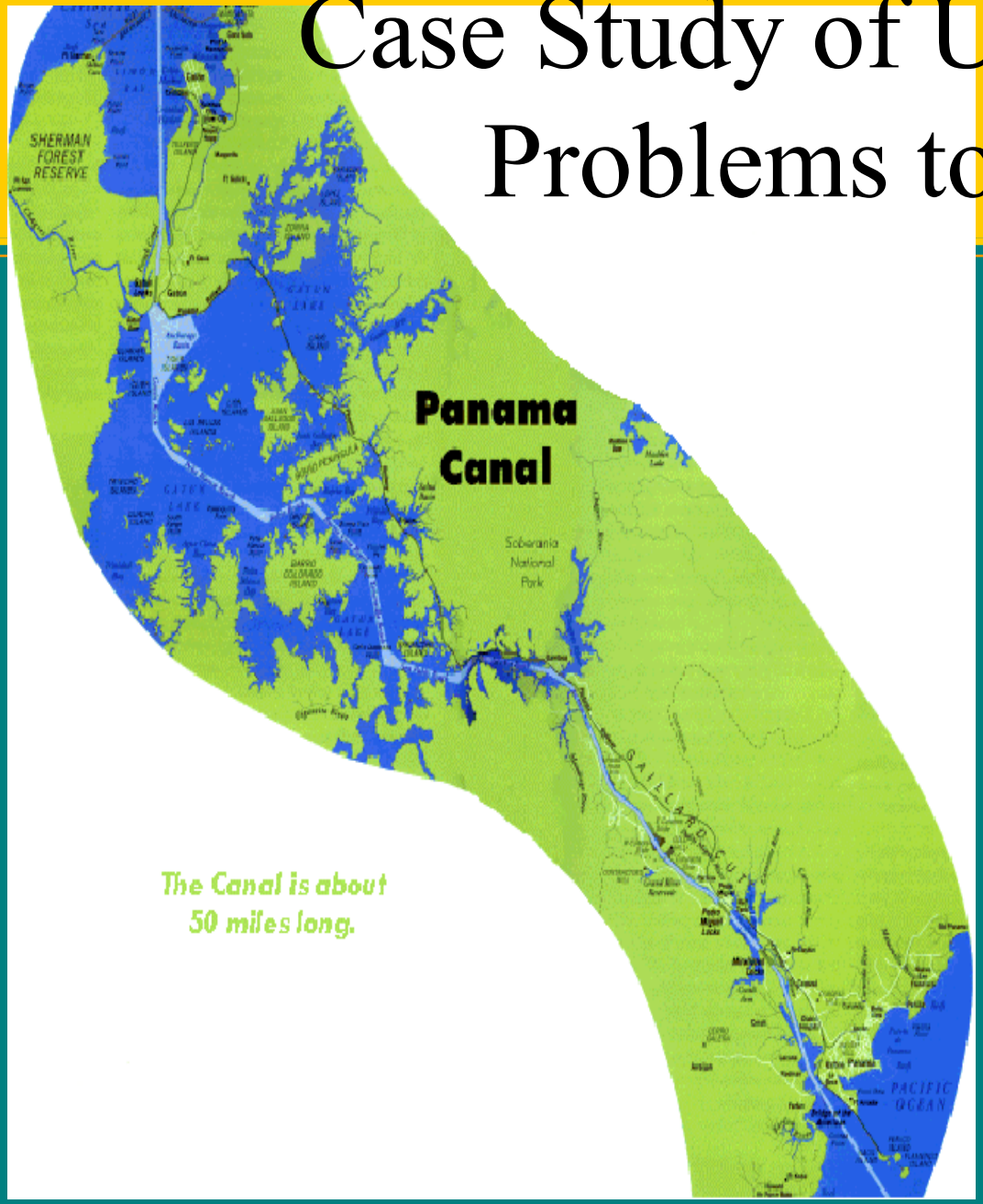
The Panama Canal:
"A Wonder of Work"



Joseph Pennell

"I looked down into a yawning gulf stretching to right and left, the bottom filled with crowds of tiny men and tiny trains … Overhead, huge iron buckets flew to and fro, great cranes raised or lowered huge masses of material…As I looked a bell rang, the men dropped their tools, and lines of little figures marched away, or climbed wooden stairs and iron ladders to the surface… It was perfect, the apotheosis of the Wonder of Work…"

Case Study of U.S. Policy and Problems to be Overcome



1. Political Problems

2. Geographical Problems

3. Other Natural Problems

Political Problem - Gran Columbia

In the 1820s, at the time of initial American interest in the Panama Canal, Panama was part of Gran Colombia.

Geographical Problems

Three major **geographical problems:**

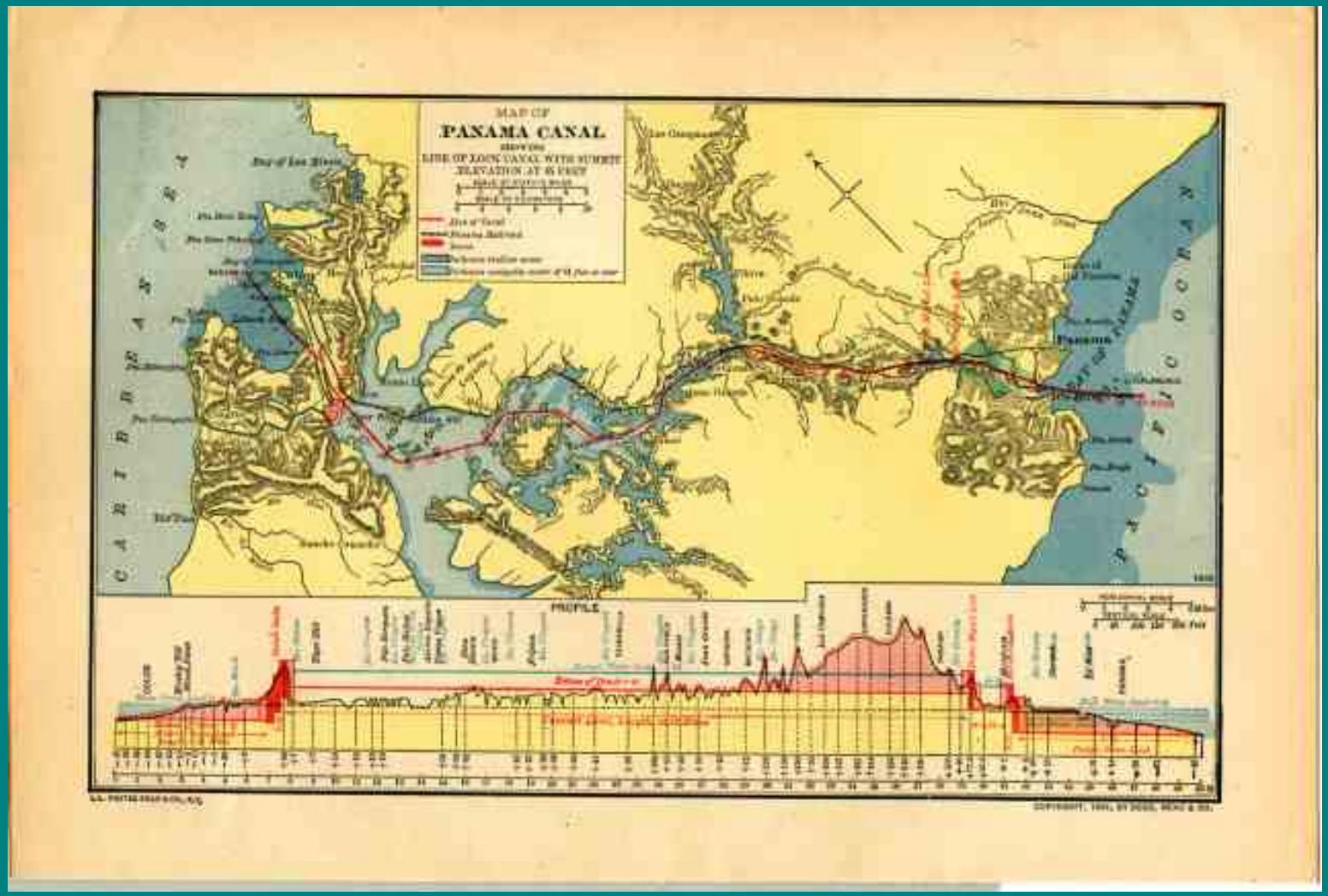
1. complex mountain range formation;
2. tropical jungles; and
3. complex topography

Complex Mountain Range Formation

Tropical Jungles

Tropical jungles with an average annual rainfall of 105 inches and average temperature of 80 degrees Fahrenheit

Complex Topography



The Other Natural Problem: Disease - the "killer" obstacle

How did the Americans overcome these political and geographical obstacles and, in so doing, create the "Wonder of Work" that Pennell observed in 1912?

The Americans created a water crossing from the Atlantic Ocean at Colon – the eastern mouth of the Canal - to the Pacific Ocean ending at Panama City – the western mouth of the Canal. With the Canal's completion, cargo and passenger ships no longer had to make the over 13,000 mile trip through the rough waters of Cape Horn.

The Canal Passage

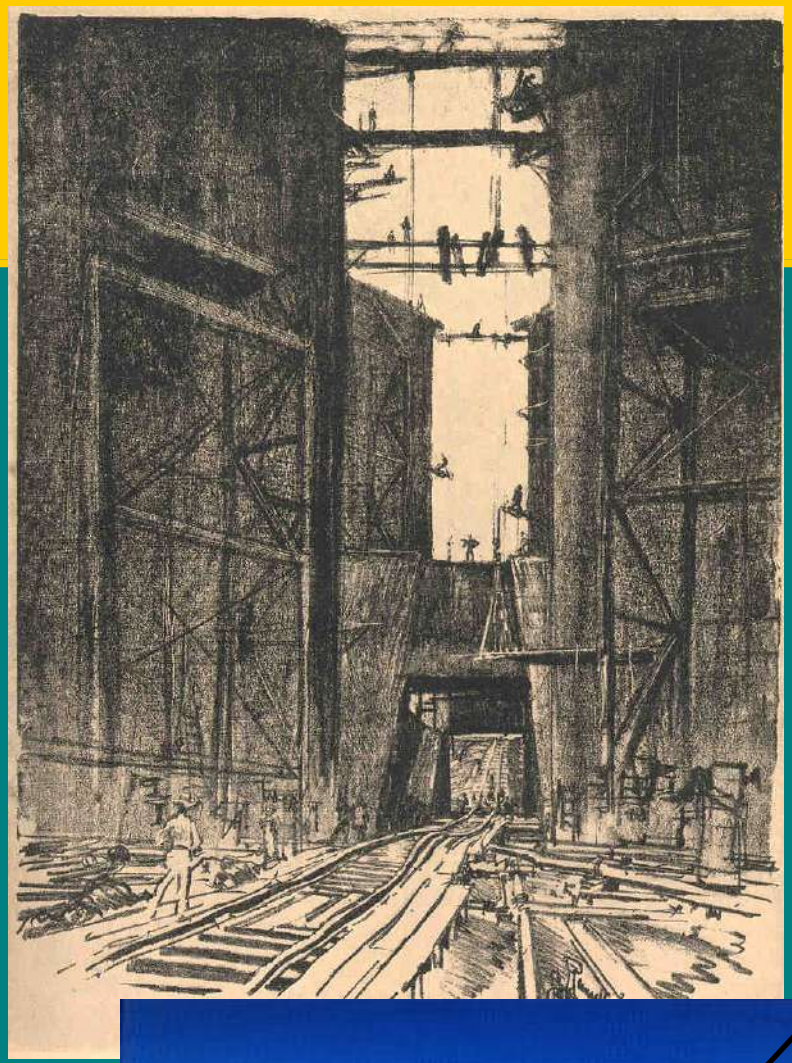
Colon

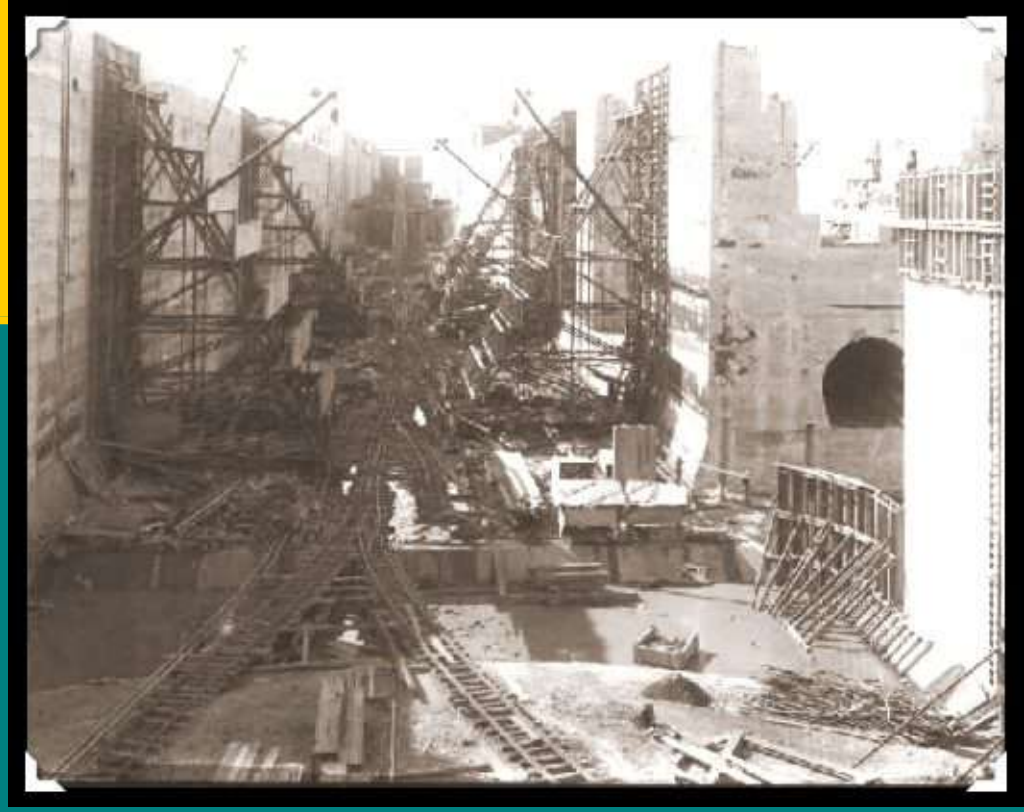
Panama City

Take the Journey

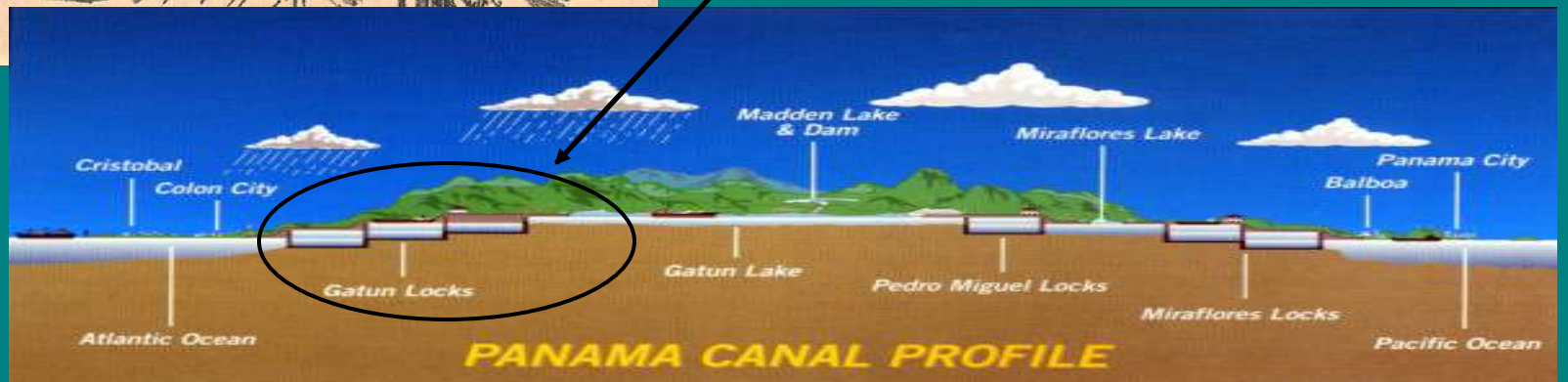
Click the link: Take the Journey
To take the journey across the Panama Canal
We will begin on the Pacific Ocean side of the canal;
travel east to the Atlantic Ocean .

Pennel began his artistic journal through the Canal from the Atlantic Ocean at Colon where American Canal employees lived in wooden bungalows. According to Pennell, the bungalows were "…built of wood, painted white, and completely screened with wire gauze, rusted black by the dampness, a protection from mosquitoes and other beasts, bugs, and vermin."

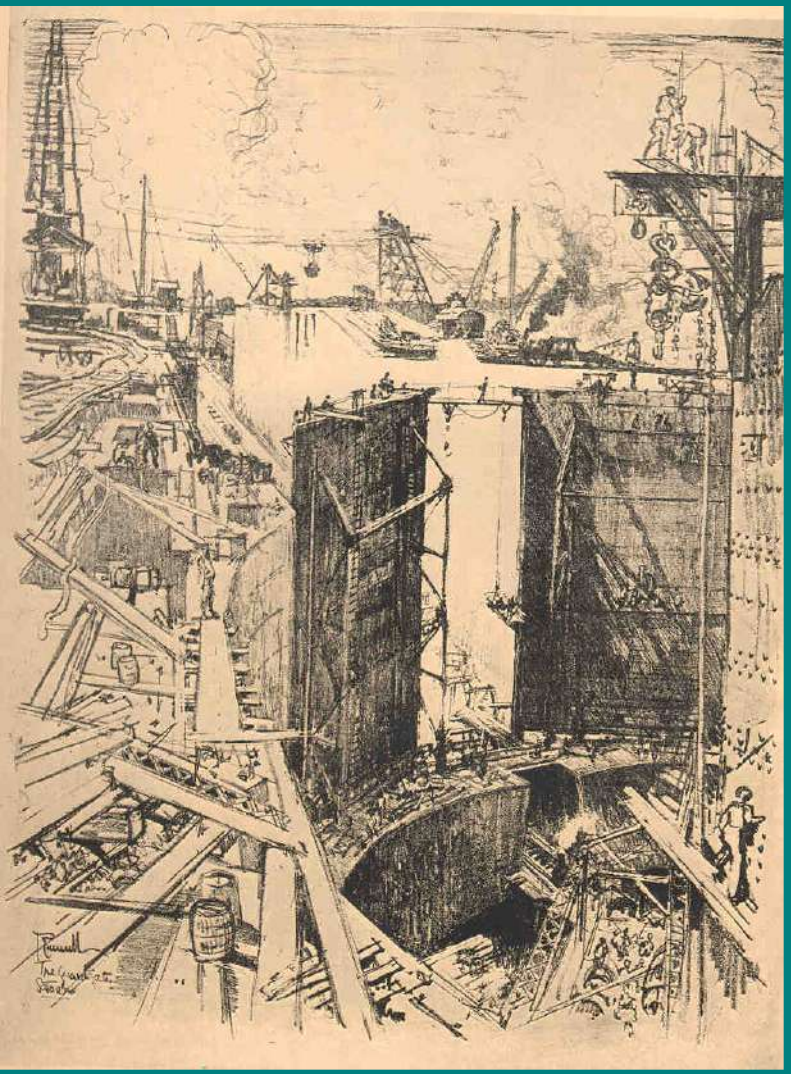




Gatun Locks

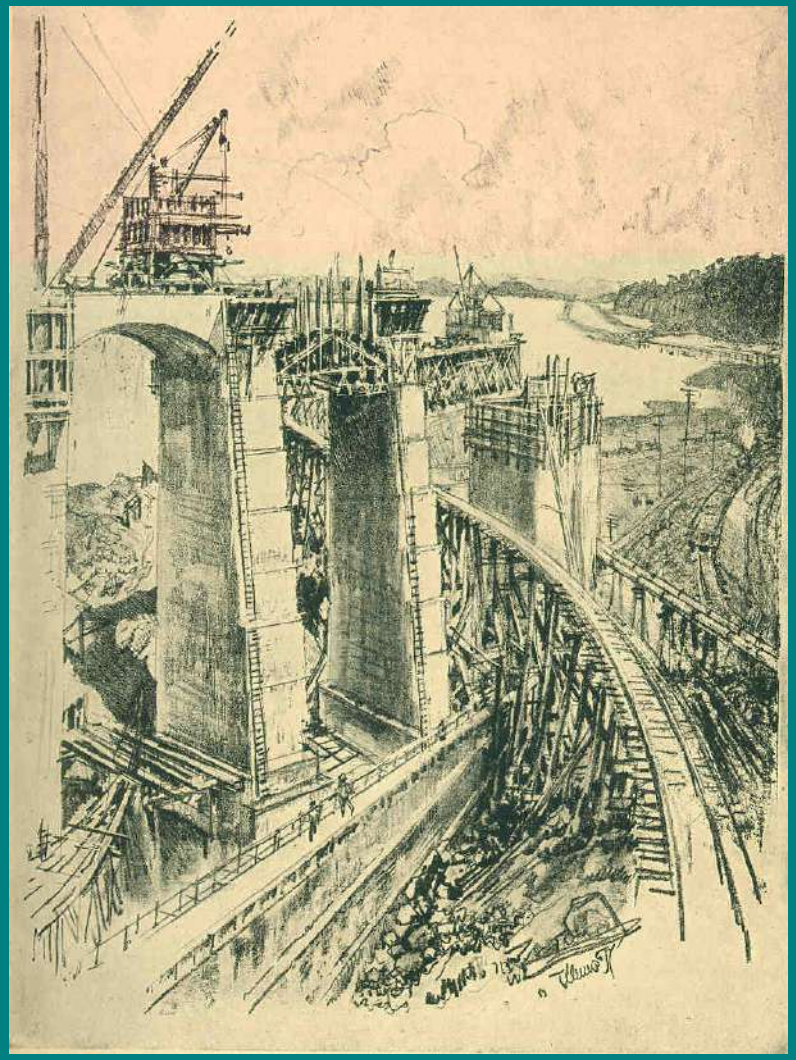

Cristobal
Colon City
Madden Lake & Dam
Miraflores Lake
Panama City
Balboa
Gatun Locks
Gatun Lake
Pedro Miguel Locks
Miraflores Locks
Atlantic Ocean
Pacific Ocean
PANAMA CANAL PROFILE

The Guard Gate, Gatun

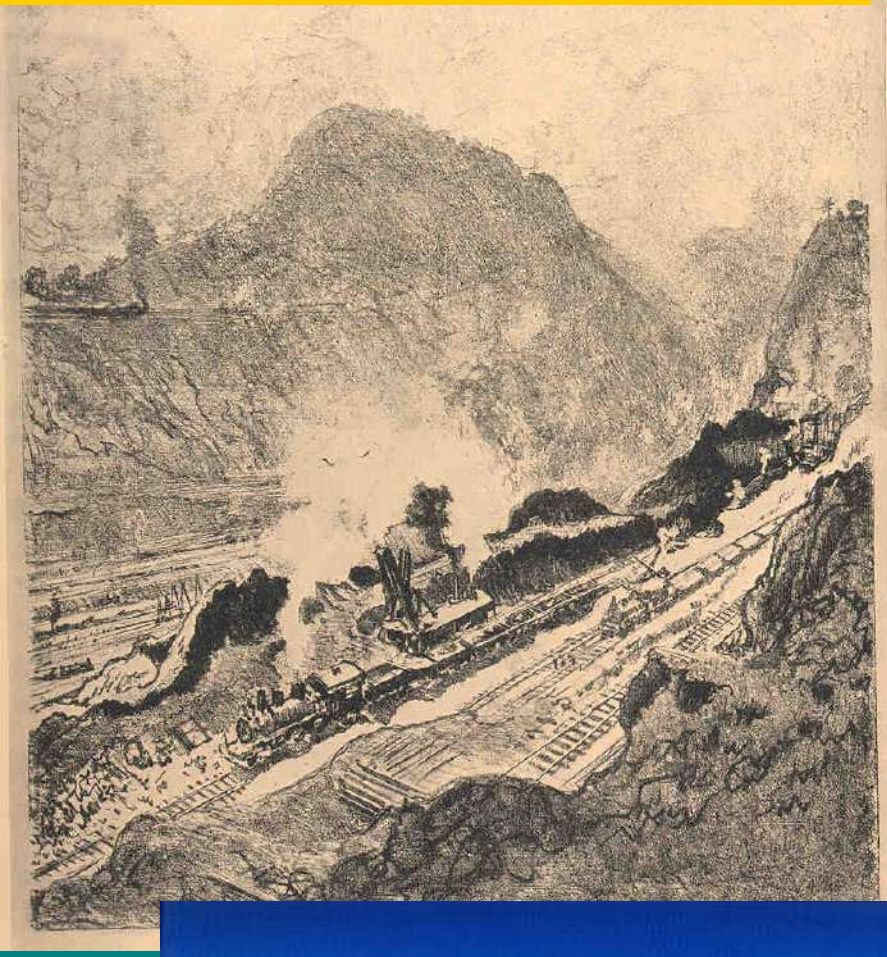


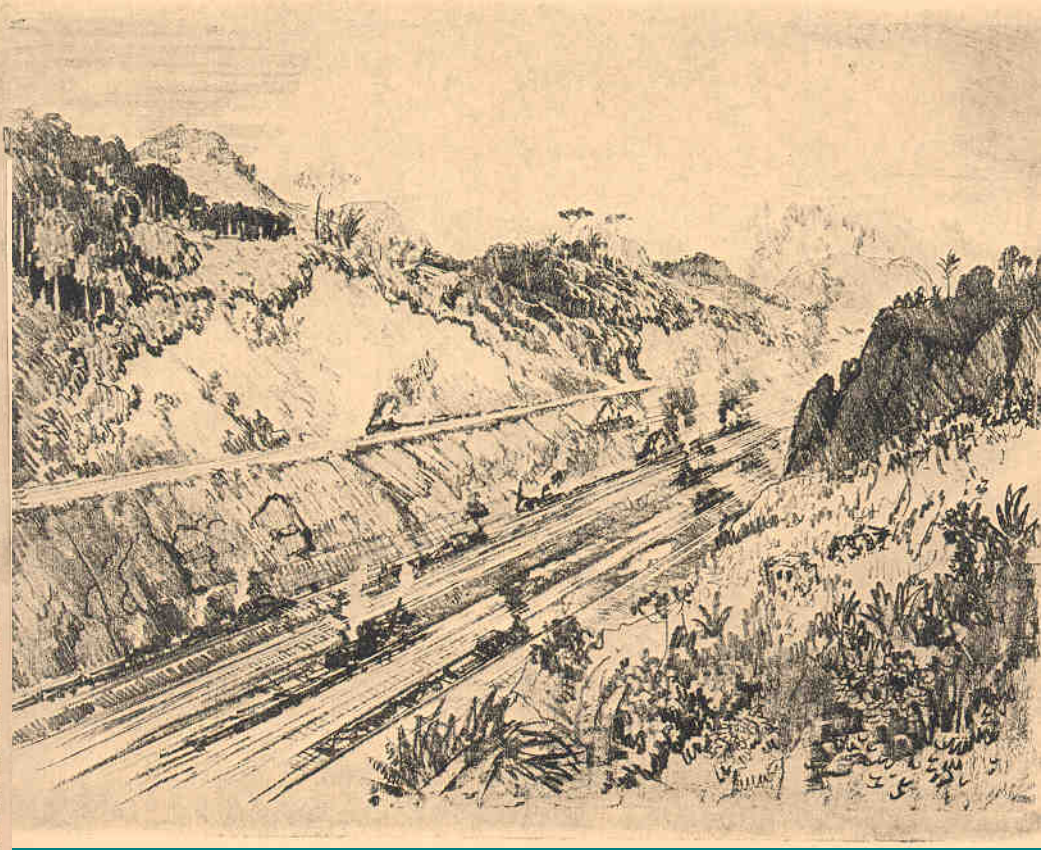
Pennell noted the "magnificent arrangements" of the Gatun gates. He wrote: "I have never seen such a magnificent arrangement of line, light and mass…great work is great art, and always was and will be. This is the Wonder of Work."

Construction of Gatun Lock

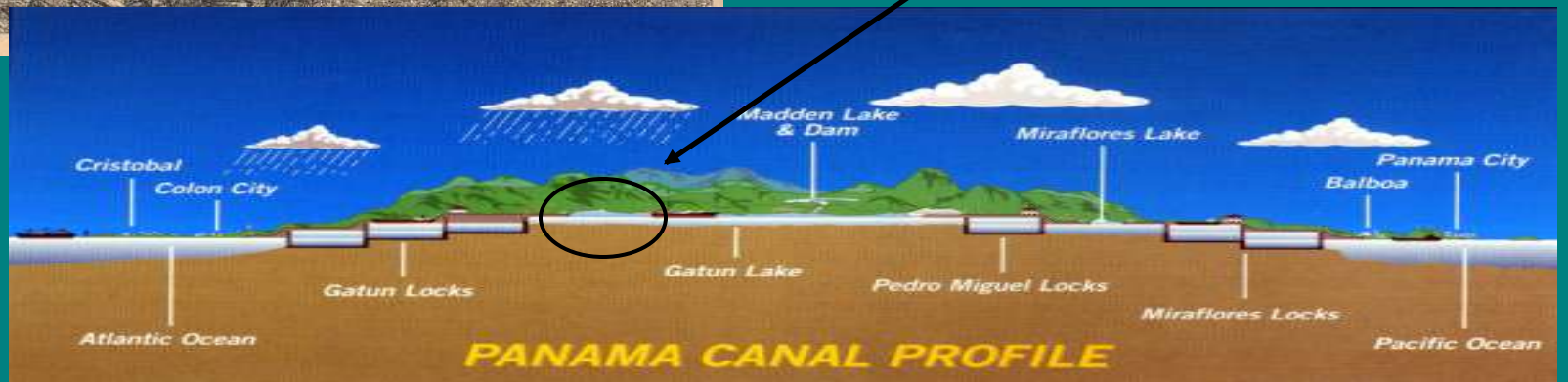


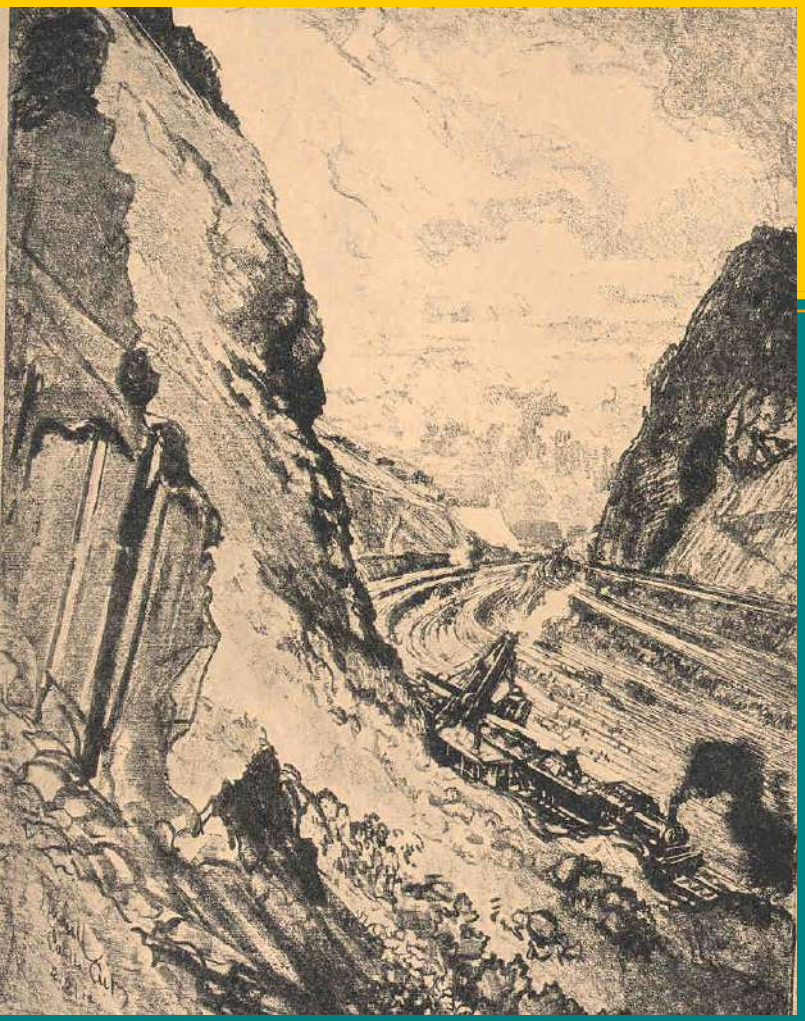
The Culebra Cut at Bas Obispo



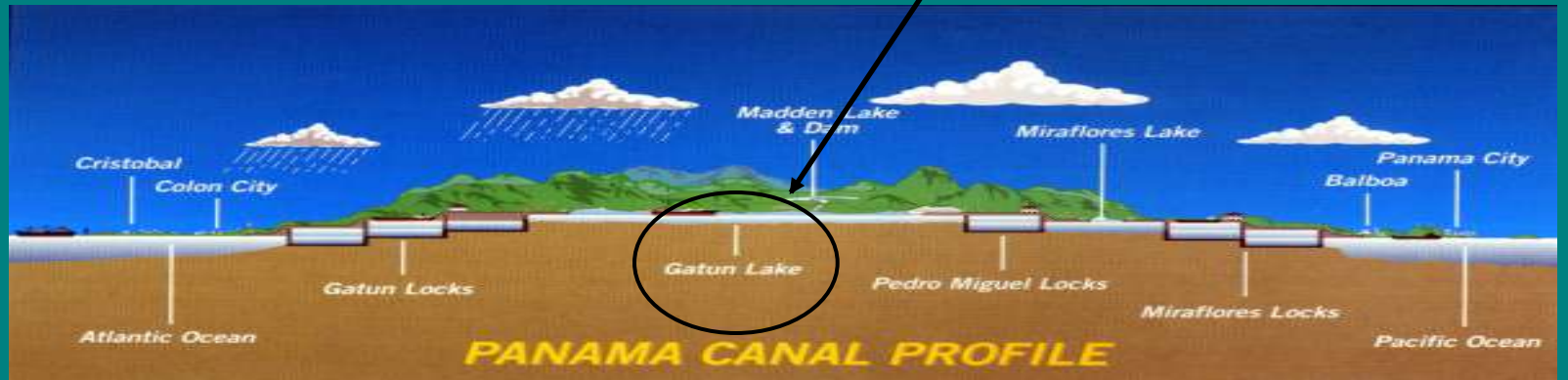


The Culebra Cut at Las Cascadas





Gatun Lake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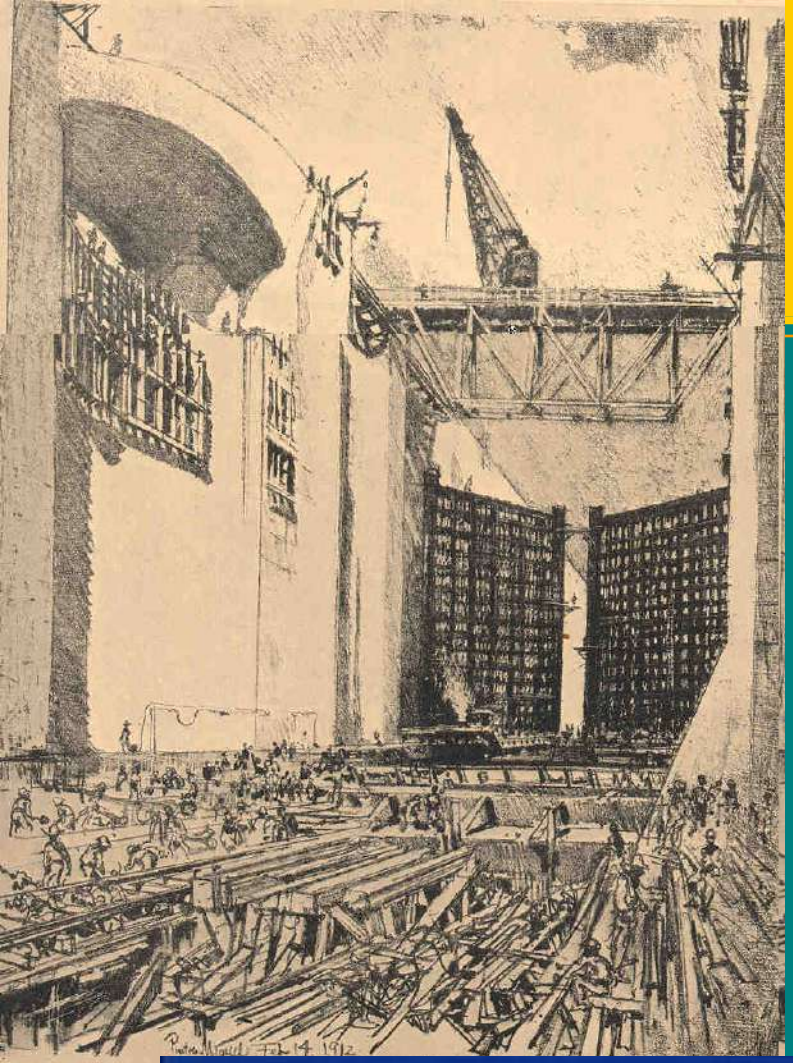
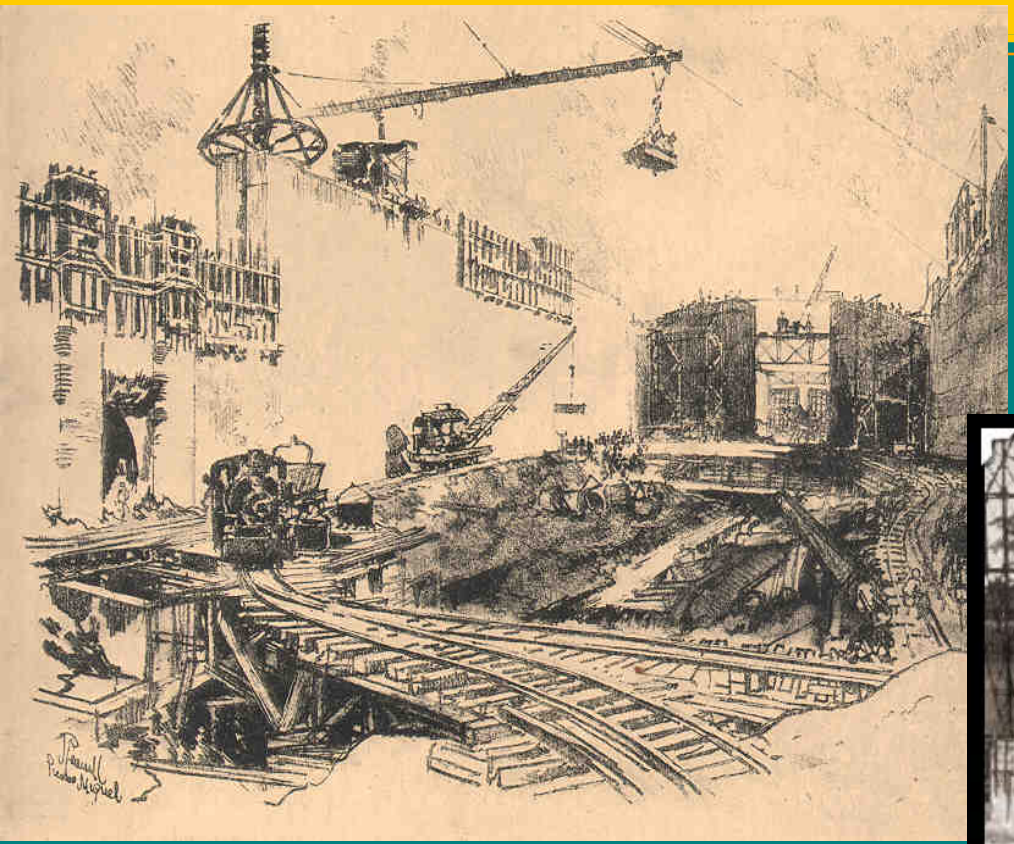
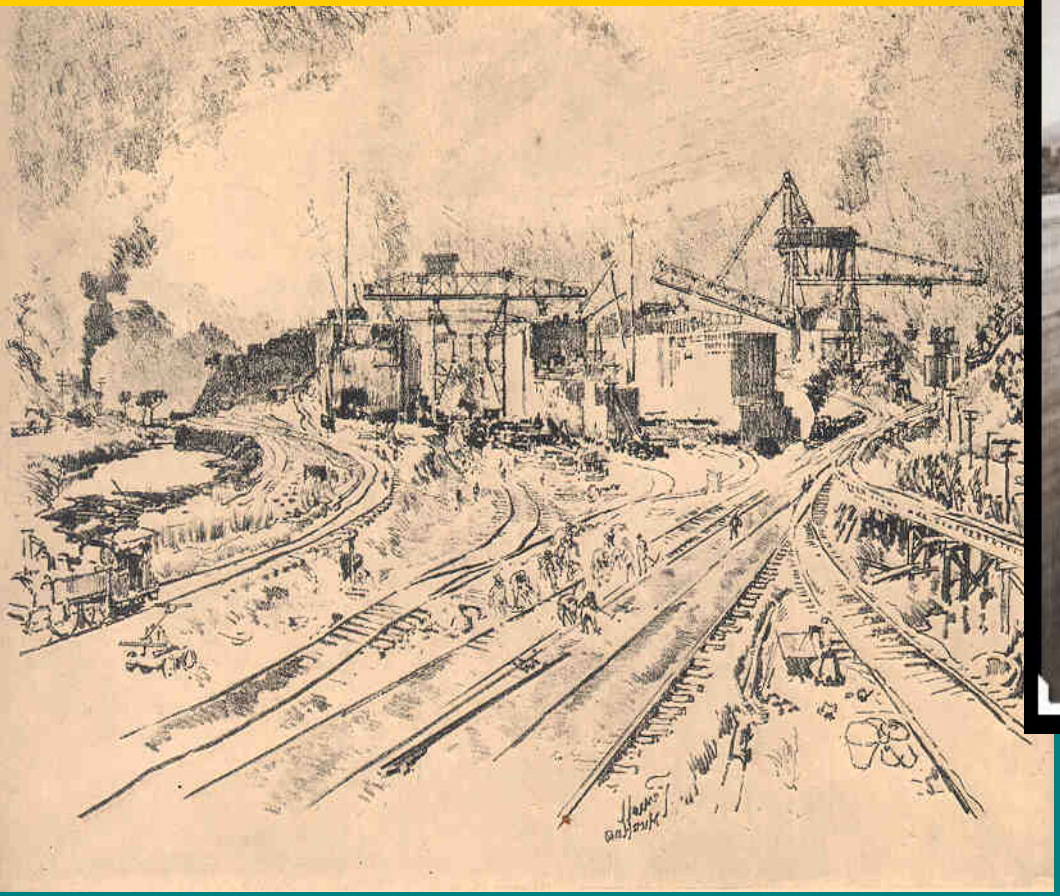


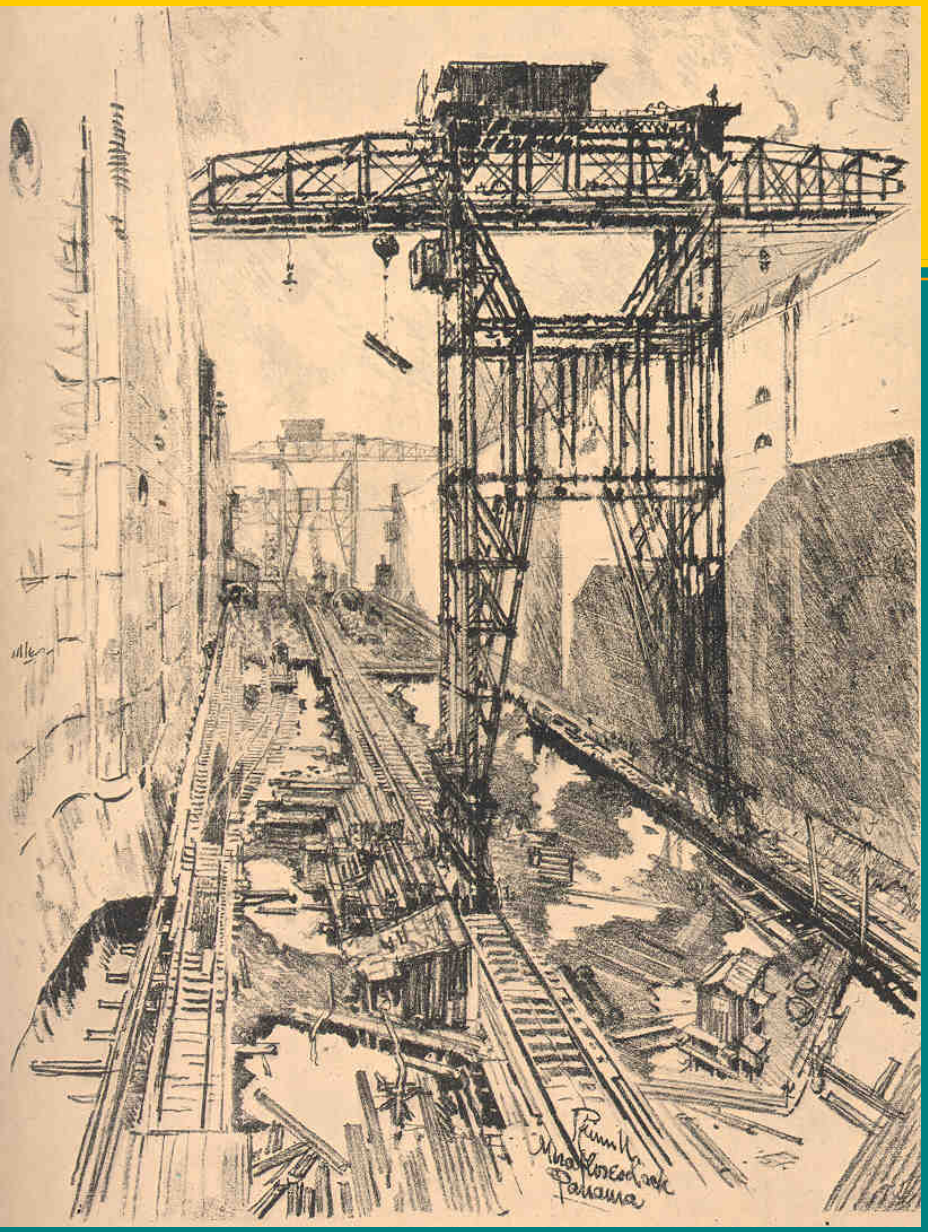
Pedro Miguel Locks

Pennell was also impressed with the walls of the Pedro Miguel Locks





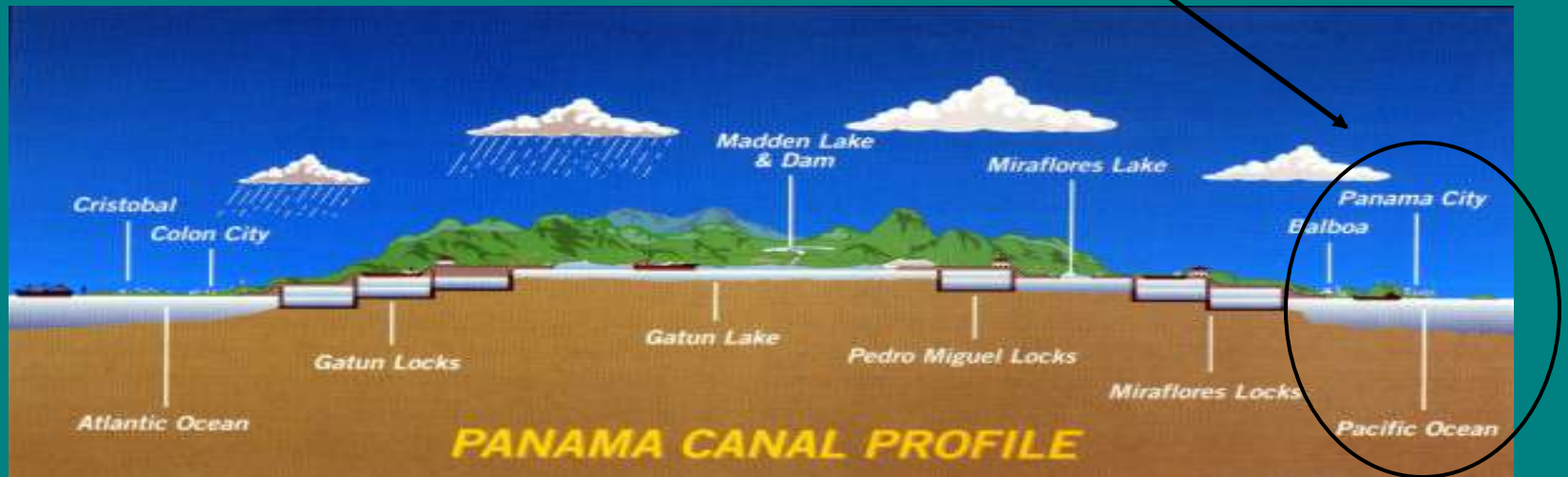
Miraflores Locks



Pennell was fascinated by the giant cranes at Miraflores Locks.

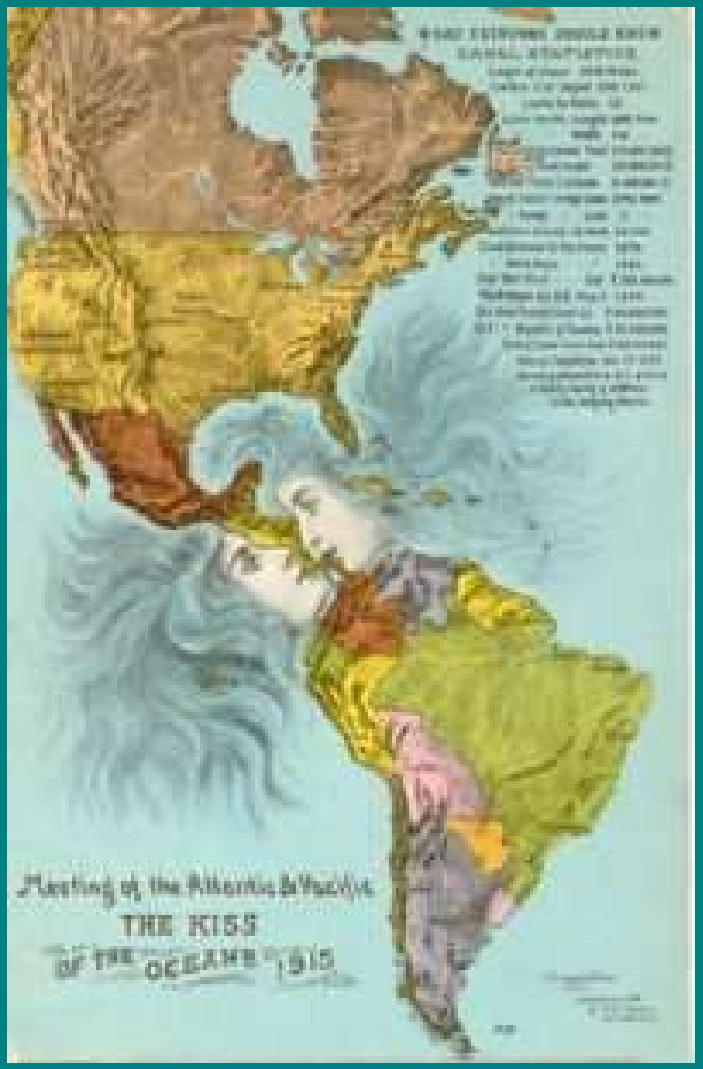
Panama City

The entrance to the Pacific Ocean at Panama City



“The Kiss of Oceans”

The Canal opened for operation in 1914, completing what one artist called the “Kiss of Oceans.”



Technological Fact #1

Upon the Canal's completion, a ship traveling from New York to San Francisco saved 7,872 miles by using the Panama Canal instead of going around South America. The average time spent in transit from port to port is approx. 8 - 10 hours.

Technological Fact #2

Between 1904 and 1913, a total of 56,307 people worked on the construction of the waterway. Of these, 11,873 were Europeans, 31,071 were from the various Caribbean nations, 11,000 were American, and 69 were not classified.

Technological Fact #3

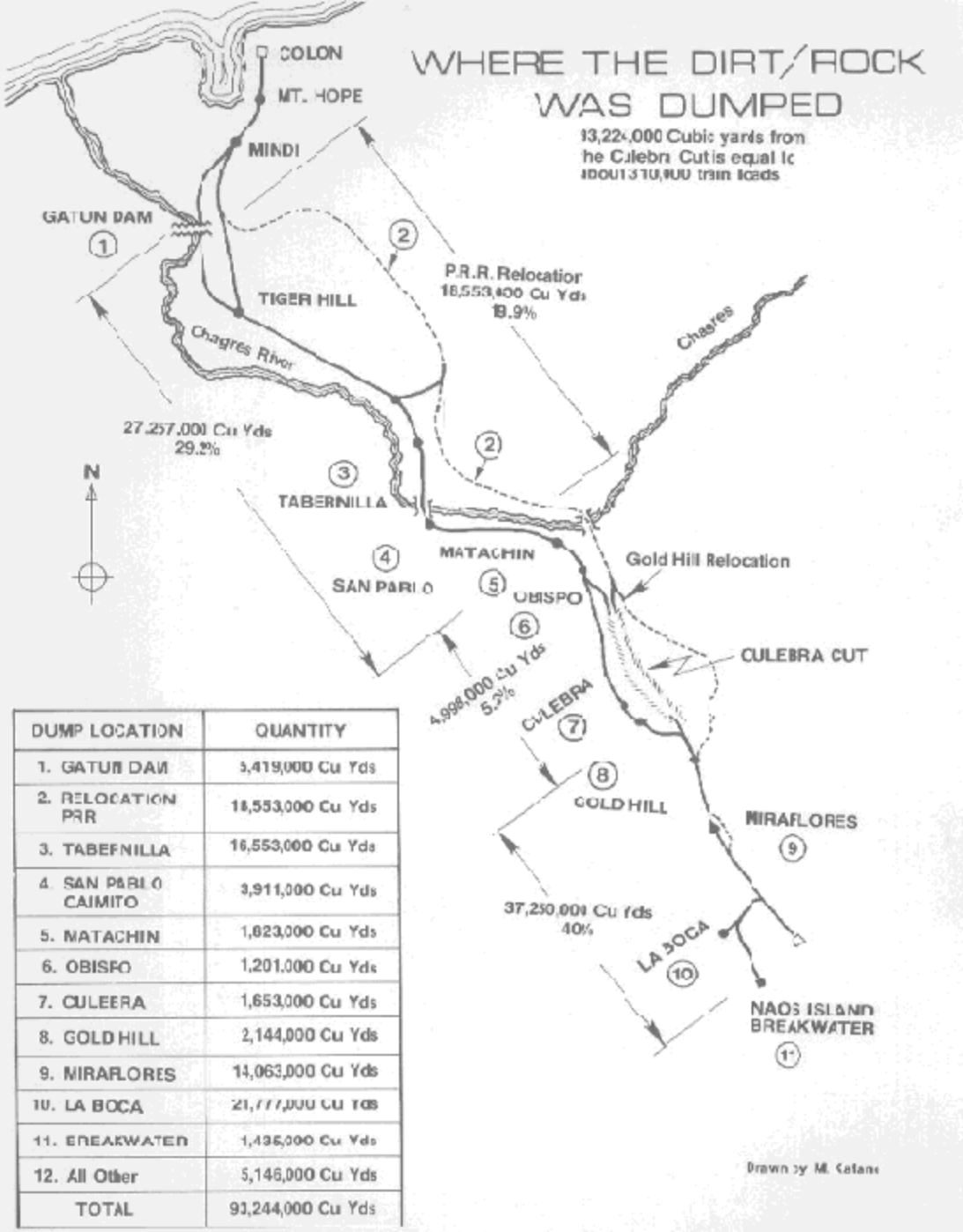
Construction costs for the Canal reached approximately $352 million. When including the $10 million paid to Panama, the $40 million paid to the French company, and the money previously invested by the French, the total expenditures were about $639 million.

Technological Fact #4

During the US construction period, 232 million cubic yards of earth were removed. This quantity, added to the 30 million removed by the French, provide an approximate of 262 million total cubic yards of earth. How to dispose of the excavated material was an important aspect of the excavation.

Technological Fact #5

Millions of cubic yards were deposited in the jungles of Panama. The biggest dumps were in Miraflores, Gatun, Tabernilla and Balboa.



DUMP LOCATION	QUANTITY
1. GATUN DAM	3,419,000 Cu Yds
2. RELOCATION PRR	18,553,000 Cu Yds
3. TABERNILLA	16,553,000 Cu Yds
4. SAN PABLO CAIMITO	3,911,000 Cu Yds
5. MATACHIN	1,623,000 Cu Yds
6. OBISPO	1,201,000 Cu Yds
7. CULEBRA	1,653,000 Cu Yds
8. GOLD HILL	2,144,000 Cu Yds
9. MIRAFLORES	14,063,000 Cu Yds
10. LA BOCA	21,777,000 Cu Yds
11. BREAKWATER	1,436,000 Cu Yds
12. All Other	5,146,000 Cu Yds
TOTAL	93,244,000 Cu Yds

Technological Fact #6

The highest Canal toll ever recorded by $ 141,344.91 paid by the *Crown Princess* and the lowest toll ever paid was 36 cents by Richard Halliburton for swimming the Canal in 1928.

Technological Fact #7

By 2006, the Panama Canal was maxed out.

In October, the country's voters approved a $5.25 billion plan to expand and modernize the canal. The project will include:

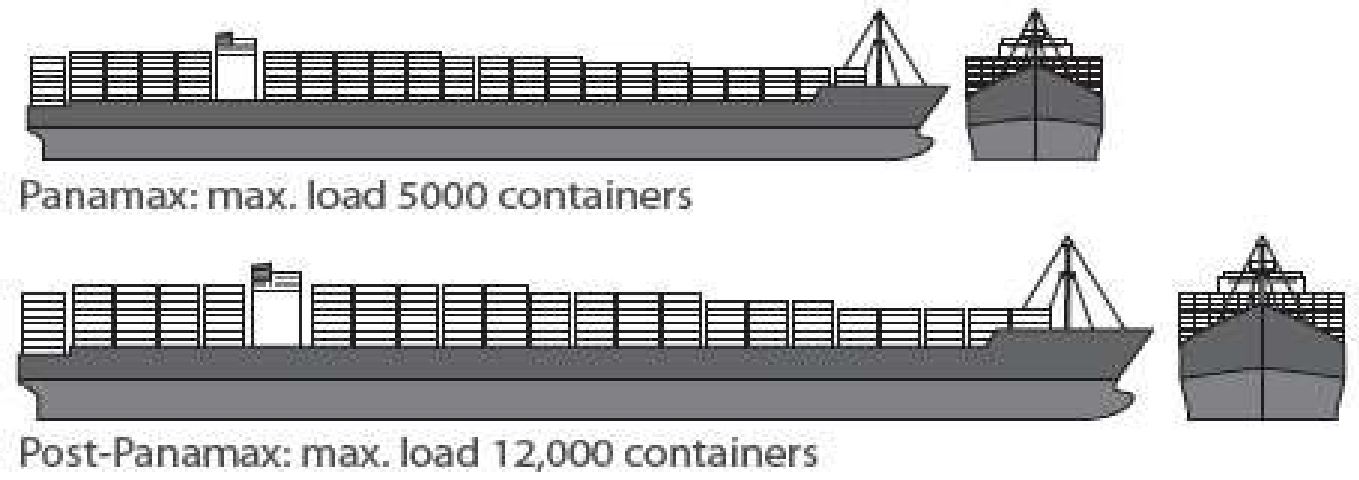
- two new sets of single-lane, three-step locks — one set at the Atlantic entrance and one at the Pacific;
- two new navigational channels to connect the new locks to existing channels; and
- deeper, wider versions of existing shipping lanes.

Tight Fit…

In the current canal locks, ships have a clearance of about 2 ft. on either side.

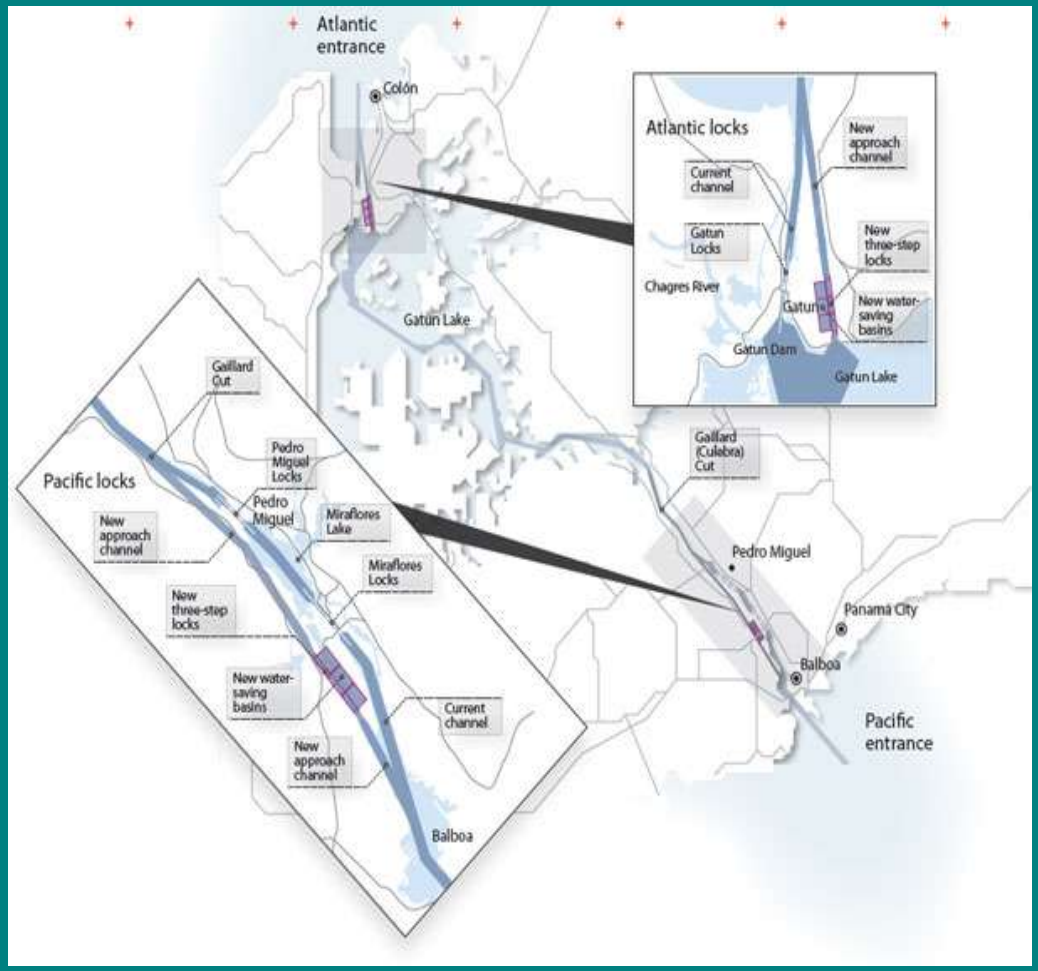
Larger Traffic Lanes

In all, canal crews will dredge 130 million cubic meters of rock and soil, enough to fill the Empire State Building nearly 130 times. The new traffic lane will be large enough to accommodate larger, more modern, ships and will double the canal's capacity.



Updates on the Panama Canal began in 2007.

To connect those locks to existing shipping lanes, nearly 5 miles of channels will be excavated. The current route through Gatun Lake will also be deepened by 5 ft. and widened, from today's 500 ft. minimum, to 920 ft. on straightaways and 1200 ft. in the turns. Gatun Lake will then be raised 1.5 ft., providing an extra 550 million gallons of water each day for the locks and alleviating concerns that canal expansion will tax water supplies.



…and
the “Wonder of Work”
lives on!