Welcome to the North Dakota-Minnesota Subsurface Drainage Forum

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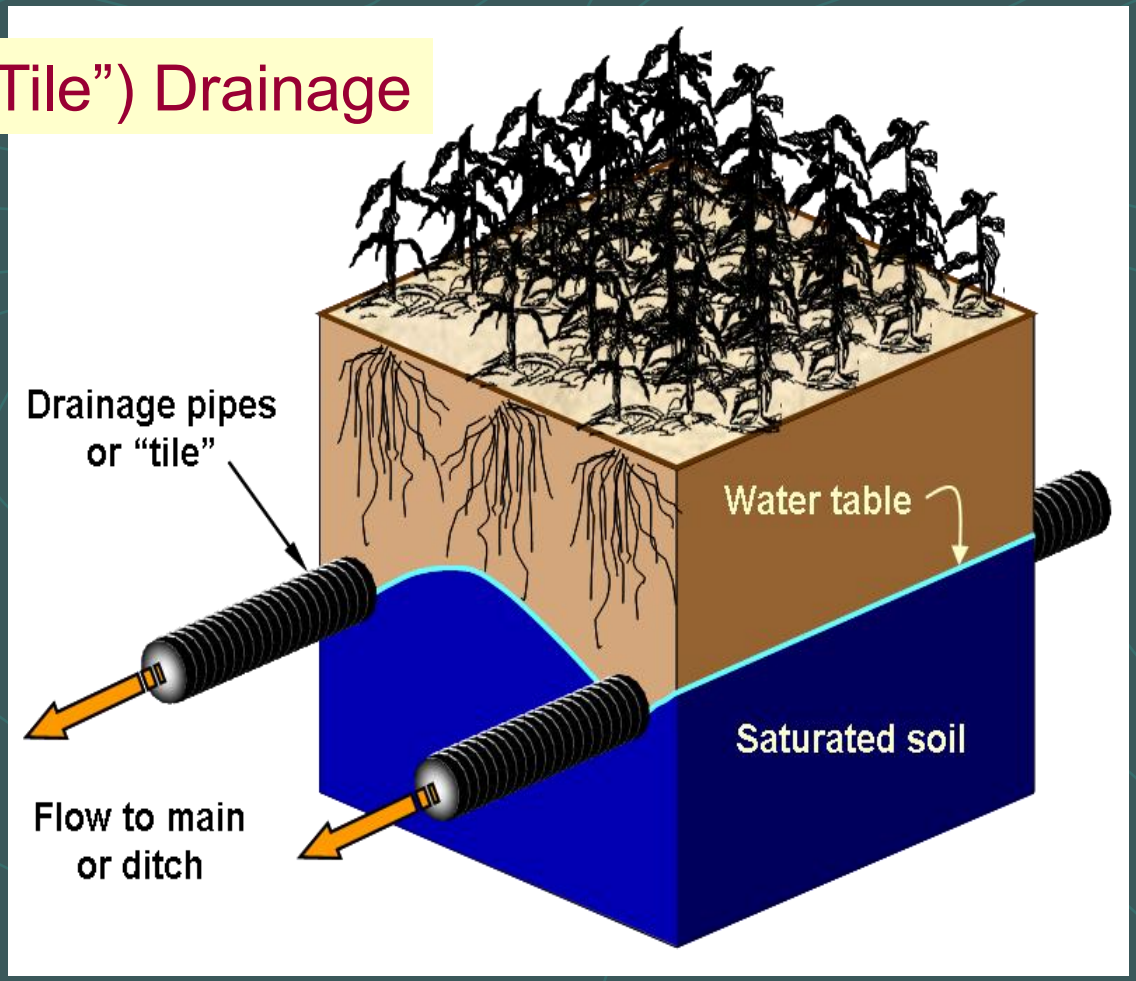
Controlling Soil Water in the Crop Root Zone on Agricultural Fields

Subsurface ("Tile") Drainage



Slide courtesy of Dr. Gary Sand

Subsurface or Tile Drainage Can:

- Control water table
- Reduce salt accumulation in the soil
- Maximize root growth
- Increase yields
- Improve timeliness of field operations

Subsurface Drainage: A Brief History

Thomas F. Scherer
NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu
(701) 231-7239

Salt Accumulation from High Water Table

Drainage: An Ancient Practice

- Use of buried clay pipe as old as art of pottery
  - Some dated on the island of Crete to 5,000 B.C.
- Farmers in ancient Egypt and Babylonia drained wet soils for crop production
- Roman author, Cato, wrote in 200 B.C. extensively on farm drainage as practiced by Roman farmers
- First subsurface drains were converted ditches (Roman times)
- Some archeological evidence that Inca's and Mayan's used subsurface drainage

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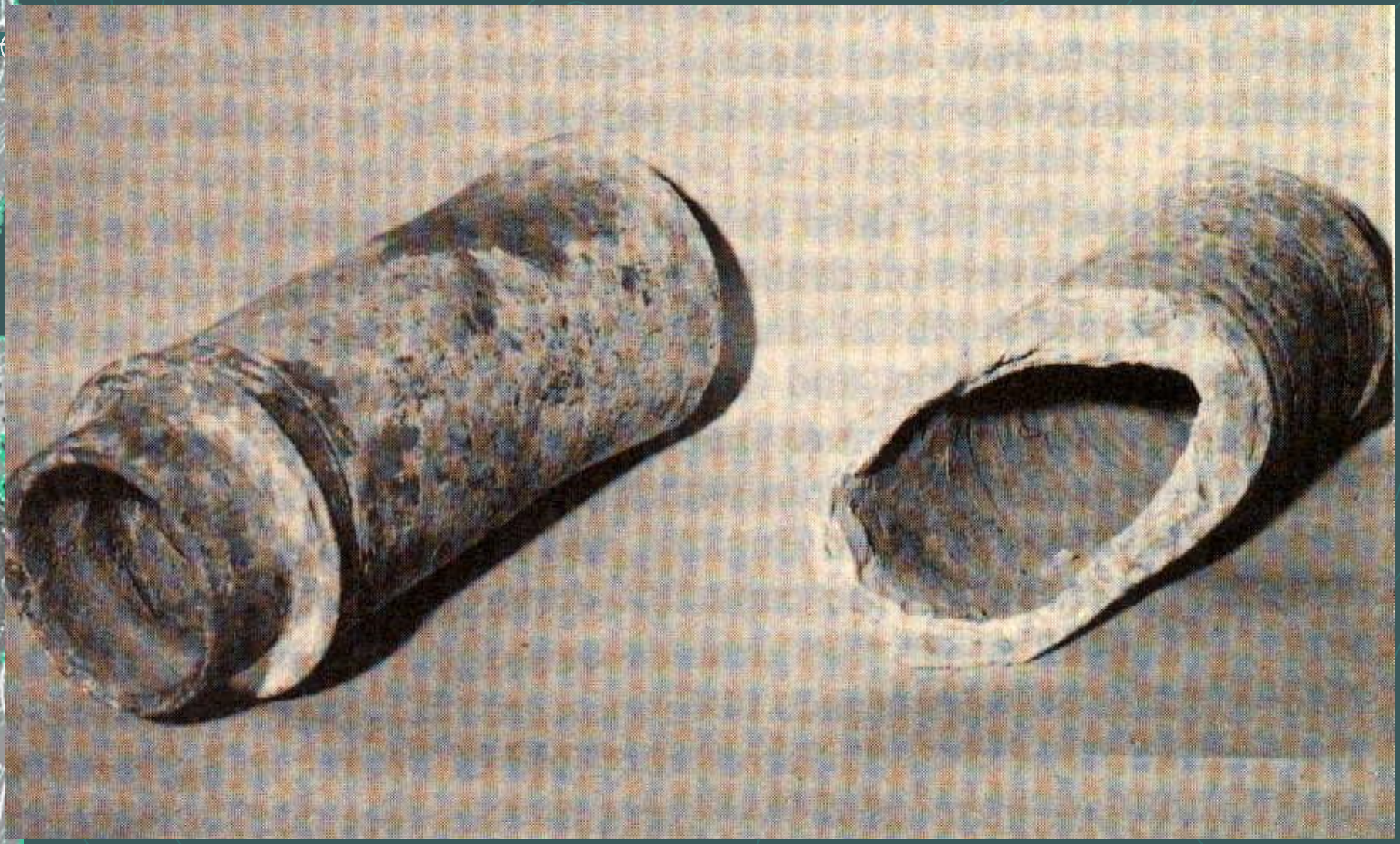
Clay Tile Dating to 1 A.D.



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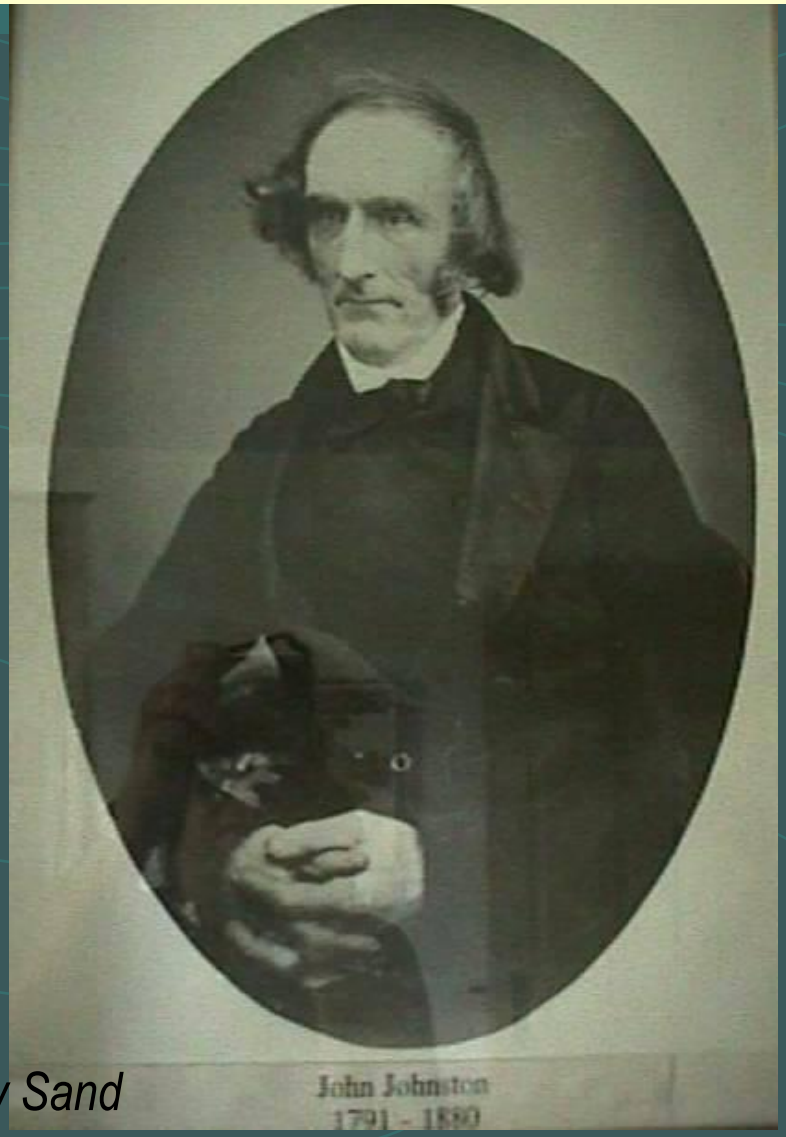
John Johnston, brought the idea of draining with tiles from Scotland to the United States in 1835.



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Drainage: In the United States

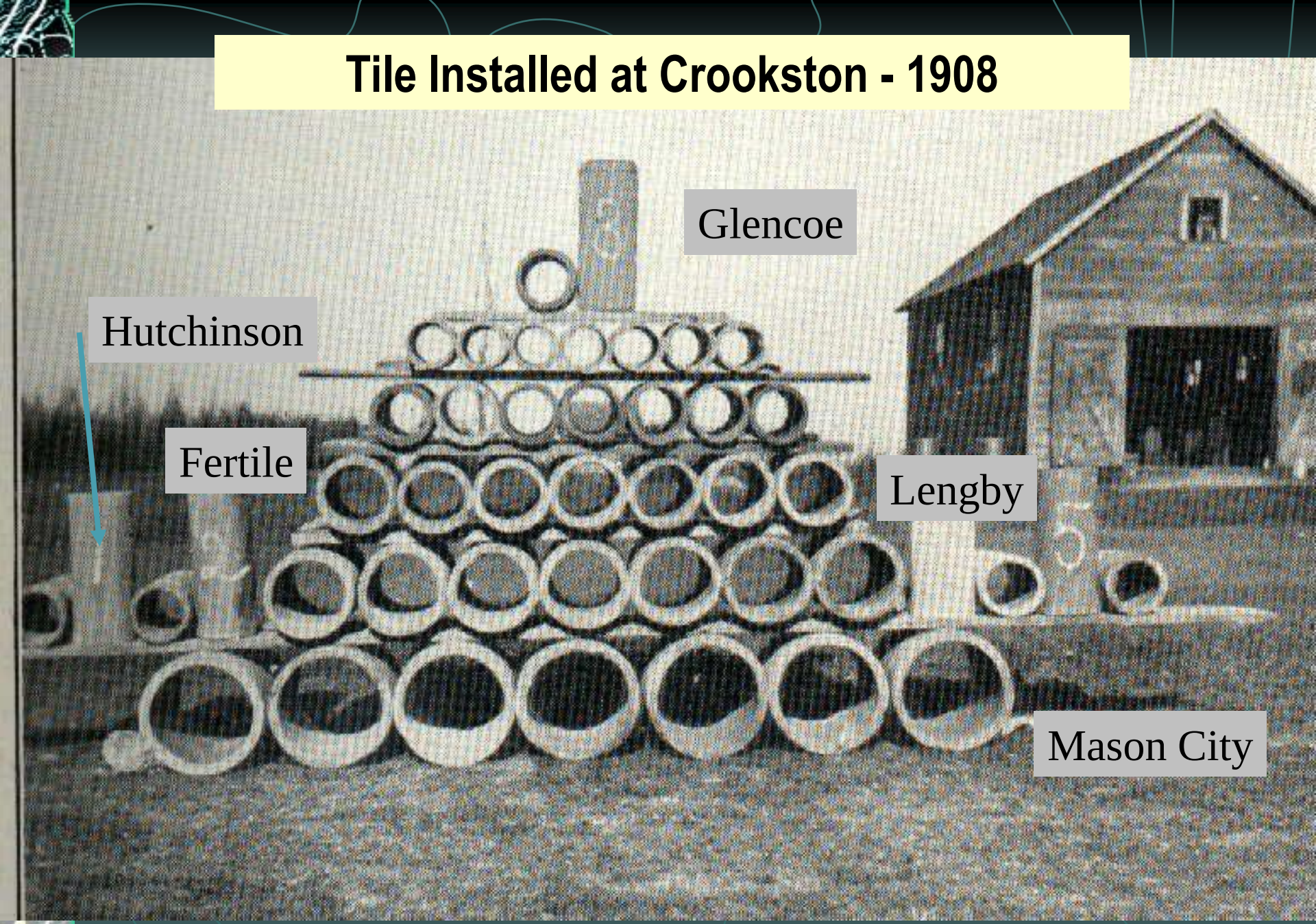
- 1835 - First tile drainage in United States
- 1858 - 856 acres of Central Park in New York were tile drained
- Mole “ditchers” were developed and used extensively in the 1800’s
- In addition to circular tile; wooden poles, field rock and other materials were buried in the trench to convey subsurface water to an outlet

Slide courtesy of Dr. Gary Sand

350 different kinds of tiles

Slide courtesy of Dr. Gary Sand

Tile Installed at Crookston - 1908



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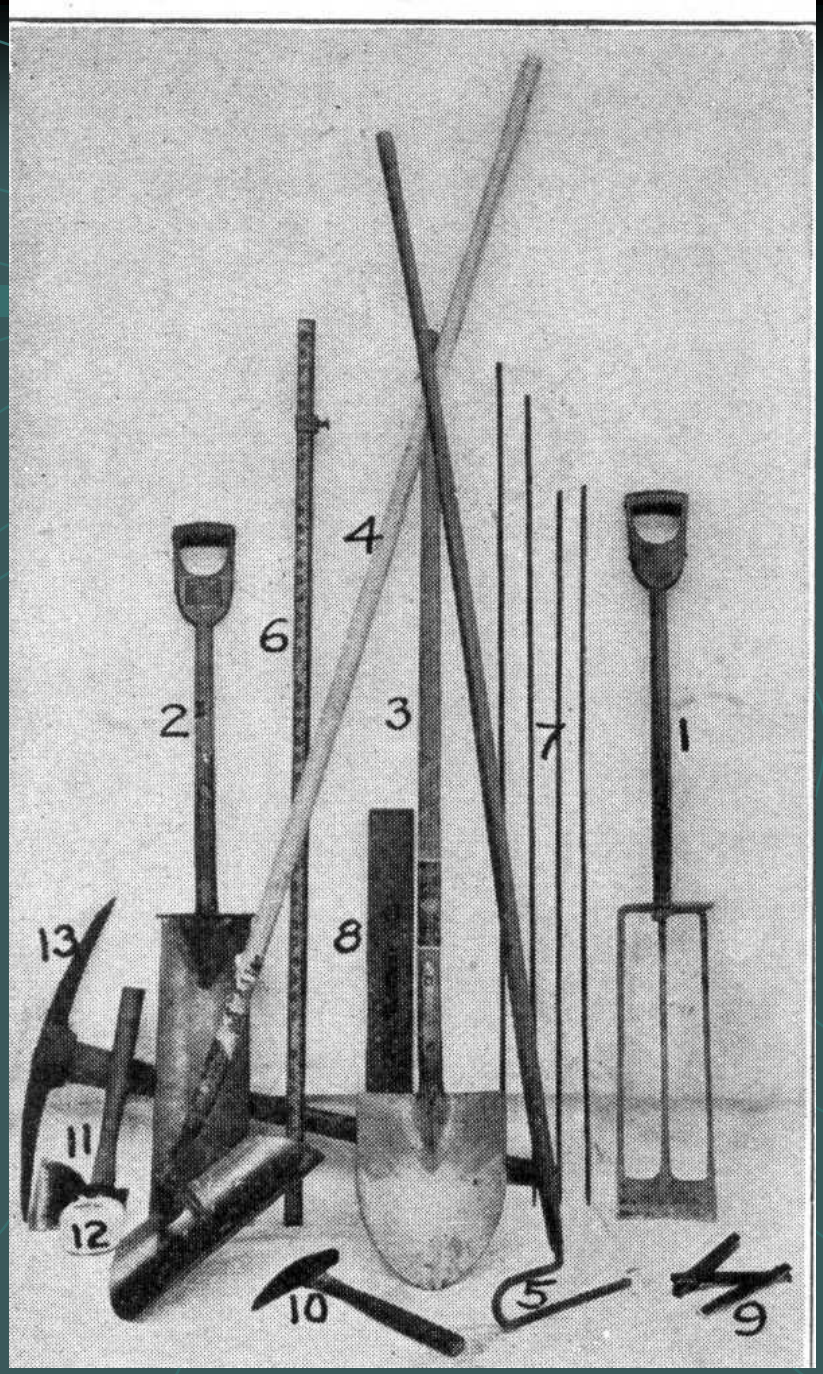
Hand Tools Used for Installation of Tiles



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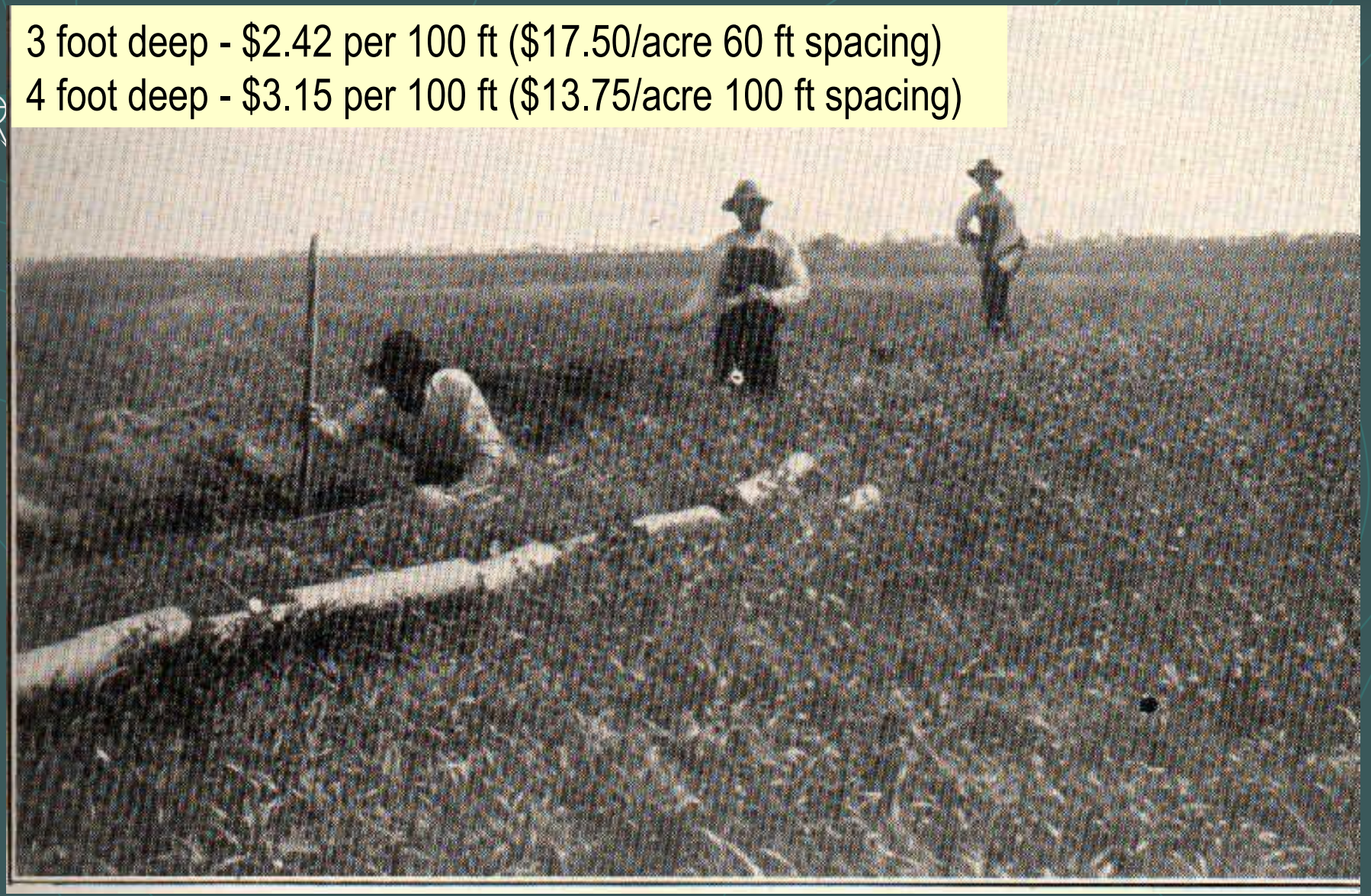
Hand Installation of Tiles at Crookston

3 foot deep - $2.42 per 100 ft ($17.50/acre 60 ft spacing)
4 foot deep - $3.15 per 100 ft ($13.75/acre 100 ft spacing)



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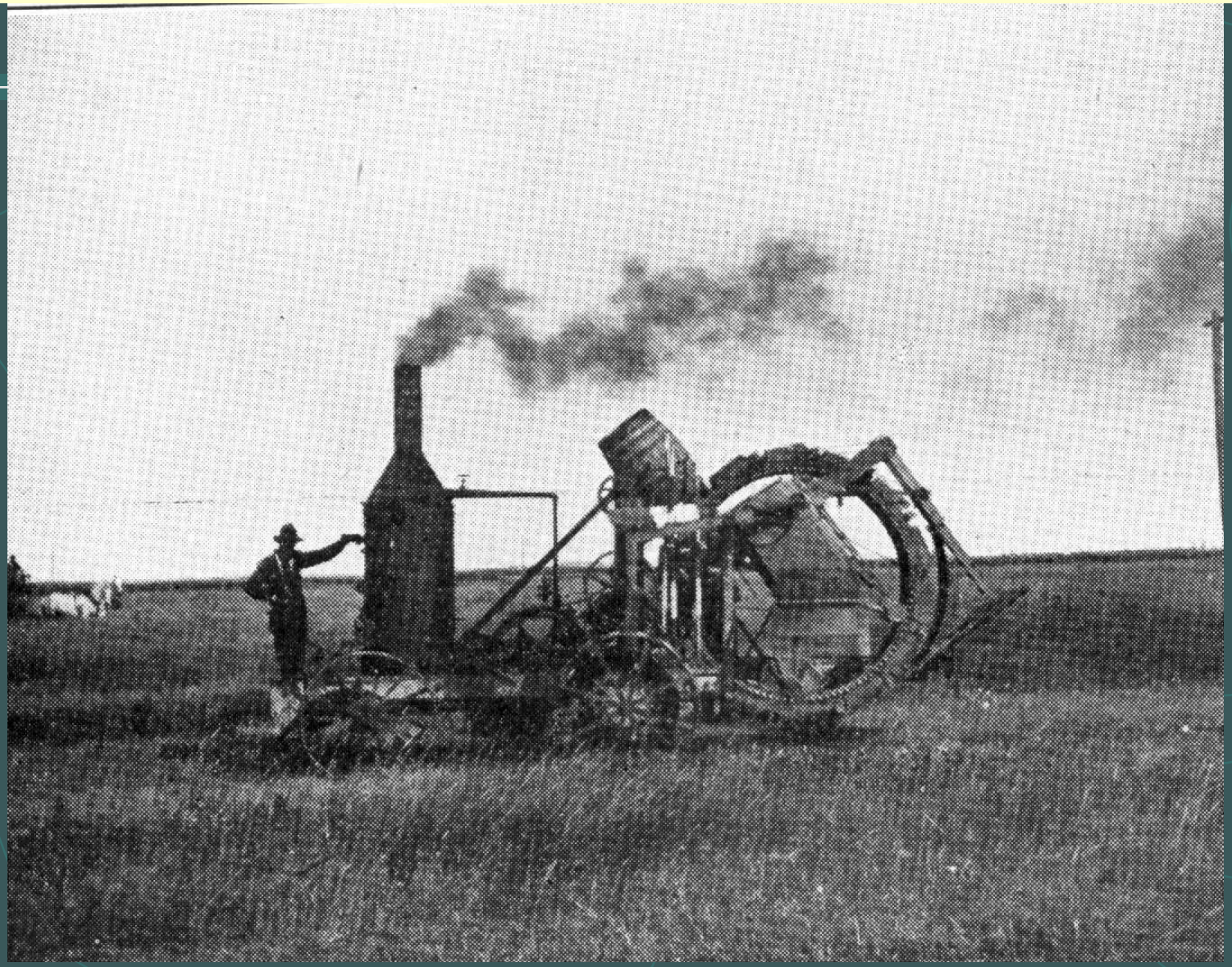
Machine Trenching at Crookston
Average cost - $1.24 per 100 ft



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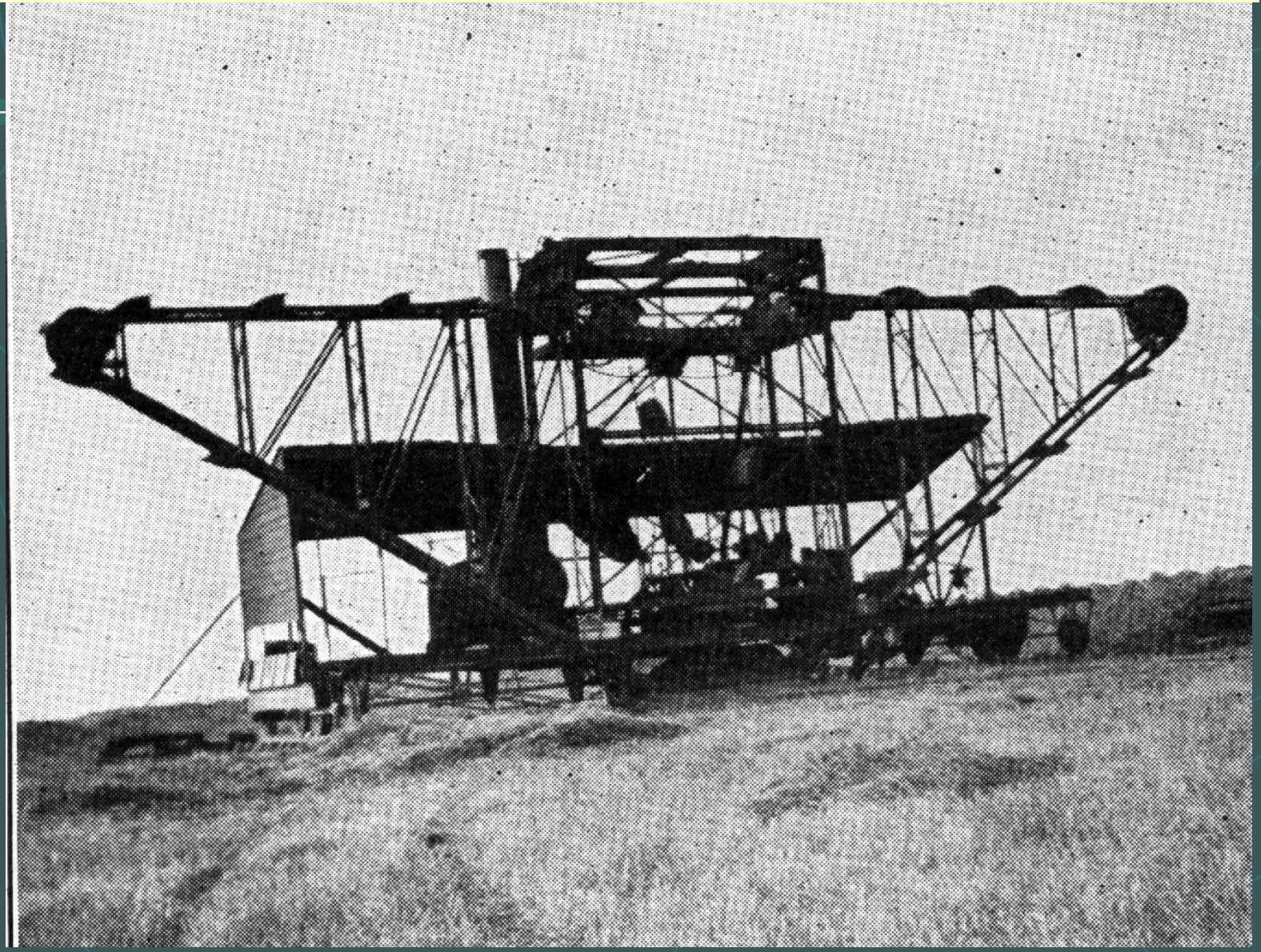
Junkin Ditcher - 1906



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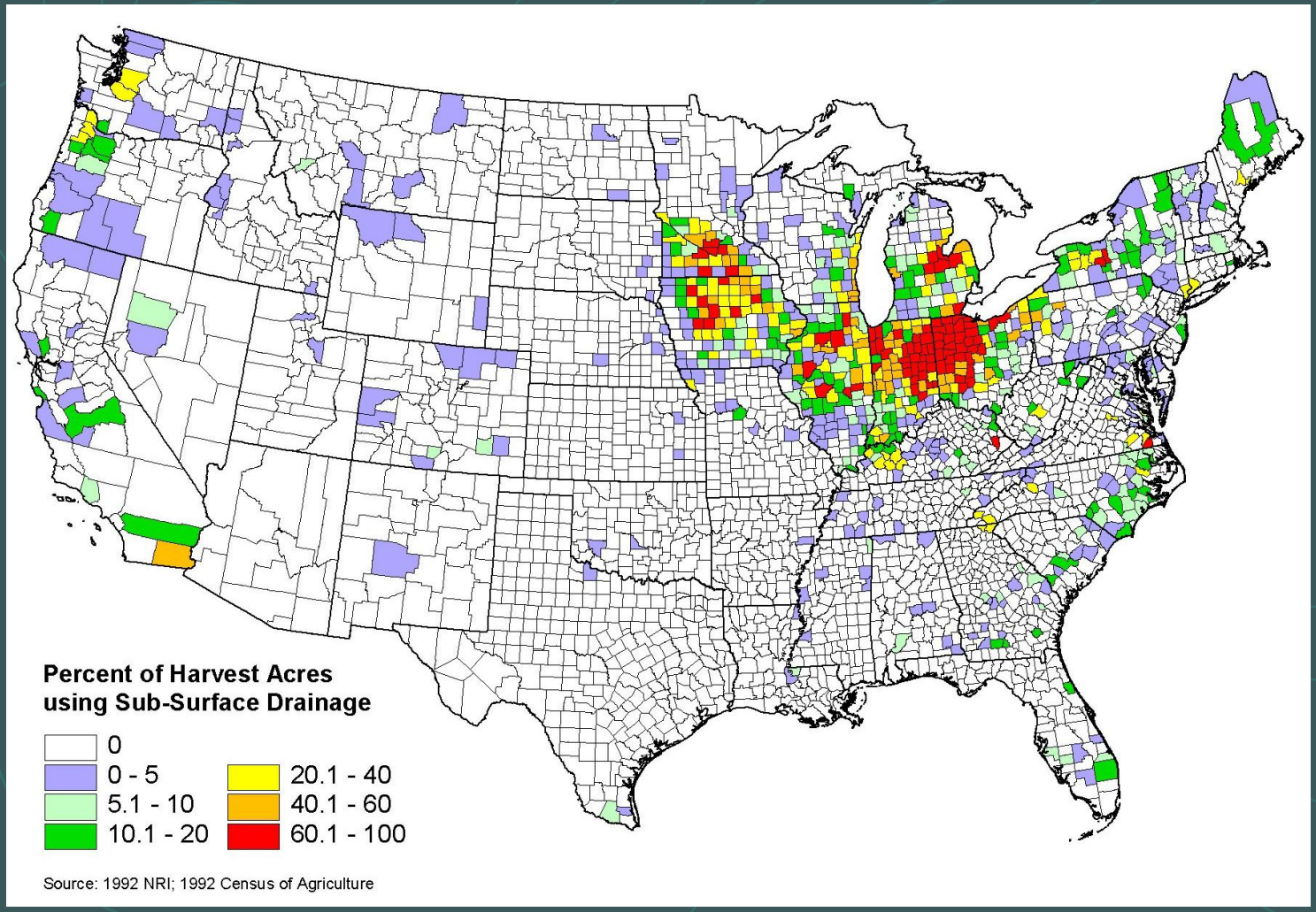
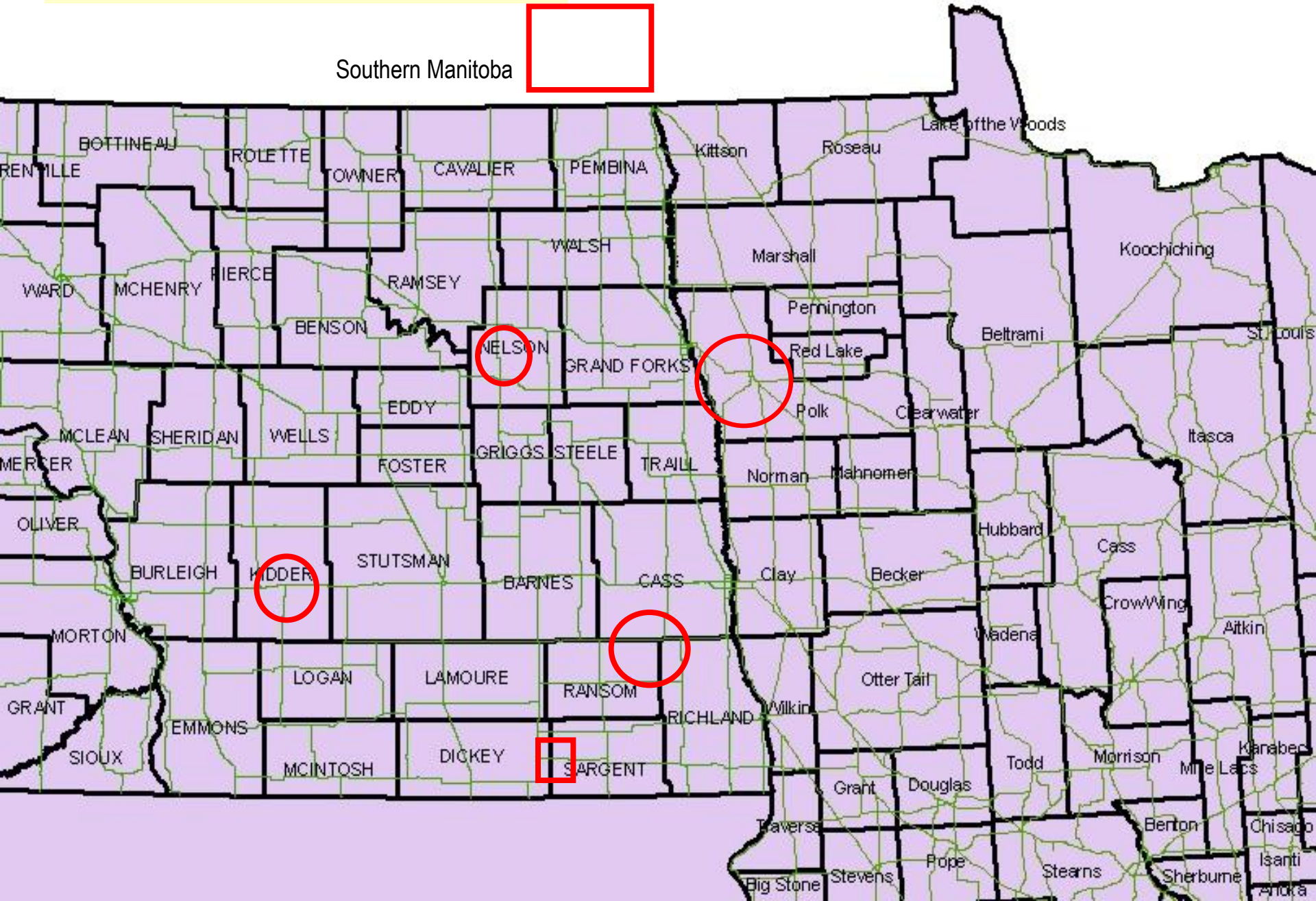
Old Machines and New Machines

Extent of Subsurface Drainage (’92)

51 million ac of corn-belt (est.)



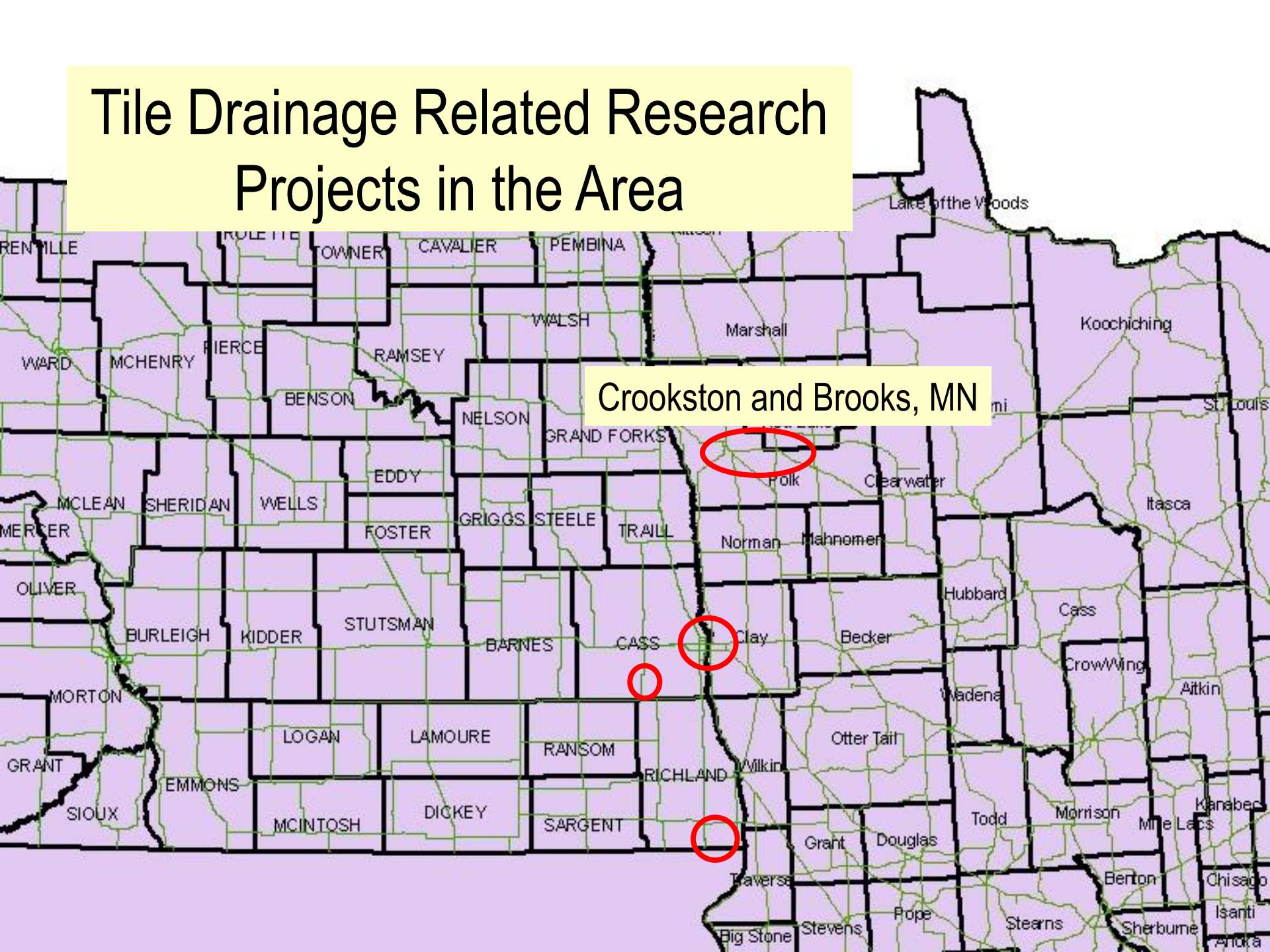
Tile Drainage Projects in this Area



Why is Tile Drainage Desirable in the Red River Valley?

- The "wet" 90's
  - Prevented planting acreage in ND (FSA)
    - 2001 677,000 acres
    - 2002 245,000 acres
    - 2003 437,000 acres
    - 2004 1,666,000 acres
    - 2005 1,033,000 acres
    - 2006 330,000 acres
    - 2007 233,000 acres
    - 2008 30,250 acres
- High land prices, higher crop prices, acquiring more land becoming difficult, improves land management options

Tile Drainage Related Research Projects in the Area




Thank you
for your attention!