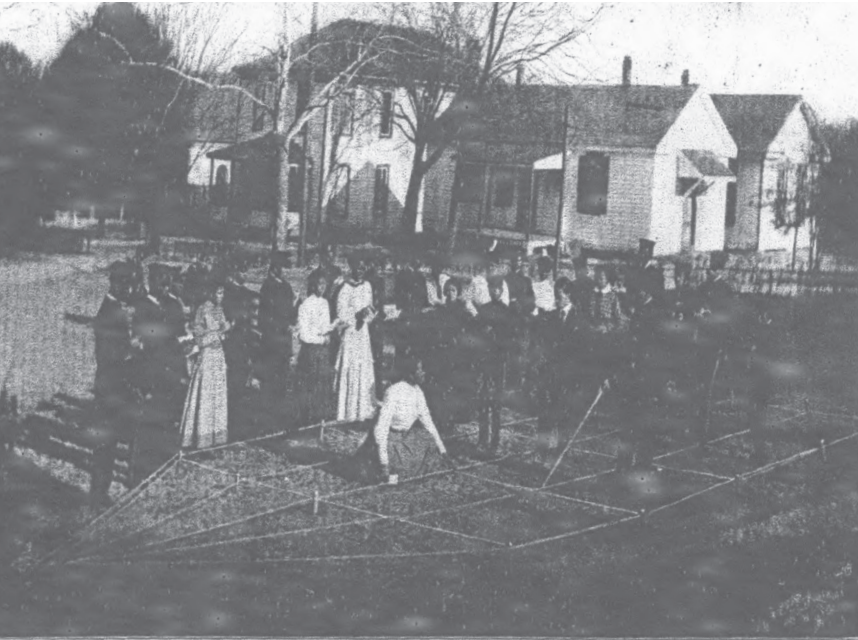# Studying Euclid in the Arkansas Delta: the Branch Normal College

Jesse Kass (UC Santa Cruz)

# Why a Black history of mathematics?



- Math is an aspect of human culture that draws on specialized knowledge (compare with art, literature, foreign languages….)
- The mathematical accomplishment and abilities of formerly enslaved people play a sometimes overlooked but important role
- Will focus on Reconstruction-era Arkansas as a case study

# An 1880 debate



- [Black cadets at West Point] have all displayed a marked deficiency in deductive reasoning, and have taken very low rank in mathematical subjects. –Peter S.Michie, "Caste At West Point"

- Prof. Michie claims that colored students cannot understand "deductive reasoning," so I beg leave to state a fact which has some bearing upon that point. A few days ago, I witnessed the recitation of the Algebra class in the Branch Normal College. The lesson was the application of "Sturm's Theorem" and Horner's Method to finding the roots of roots of higher equations. –Toothpick, *Weekly Louisianian*
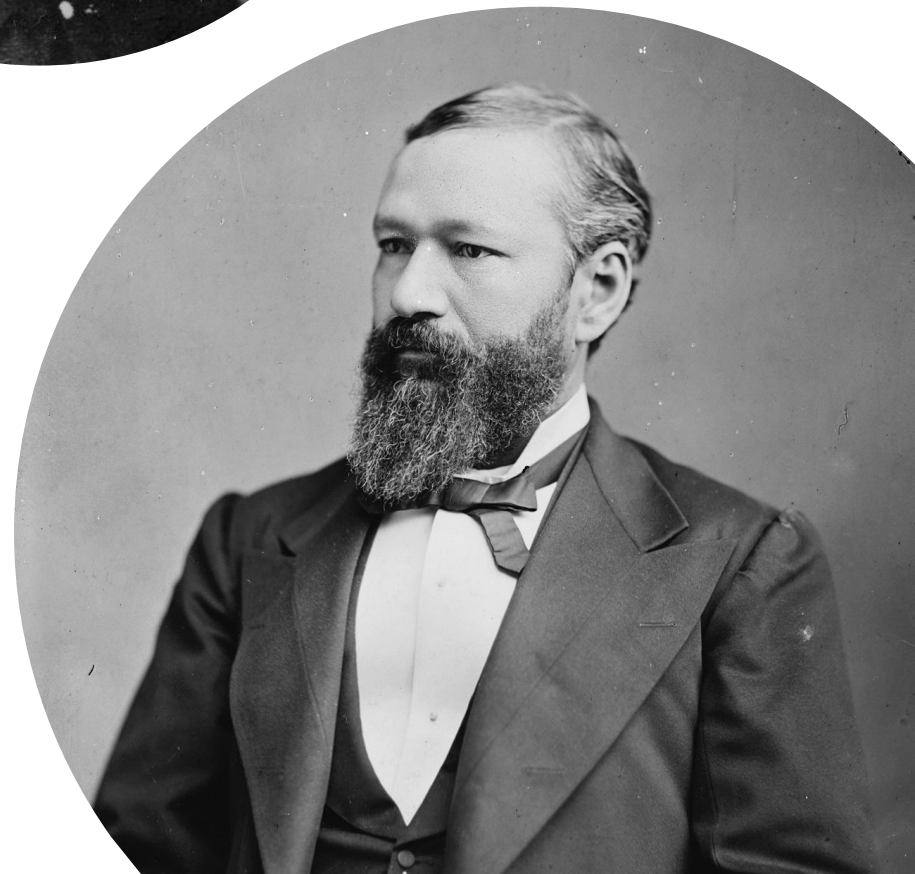
# The National Debate

- Debate was nationally significant
- West Point was accused of racism
- 9 out of 10 Black students admitted had left without a degree
- One student was facing a court martial after reporting an assault
- Prof. Michie's argued that West Point wasn't racist, Black students were just bad at math

# Things to notice

- Public narrative about African-American participation in math typically focuses on denied opportunities

- "Toothpick" suggest a counternarrative of remarkable achievement

- What is Sturm's theorem? Need to know the math to assess Toothpick's claims

# How can we study mathematics at the Branch Normal College at Pine Bluff?

- Biography of the faculty (J. C. Corbin – well-documented)
- Biography of the students
- Publications by the faculty
- Textbooks used by the students
- Mathematically connections with other places
- Broader math/education context
- Ideas I have missed

# How to study students: Joseph A. Booker

- Booker was 21 years old

- Born in 1859 on plantation near Portland

- Was one of 50+ enslaved workers

- Both parents died when he was an infant. Raised by grandmother
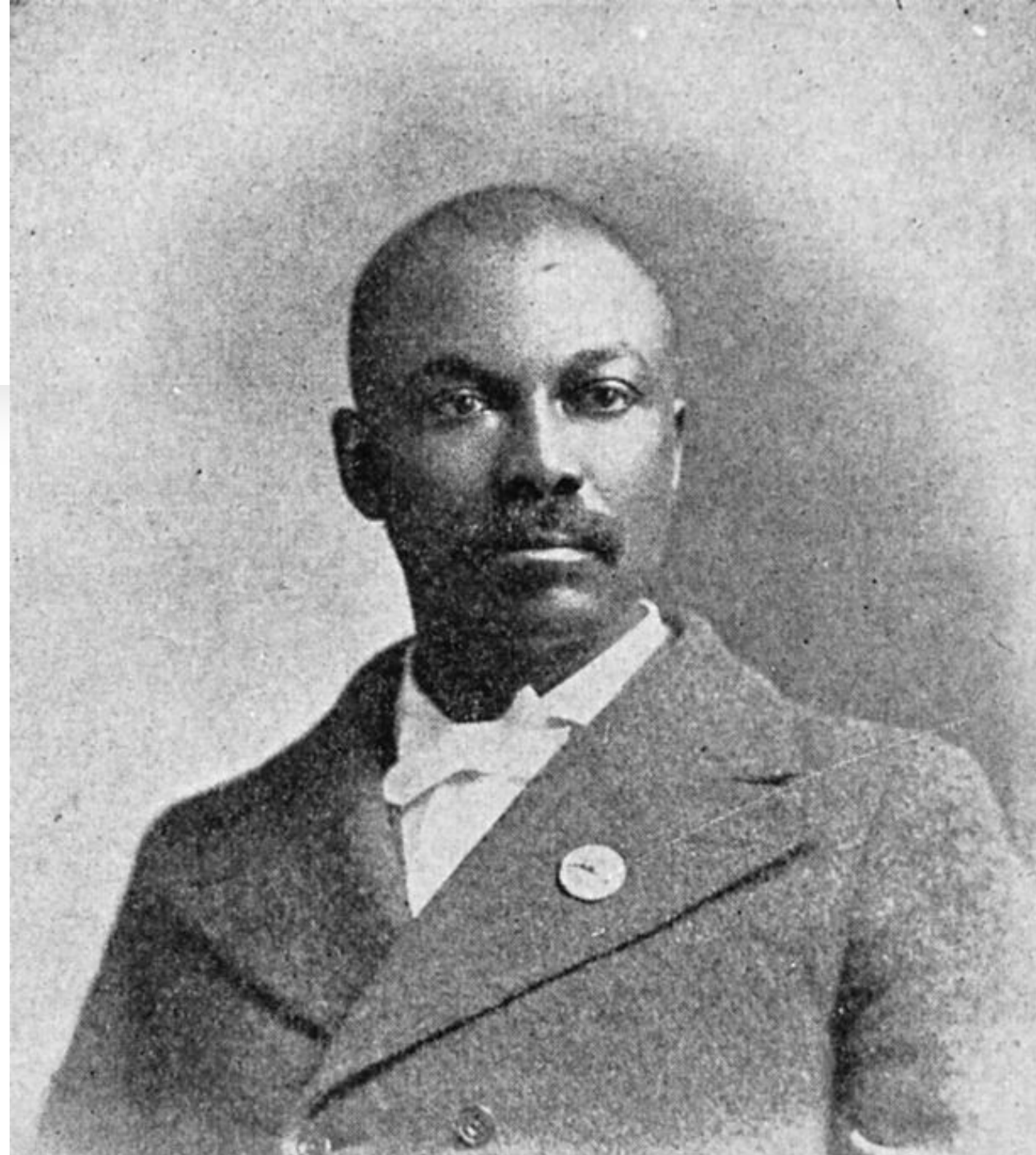
# More on Joseph A. Booker
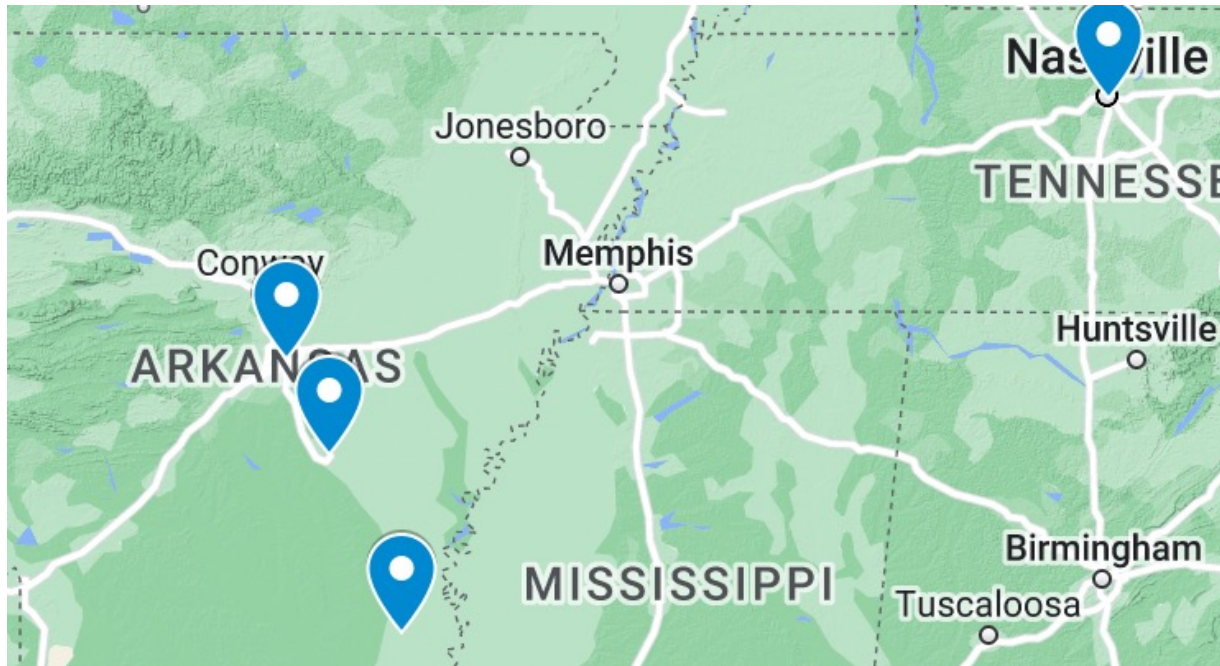


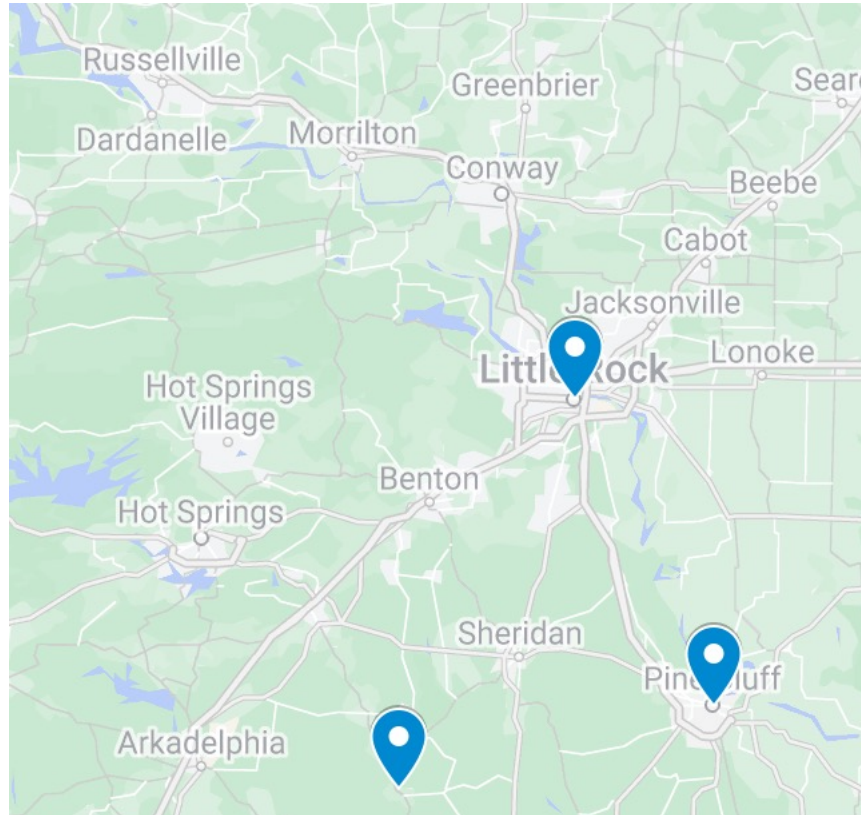- Completed education at Roger Williams U. in Nashville
- Served as a Baptist minister and president of Arkansas Baptist College

# Another student: Joseph Samuel Badgett



- Born in 1864 on a small farm in Tulip

- Mixed race: father was also the father of his enslaver

- Given land after the Civil War

- Education: private lessons by "old white woman" + public school run by Branch Normal student

# How to read faculty publications?

- Problem isn't original to Corbin
- Was originally written by Lewis Carroll
- Published in many newspapers

110. **Proposed by J. C. CORBIN, Pine Bluff, Ark.**

I find the annexed problem in a secular newspaper:

Put down any sum of pounds, shillings and pence under £11, taking care that the number of pence is less than the number of pounds. Reverse this sum, putting pounds in the place of pence, and subtract from original amount. Again reverse this remainder and add. The result in all cases will be £12 18s 11d, neither more nor less, whatever the amount with which we start.

Will some of the MONTHLY's contributors verify and explain or disprove it?

*\*\* Solutions of these problems should be sent to J. M. Colaw not later than Dec. 10.

# How to read faculty publications?

- Problem isn't original to Corbin
- Shows Corbin knew linear algebra
- Had a copy of Muir's *A Treatise on the Theory of Determinants*

**306. Proposed by J. C. CORBIN, Pine Bluff, Ark.**

Muir gives the following problem:

Prove:
$$\begin{vmatrix} 1 & a & a & a^2 \\ 1 & b & b & b^2 \\ 1 & c & c' & cc' \\ 1 & d & d' & dd' \end{vmatrix} = (a-b) \begin{vmatrix} 1 & ab & a+b \\ 1 & cd' & c+d' \\ 1 & c'd & c'+d \end{vmatrix}$$

which, of course, can be solved by finding the terms of both determinants. Is there any method of changing from one form to the other which is direct?

# How to read textbooks?

Robinson's Shorter Course.

THE

COMPLETE

A L G E B R A,

DESIGNED FOR USE IN

SCHOOLS, ACADEMIES, AND COLLEGES.

BY

JOSEPH FICKLIN, Ph.D.,

PROFESSOR OF MATHEMATICS IN THE UNIVERSITY OF THE STATE OF MISSOURI.

## STURM'S THEOREM.

**612.** If the coefficients of $f(x)$ are real and the equation $f(x) = 0$ has no equal roots, then, if $x$ is made to assume, in succession, all real values from $-\infty$ to $+\infty$, the sign of $f(x)$ will change as often as $x$ passes a real root of the equation (**608, Cor. 3**). Sturm's Theorem enables us to determine the number of such changes of sign.

**613. Sturm's Functions.**—Let $f(x) = 0$ be an equation whose coefficients are real, and which is freed from equal roots (**607**); and let $f'(x)$ be the first derivative of $f(x)$.

We now apply to $f(x)$ and $f'(x)$ the process of finding their G. C. D. (**125**), with this modification, namely: 1. *When a remainder is found which is of a lower degree than the corresponding dividend and divisor, we change its sign and use the result for the next divisor. 2. We neither introduce nor reject a negative factor in preparing for division.*

# There is funding for this work!



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## Mathematics for Humanity

**Closing Date:** 1 Jun 2023

This is a new programme of activities devoted to education, research and scholarly exchange that will have direct relevant to the ways in which mathematics can contribute to the betterment of humanity. These activities will revolve around three inter-related themes.

A. **Integrating the global research community** (GRC)

 B. **Mathematical challenges for humanity** (MCH)

C. **Global history of mathematics** (GHM)

Development of the three themes will facilitate the engagement of the international mathematical community with the challenges of accessible education, knowledge-driven activism, and transformative scholarship.

For this first call, ICMS is not being overly prescriptive.   Within each of the three themes, researchers can apply for funding of one or more of the activities in the list below.   For theme A in particular we consider that a coherent plan of multiple activities over an extended period would be of the most benefit. Anyone interested in putting forward a proposal – even if for an activity not currently in this list but that would meet the objectives of a particular theme – is encouraged to discuss their ideas with either ICMS Director **Minhyong Kim** or Deputy Director **Beatrice Pelloni**.

1. *Research-in-groups*. This is a proposal for a small group of 3 to 6 researchers to spend from 2 weeks to 3 months in Edinburgh on a reasonably well-defined