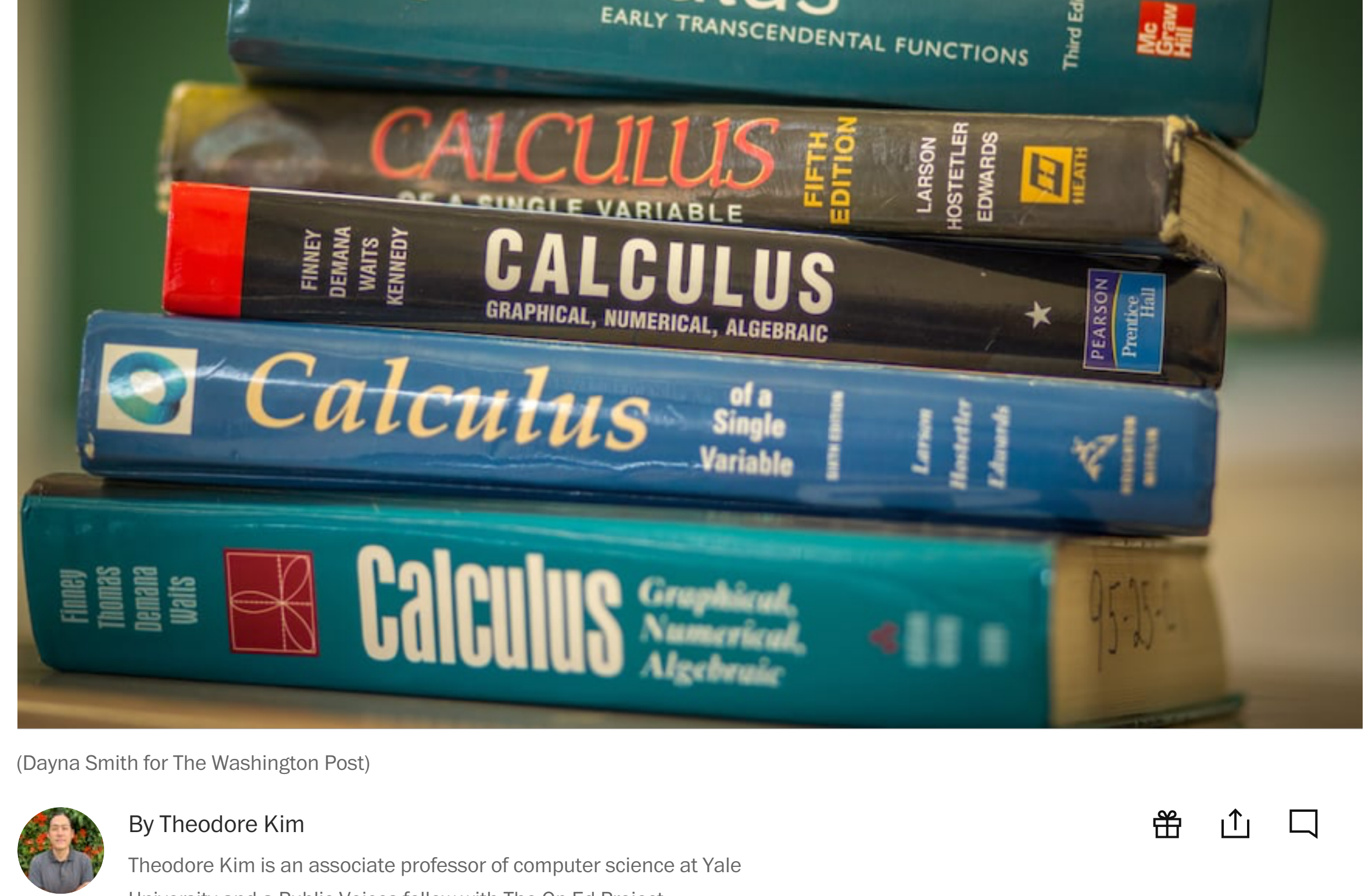


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# Racism in our curriculums isn't limited to history. It's in math, too.

The other 'CRT'



(Dayna Smith for The Washington Post)

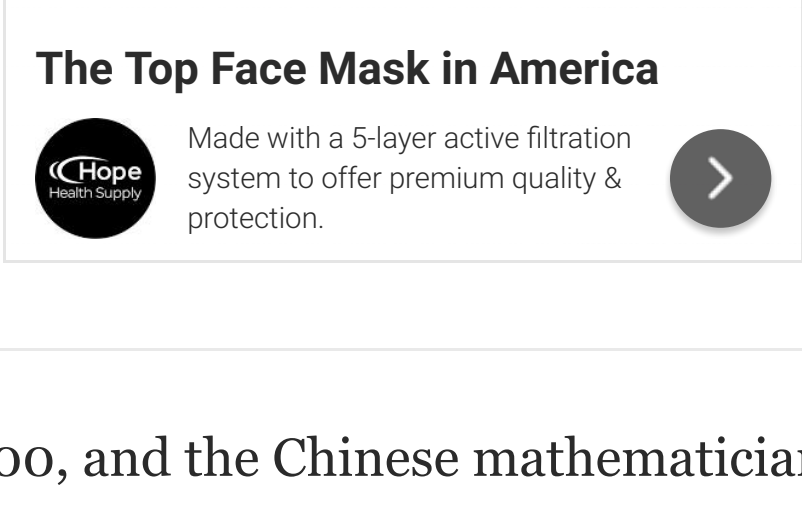
By Theodore Kim  
Theodore Kim is an associate professor of computer science at Yale University and a Public Voices fellow with The Op-Ed Project.

December 8, 2021 at 6:00 a.m. EST

Virginia's 2021 gubernatorial race revealed that the education wars will play a major role in politics for the foreseeable future. Debates over how history gets taught in schools and universities are increasingly framed in relation to "critical race theory," a term that has been used to mean almost anything. However, the conversations are difficult even in subjects such as math, which is perceived, incorrectly, as a neutral space outside the reach of structural racism and national histories.

These tensions become clear when teaching **RSA encryption**, the algorithm that runs on your phone to prevent hackers from stealing your credit card number. Learning about RSA encryption is usually preceded by lessons on Euclid's Algorithm and the Chinese Remainder Theorem (which, ironically, shares an acronym with critical race theory, CRT).

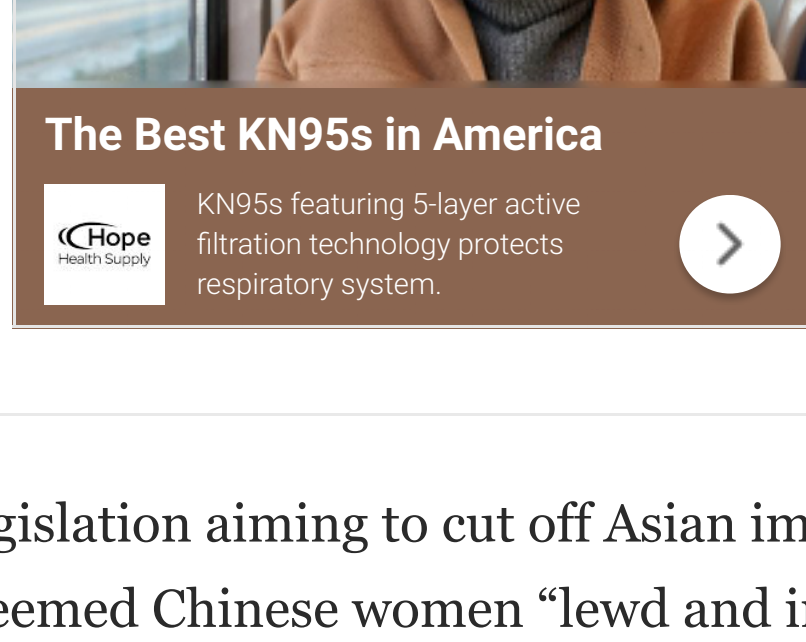
The juxtaposition is jarring: The Greek scholar Euclid (300 B.C.) gets his name attached to an algorithm, while a Chinese scholar's identity is erased, his work reduced to his nationality. This dichotomy reveals the racial assumptions hidden in seemingly apolitical subjects and how the biases of the past are embedded in the present.



The CRT dates to at least A.D. 300, and the Chinese mathematician Sun Tzu is widely credited with popularizing it. (Centuries before, a different Sun Tzu wrote "The Art of War.") In China, the theorem is still often called Sun Tzu's Theorem. However, as this scholarship existed outside the European tradition, it was not significantly visible in the West until the 20th century.

In 1929, a White mathematician at the University of Chicago named **L.E. Dickson** popularized the CRT in the English-speaking world and simultaneously stripped away Sun Tzu's name. Dickson discovered Sun Tzu's work through the writings of **Alexander Wylie**, a British missionary who published translations of various Chinese texts in 1852. Dickson included Sun Tzu's name directly in his writings but then immediately referred to the work as the "**Chinese problem of remainders**" and, later on, the "**Chinese remainder theorem**." This name was then disseminated throughout the English-speaking world.

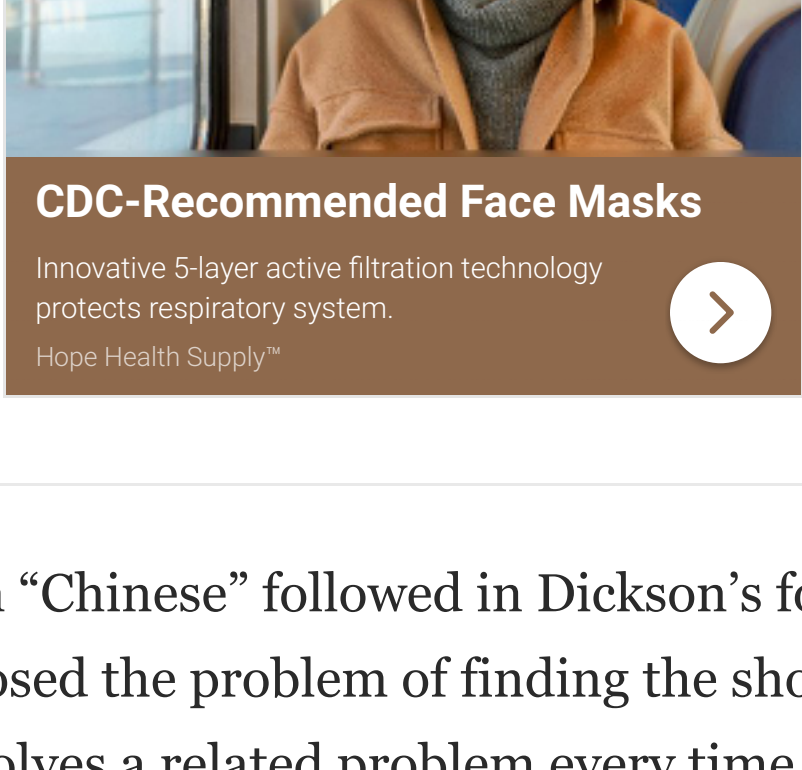
Why did Dickson remove Sun Tzu's name from the theorem? We can't know what was in his heart, but we know that Dickson made the choice amid a surge of anti-Asian violence in the United States stretching back to the late-19th century. For example, in Rock Springs, Wyo., in 1885, a White mob torched the local Chinatown and killed 28 Chinese immigrants. Two years later, in the Snake River Massacre, the mutilated bodies of 34 Chinese miners were found floating down a river in Oregon, butchered by White miners upstream. Paralleling lynch mobs in the South, no one was ever brought to justice for these acts of mass murder.



Decades of legislation aiming to cut off Asian immigration accompanied this violence. The **Page Act of 1875** deemed Chinese women "lewd and immoral" and barred them from immigrating to the United States. Congress broadened this prohibition to all Chinese workers in the Chinese Exclusion Act of 1882, which remains the sole instance in U.S. history in which a lone nationality was overtly singled out for exclusion.

In subsequent years, immigration quotas from nearly all Asian countries were curtailed, until they reached virtually zero, with the passage of the Johnson-Reed Act of 1924, including the Asian Exclusion Act. The eugenic intent of this legislation was openly stated at the time, and it received strong public support from the Ku Klux Klan. Sen. David Reed (R-Pa.), one of the bill's architects, declared its intent to keep "American stock up to the highest standard."

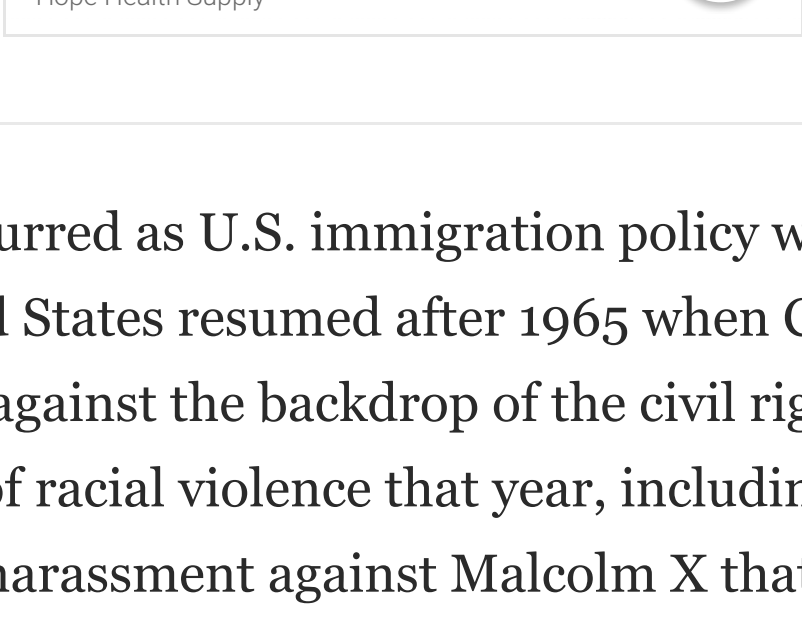
With this federal project to maintain U.S. racial purity as a backdrop, Dickson coined the theorem's new name. After World War II, the United States' emerging Cold War dominance in math and science drove a preference for American technical language. Dickson's erasure became entrenched, making it all but impossible to find an English-language textbook that refers to "Sun Tzu's Theorem."



Similar deployments of the term "Chinese" followed in Dickson's footsteps. In 1960, the Chinese mathematician Mei-Ko Kwan posed the problem of finding the shortest closed walk on an undirected graph. Your phone solves a related problem every time you ask for directions on Google Maps.

Kwan's paper was translated into English in 1962 and read by Jack Edmonds at the National Bureau of Standards. Edmonds cited Kwan's work directly in subsequent **scholarship** but labeled the formulation the "Chinese Postman Problem." This naming goes beyond obscuring Kwan's contribution: It becomes ambiguous whether a Chinese scholar originated the problem, or whether it is examining an imaginary postal worker who happens to be Chinese.

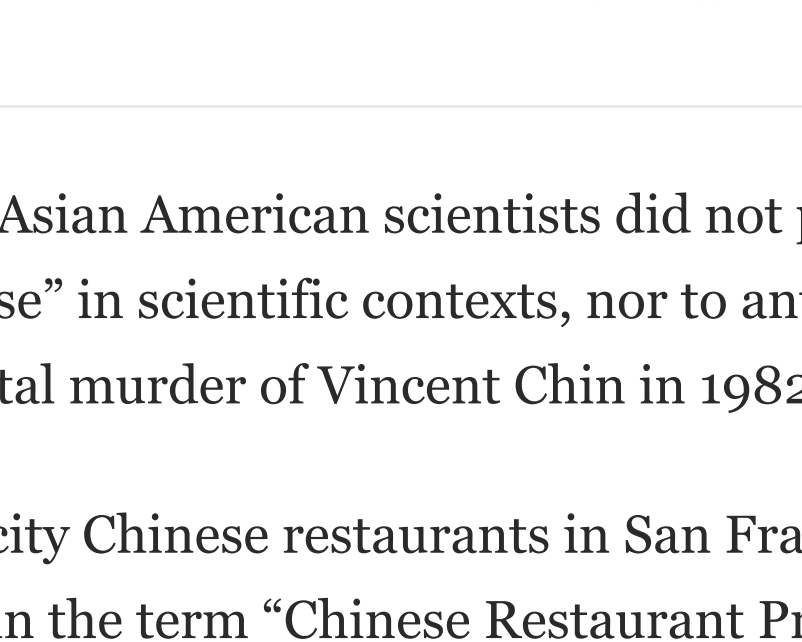
There is no indication that naming it "Kwan's Problem" was ever considered, an abrupt departure from the Western tradition of attaching scholars' names to their discoveries. Such lapses rarely extend to White scholars: Edmonds himself is credited with both the Gallai-Edmonds theorem and the Edmonds-Karp algorithm.



Edmonds's erasure of Kwan occurred as U.S. immigration policy was finally shifting. Large-scale Asian immigration to the United States resumed after 1965 when Congress passed the Hart-Celler Act. The act's passage occurred against the backdrop of the civil rights movement and internationally visible displays of racial violence that year, including the Bloody Sunday march in Selma, Ala., and a campaign of harassment against Malcolm X that ended in his assassination.

The immigration act became part of a wave of liberal legislative changes that included the Civil Rights Act the year before and the Voting Rights Act two months prior.

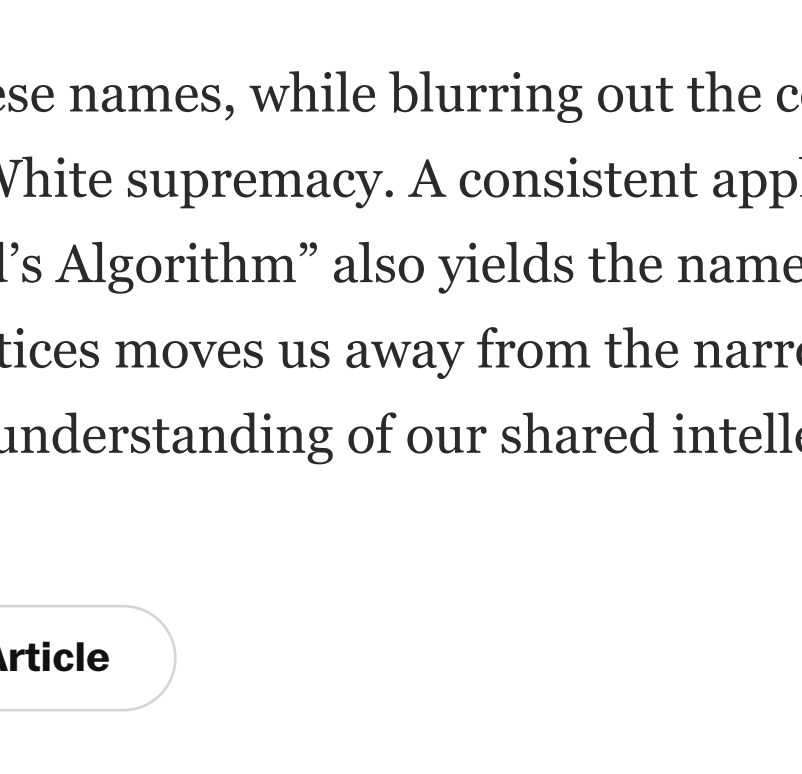
A seemingly minor provision in Hart-Celler gave preferential access to Asians with "**exceptional ability in the sciences or the arts**." This and other elements of U.S. immigration policy spurred a demographic shift that continues to this day, including a wealth of Asian doctors and scientists immigrating to the United States.



However, the inclusion of more Asian American scientists did not put an end to troubling deployments of the term "Chinese" in scientific contexts, nor to anti-Asian violence in the broader United States, including the brutal murder of Vincent Chin in 1982.

Circa that same year, high-capacity Chinese restaurants in San Francisco inspired scholars Jim Pitman and Lester Dubins to coin the term "Chinese Restaurant Process," a statistical process that mirrors the random seating of an infinite number of patrons at an infinite number of tables. Similar processes are involved whenever Siri tries to parse your verbal commands.

With this naming, the implicit dehumanization of the "Chinese Postman" became explicit. Instead of referencing an Eastern scholarly tradition, "Chinese" was used to refer to a mindless horde of imaginary restaurant patrons and hostesses, lacking all agency or humanity.



These uses of "Chinese" can be found in math textbooks today. Allowing these racist namings to persist erases the fact that the construction of math and science has always been a global project. Rather than celebrating the innate curiosity that drives humanity to make discoveries around the globe, these practices have historically enshrined the names of White men. The rest of the world is reduced to an inscrutable, fungible mass.

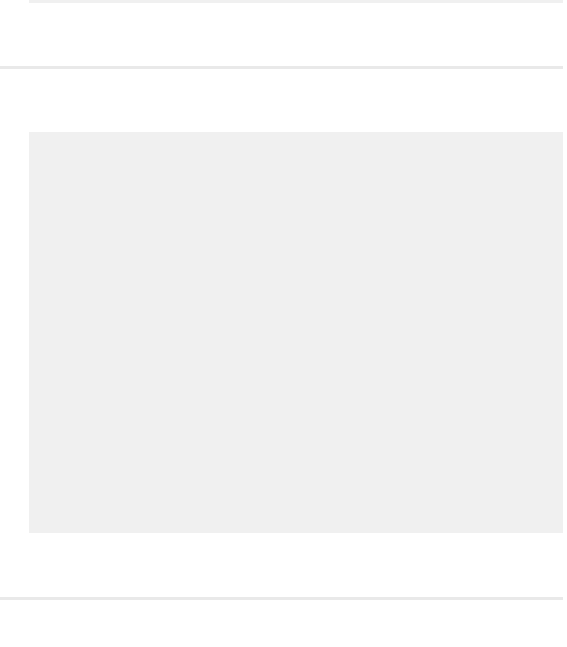
The textbooks that showcase these names, while blurring out the contributions of others, constitute false monuments to White supremacy. A consistent application of the naming standard that yielded the moniker "Euclid's Algorithm" also yields the name "Sun Tzu's Theorem." Correcting these historical injustices moves us away from the narrow bigotries of the past and points toward a more complete understanding of our shared intellectual histories.

39 Comments Gift Article

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