

HUMAN EVOLUTION

Latin America's lost histories revealed

Clues to forgotten
migrations emerge from
today's genomes



By **Lizzie Wade**, in *Austin*

If you walked the cobblestone streets and bustling markets of 16th and 17th century Mexico City, you would see people born all over the world: Spanish settlers on their way to mass at the cathedral built atop Aztec ruins. Indigenous people from around the Americas, including soldiers who had joined the Spanish cause. Africans, both enslaved and free, some of whom had been among the first conquistadors. Asians, who traveled to Mexico on Spanish galleons, some by choice and some in bondage. All these populations met and mingled for the first time in colonial Latin America.

Historical documents describe this cultural mixture, but now international teams of researchers are enriching our view by analyzing the genomes of people today. Aided by sophisticated statistics and worldwide genetic databases, they can tease apart ancestry and population mixing with more nuance than ever before. The results, reported at a meeting here this week and in a preprint, tell stories of Latin America that have been largely forgotten or were never recorded in historical documents. From the immigration of enslaved Filipinos to that of formerly Jewish families forbidden to travel to the colonies, hidden histories are emerging.

“It’s helping us to recognize the ways that really fine-scale historical experiences and practices have left this deeply significant im-

print on our genomes,” says Deborah Bolnick, an anthropological geneticist at the University of Texas here.

Juan Esteban Rodríguez, a graduate student in population genetics at the National Laboratory of Genomics for Biodiversity (LANGEBIO) in Irapuato, Mexico, initially planned to study a recent thread in the global tapestry that is Mexican ancestry. Starting in the 19th century, many Chinese immigrants moved to Mexico to construct railroads in the country’s northern states. Growing up near the U.S. border, Rodríguez knew this history well, and he wanted to see whether he could identify the Chinese immigrants’ genetic contribution to the modern Mexican population.

But when he searched a database of 500 Mexican genomes—initially assembled for biomedical studies—and sought genetic variants more common in Asian populations, he found a surprise. Some people from northern Mexico did have significant Asian ancestry, but they weren’t the only ones. Rodríguez discovered that about one-third of the people sampled in Guerrero, the Pacific coastal state that lies nearly 2000 kilometers south of the U.S. border, also had up to 10% Asian ancestry, significantly more than most Mexicans. And when he compared their genomes to those of people in Asia today, he found that they were most closely related to populations from the Philippines and Indonesia.

Rodríguez and his adviser, Andrés Moreno-Estrada, a population geneticist at

British ships often harassed Spanish galleons, which ferried long-forgotten peoples to Latin America, including enslaved Filipinos and former Jews.

LANGEBIO, turned to the historical record to figure out who these people’s ancestors might be. They learned from historians who study ship manifests and other trade documents that during the 16th and 17th centuries, Spanish galleons sailed between Manila and the port of Acapulco in Guerrero, carrying goods and people, including enslaved Asians. Although historians knew of this transpacific slave trade, the origins of its victims were lost. Once they landed in Mexico, they were all recorded as “*chinos*”—Chinese, says Moreno-Estrada, who will present the work this weekend at the American Association of Physical Anthropologists (AAPA) annual meeting here. “We’re uncovering these hidden stories of slavery and people who lost their identities when they disembarked in a whole new country.”

Other researchers study the legacy of another marginalized group in colonial Mexico: Africans. Tens of thousands of enslaved and free Africans lived in Mexico during the 16th and 17th centuries, outnumbering Europeans, and today almost all Mexicans carry about 4% African ancestry. The percentage is much higher in some communities, says geneticist María Ávila-Arcos of the International Laboratory for Human Genome Research in Juriquilla, Mexico. She

found that in Afro-descendent communities in Guerrero and Oaxaca, many of which remain isolated, people had about 26% African ancestry, most of it from West Africa.

Other data also suggest a strong African presence in colonial Mexico. Bioarchaeologist Corey Ragsdale of Southern Illinois University in Edwardsville and his colleagues examined skeletons for dental and cranial traits that tend to be more common among Africans. They estimated that 20% to 40% of the people buried in cemeteries in Mexico City between the 16th and 18th centuries had some African ancestry, as they will present this weekend at the AAPA meeting. “It could be that Africans played as much of a role in developing population structure, and in fact developing the [Spanish] empire, as Europeans did,” Ragsdale says.

Ávila-Arcos hopes to use genetic data to trace the ancestors of those in her study back to specific West African groups or regions. She’s also found significant Asian ancestry in some of her volunteers, likely an echo of communities once formed by enslaved Africans and Asians on the Pacific coast.

Some Europeans carried hidden histories with them to colonial Latin America. A preprint recently posted on the bioRxiv server used genetic data from more than 6500 people born in Brazil, Chile, Colombia, Mexico, and Peru to tease apart how specific Native American groups and multiple populations from the Iberian peninsula contributed to modern genomes. “It’s undoubtedly the most comprehensive genetic analysis of Latin American populations to date,” Ávila-Arcos says. (The authors declined to comment because the paper has been submitted to a peer-reviewed journal.) One striking finding was that genetic variants common in the eastern Mediterranean and North Africa, and especially in Sephardic Jews, show up all over Latin America, in nearly a quarter of the individuals sampled.

The authors, led by geneticists Andrés Ruiz-Linares of Fudan University in Shanghai, China, and Garrett Hellenthal of University College London, trace a significant portion of this ancestry to *conversos*, or Jews who converted to Christianity in 1492, when Spain expelled those who refused to do so. *Conversos* were prohibited from migrating to the Spanish colonies, though a few are known to have made the trip anyway. But widespread Sephardic ancestry in Latin America implies that migration was much more common than records suggest.

For Ragsdale, the work serves as a reminder that even migrations scientists think are well understood can contain surprises. “The way we think about colonization is simplified,” Ragsdale says. “We’re missing a lot of subtleties here.” ■



ASTRONOMY

Alpha Centauri’s siren call has frustrated planet hunters

The nearest sunlike stars have failed to yield exoplanets so far, but searches for Earth-like ones are ramping up

By **Daniel Clery**, in Liverpool, U.K.

Alpha Centauri, a three-star system just 4 light-years away that is the sun’s nearest neighbor, ought to be a great place to look for Earth-like planets. But last week, at a meeting of the European Astronomical Society (EAS) here, astronomers lamented the way the system has thwarted discovery efforts so far—and announced new efforts to probe it. “It’s very likely that there are planets,” says Pierre Kervella of the Paris Observatory in Meudon, France, but the nature and positions of the stars complicate the search. “It’s a little frustrating for planet searchers.”

The system’s two sunlike stars, Alpha Centauri A and B, orbit each other closely while Proxima Centauri, a tempestuous red dwarf, hangs onto the system tenuously in a much more distant orbit. In 2016, astronomers discovered an Earth-mass planet around Proxima Centauri (*Science*, 26 August 2016, p. 857), but the planet, blasted by radiation and fierce stellar winds, seems unlikely to be habitable. Astrobiologists think the other two stars are more likely to host temperate, Earth-like planets.

Maksym Lisogorskyi, an astronomer at the University of Hertfordshire in Hatfield, U.K., tried to find them with an instrument on the European Southern Observatory’s (ESO’s) 3.6-meter telescope in Chile. He

and his colleagues looked for Doppler shifts in the spectral lines of the stars’ light that would be caused if a planet tugged them back and forth. But Lisogorskyi told the meeting that the stars’ surfaces are turbulent, and prone to flares that also jiggle the spectral lines, masking the subtle signals from any Earth-size planets. “The lines do all kinds of things,” he says. Although Alpha Centauri has been a primary target for the planet-finding instrument since it was inaugurated in 2005, it has seen nothing so far.

Also hampering observations are the current positions of the two stars. As viewed from Earth, they are very close together, making them harder to study individually, Lily Zhao of Yale University told the meeting. More precise observations should become possible as their 80-year orbit carries them farther apart. In the meantime, Zhao and her colleagues have succeeded in ruling out the presence of giant planets around either star, based on a decade’s worth of data from three instruments on different telescopes. “There are no Jupiters in the system, but there may be plenty of Earth-sized planets still to discover,” she said.

In a binary system like Alpha Centauri the lack of giant planets in Jupiter-like orbits is no surprise, because the gravity of each star would tend to kick any such planets orbiting the other star out of the system, Kervella says. But he says that temperate planets in the

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