Five Streams of Migration

M1 (before 2800BP): Lineage FRO
M2 (before 2400BP): Lineage FRO
M3 (before 2100BP): Lineage FRO
M4 (before 1800BP): Lineage Papuan
M5 (after 1000BP): Polynesian immigration
Major New Scientific Paper On Ancestry of Pacific Islanders

By Matthew Sorrigs

A MAJOR NEW PAPER ON THE origins and ancestry of Pacific islanders was published yesterday in the major world scientific journal "Science".

It was a collaboration of a team of geneticists from Harvard University, USA, led by Yue Chen-Liu and David Reich, along with Ron Pinhasi from the University of Vienna in Austria and Pacific archaeologists. Much of the archaeological effort was coordinated by Rosalind Hunter-Anderson, a long-time specialist on the archaeology of Guam and the wider Mariana Islands in Micronesia.

I was among the 40 authors of the study, contributing to the interpretation of the findings in the light of archaeological and linguistic evidence from across the Pacific.

The study analyses ancient DNA, genetic material extracted from the bones and teeth of skeletons excavated by archaeologists in Micronesia and dating to the last 3000 years or so. These were then compared to other archaeological samples - particularly those from Lapita and later sites in Vanuatu - and modern-day inhabitants of Micronesia and the wider region.

Pacific peoples of course have their own stories of origins, either from far away islands or from the land itself. When the first European visitors came to the Pacific, mainly from the eighteenth century onwards, they too speculated about where populations on the far-flung Pacific islands could have come from.

Many theories have been put forward since and disputed. But it is with the development of methods to extract ancient DNA from the actual bones and teeth of long-dead individuals that now gives us the power to judge these different theories and come up with definite answers. The problem is that DNA degrades over time, so after a body is buried and such degradation is much worse under tropical conditions. New Guinea, but its origins clearly go back into Island Southeast Asia (Indonesia, the Philippines and Taiwan) and beyond that to the early rice farmers in southern China. Lapita sites are also known from Vanuatu, New Caledonia, Fiji, Tonga, Samoa and Wallis and Futuna. In all these places they represent the first human settlers.

From the study of Pacific languages, we know that the Austronesian languages of the Pacific islands can be traced back through Island Southeast Asia to their origins in Taiwan, among the Taiwanese Aborigines who were there before the modern-day Chinese migrated in recent times and who still live in the mountain regions of the island. All traditional languages in Vanuatu are part of this Austronesian language family.

That first 2016 ancient DNA study by Skoglund and colleagues in the journal "Nature" was followed by two further important papers highlighting the ancient DNA of Vanuatu in 2018. One of them was again by the Harvard team, this time with Mark Lipson as senior author, and the other by a team from the Max Planck Institute in Germany, led by Cosimo Posth and Johannes Krause. VKS archaeologists were involved in all these studies, and in the most recent aDNA study of Vanuatu published in 2020 again by a team led by Mark Lipson and David Reich at Harvard.

This last study examined the DNA of burials from the grave of Chief Roi Mata on Eretok or Hat Island in north Efate, whereas the previous two looked at a range of ancient samples from different islands and time periods in Vanuatu.

The combined evidence of these four studies show that the first human settlers of Vanuatu were East Asians, whose closest living relatives today are the Taiwanese Aborigines and the Kankanaee tribe of the northern Philippines. We call them 'First Remote Oceaniaans' or 'FRO-Southwest Pacific'.

Within a few hundred years, perhaps at the end of the Lapita period when the population of Vanuatu was still very small, they were joined by Papuan settlers (mostly men) from the island of New Britain - their closest living relatives would be the Baining of the mountains Inland of Rabaul in East New Britain. Most Ni-Vanuatu today are the descendants of the mixing of these two groups - East Asian and Papuan.

So are other Pacific peoples such as Kanaks, Fijians and Polynesians. The only difference is in the proportion of ancestry derived from each group. Ni-Vanuatu today are about 80-90% Papuan-New Britain ancestry and 10-20% FRO-Southwest Pacific, whereas Polynesians are about 25% Papuan-New Britain and 75% FRO-Southwest Pacific. Fijians are somewhere in between in ancestry proportions. As the Papuans moved further out into the Pacific there were fewer of them and so they had less genetic influence.
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Then within the last thousand years Polynesian settlers from two different source islands migrated and settled Futuna, Aniwa, Ifira, Mele and part of Emae, also intermarrying more widely in Tafea and Shefa provinces where some Polynesian ancestry is common.

For instance, several people buried with Chief Roi Mata in the 1600s showed some Polynesian ancestry.

The new paper by Yue Chen-Liu and others is the latest one to look at the origins of Pacific peoples, this time concentrating on the vast area of Micronesia in the northern Pacific.

It is titled “Ancient DNA reveals five streams of migration into Micronesia and matrilocality in early Pacific seafarers”.

The paper helps expand the results of earlier studies, also showing once again that
The Harvard team used 164 ancient DNA samples from cemeteries at five sites on Guam and Saipan in the Mariana Islands and from Pohnpei in Central Micronesia to estimate the migration patterns. They found that the migration of Pacific Islanders was more complicated than most theories have suggested.

The Harvard team used 164 ancient DNA samples from cemeteries at five sites on Guam and Saipan in the Mariana Islands and from Pohnpei in Central Micronesia that ranged in age from 2800 to 300 years ago. This increased the number of ancient DNA samples studied from the Pacific by five times. They also sampled 112 living people mainly from Guam, Palau, Pohnpei, and Chuuk in Micronesia and compared the results with many more ancient and modern samples from the region.

The five streams of migration they identified were labelled as M1 to M5. First, there were separate migrations of East Asians to the Mariana Islands and Palau from somewhere in Island Southeast Asia, either the present-day Philippines or Eastern Indonesia around 3000 years ago. They were in relations to those 'First Remote Oceanians' who settled Vanuatu but different enough that we can tell them apart. The geneticists have labelled them 'FRO-Marianas' (M1) and 'FRO-Palau' (M2).

Sometime between about 2400 and 1700 years ago, some of the M2 group moved from Palau to the Marianas and mixed with the M1 group there. The 'FRO-Chamorros' of Guam and the Chamorro of the rest of the Marianas are descendants of these two groups and are the only Pacific Island population that just prior to European contact showed no Papuan admixture at all. They share about 85% ancestry from M1 and 15% from M2.

The third migration (M3) was again by an East Asian group, FRO-Southwest Pacific, already known to us from the early Vanuatu Lapita people. They moved from somewhere in the Lapita culture area to Central Micronesia, presumably about 2500 years ago although that is not certain. The next migration (M4), which affected the whole of Micronesia except the Marianas, was of a Papuan group. But not the same as the New Britain ones whose genes are found all over the Southwest Pacific. These Papanus came from further north along the northern fringes of New Guinea, most likely from the area around Manus Province, and are labelled as 'Papanu-New Guinean'.

The admixture between M3 and M4 in Central Micronesia probably took place around 2100 to 1800 years ago, but in Palau, the mixture between M2 and M4 is dated by the geneticists to 2500 to 2200 years ago. Today Central Micronesians derive about 27% of their ancestry from 'Papanu-New Guinean' whereas for Palauans the percentage is higher at 38%.

The final documented migration into Micronesia was of Polynesian people, within the last 1000 years, and two 2100 years ago and we may be missing several hundred years of earlier settlement.

This also means that we don't yet have archaeological evidence of when exactly M4 took place in Central Micronesia or Palau and what the effect of this migration of culturally quite different people (mainly men) would have had on island cultures. One thing seems clear and that is that it didn't change the languages either of Palau or of Central Micronesia.

This is very similar to what seems to have happened in Vanuatu where incoming Papuan-New British populations, mainly men, didn't have enough effect on local languages to have caused major changes. There must be something in the idea of 'mother-tongue' after all, with children learning their mother's rather than their father's language if they were different.

The genetic information also tells us something about marriage patterns in the early Pacific. It shows a pattern of matriarchal law, which basically means that men join their wife's community on marriage, as opposed to patrilocality where a woman moves to her husband's village upon marriage. Archaeologically, the Southeast Solomons is very poorly researched so we don't know if there are Lapita culture sites there which could fit with this origin.

Central Micronesia's early archaeology is also unknown. There are no sites yet found older than 2100 years ago and we may be missing several hundred years of earlier settlement. The clue is in the pattern of mitochondrial DNA which is inherited solely from one's mother.

When we compare different related communities in the past, such as Guam in the Mariana Islands and Vanuatu, it was found that although the rest of their DNA was shared, the mitochondrial DNA was quite different which can only happen if men from outside the group are marrying in. "Females certainly moved to new islands, but when they did so they were part of joint movements of both males and females," explains Harvard's David Reich.

"This pattern of leaving the community must have been nearly unique to males in order to explain why genetic differentiation is so much higher in mitochondrial DNA than in the rest of the genome."

This wasn't just true of the first generation of migrant men arriving in these archipelagos but persisted in many areas over time. In some areas today, the pattern is that women move to their husband's village, the patrilocality pattern.

What does this show is that culture and 'kastom' are forever changing to fit new circumstances. There is still much to learn. We still don't have very early ancient DNA samples from Central Micronesia or Palau, for instance, and the archaeology is still poorly known in many island groups there, as well as in the Southeast Solomons.

The Papuan movements out from New Britain and from northern New Guinea that affected the whole of the Southwest Pacific and Micronesia (except the Marianas) took place at about the same time.

What caused this need to migrate around 2500 to 2000 years ago? At present we can only guess.

One thing is very clear - When we talk of 'Melanesians', 'Micronesians' or 'Polynesians', with the partial exception of Polynesians we are talking of very internally diverse groups.

None of them represent any kind of idealized or pure 'race'; all of them show multiple and sometimes quite different origins. We should only use these outdated terms to refer only to geographical areas - Melanesia, Micronesia and Polynesia. They tell us very little about history.