

Japanese Roots

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Just who are the Japanese? Where did they come from and when? The answers are difficult to come by, though not impossible—the real problem is that the Japanese themselves may not want to know.

Unearthing the origins of the Japanese is a much harder task than you might guess. Among world powers today, the Japanese are the most distinctive in their culture and environment. The origins of their language are one of the most disputed questions of linguistics. These questions are central to the self-image of the Japanese and to how they are viewed by other peoples. Japan's rising dominance and touchy relations with its neighbors make it more important than ever to strip away myths and find answers.

The search for answers is difficult because the evidence is so conflicting. On the one hand, the Japanese people are biologically undistinctive, being very similar in appearance and genes to other East Asians, especially to Koreans. As the Japanese like to stress, they are culturally and biologically rather homogeneous, with the exception of a distinctive people called the Ainu on Japan's northernmost island of Hokkaido. Taken together, these facts seem to suggest that the Japanese reached Japan only recently from the Asian mainland, too recently to have evolved differences from their mainland cousins, and displaced the Ainu, who represent the original inhabitants. But if that were true, you might expect the Japanese language to show close affinities to some mainland language, just as English is obviously closely related to other Germanic languages (because Anglo-Saxons from the continent conquered England as recently as the sixth century a.d.). How can we resolve this contradiction between Japan's presumably ancient language and the evidence for recent origins?

Archeologists have proposed four conflicting theories. Most popular in Japan is the view that the Japanese gradually evolved from ancient Ice Age people who occupied Japan long before 20,000 b.c. Also widespread in Japan is a theory that the Japanese descended from horse-riding Asian nomads who passed through Korea to conquer Japan in the fourth century, but who were themselves—emphatically—not Koreans. A theory favored by many Western archeologists and Koreans, and unpopular in some circles in Japan, is that the Japanese are descendants of immigrants from Korea who arrived with rice-paddy agriculture around 400 b.c. Finally, the fourth theory holds that the peoples named in the other three theories could have mixed to form the modern Japanese.

When similar questions of origins arise about other peoples, they can be discussed dispassionately. That is not so for the Japanese. Until 1946, Japanese schools taught a myth of history based on the earliest recorded Japanese chronicles, which were written in the eighth century. They

describe how the sun goddess Amaterasu, born from the left eye of the creator god Izanagi, sent her grandson Ninigi to Earth on the Japanese island of Kyushu to wed an earthly deity. Ninigi's great-grandson Jimmu, aided by a dazzling sacred bird that rendered his enemies helpless, became the first emperor of Japan in 660 b.c. To fill the gap between 660 b.c. and the earliest historically documented Japanese monarchs, the chronicles invented 13 other equally fictitious emperors. Before the end of World War II, when Emperor Hirohito finally announced that he was not of divine descent, Japanese archeologists and historians had to make their interpretations conform to this chronicle account. Unlike American archeologists, who acknowledge that ancient sites in the United States were left by peoples (Native Americans) unrelated to most modern Americans, Japanese archeologists believe all archeological deposits in Japan, no matter how old, were left by ancestors of the modern Japanese. Hence archeology in Japan is supported by astronomical budgets, employs up to 50,000 field-workers each year, and draws public attention to a degree inconceivable anywhere else in the world.

Why do they care so much? Unlike most other non-European countries, Japan preserved its independence and culture while emerging from isolation to create an industrialized society in the late nineteenth century. It was a remarkable achievement. Now the Japanese people are understandably concerned about maintaining their traditions in the face of massive Western cultural influences. They want to believe that their distinctive language and culture required uniquely complex developmental processes. To acknowledge a relationship of the Japanese language to any other language seems to constitute a surrender of cultural identity.

What makes it especially difficult to discuss Japanese archeology dispassionately is that Japanese interpretations of the past affect present behavior. Who among East Asian peoples brought culture to whom? Who has historical claims to whose land? These are not just academic questions. For instance, there is much archeological evidence that people and material objects passed between Japan and Korea in the period a.d. 300 to 700. Japanese interpret this to mean that Japan conquered Korea and brought Korean slaves and artisans to Japan; Koreans believe instead that Korea conquered Japan and that the founders of the Japanese imperial family were Korean.

Thus, when Japan sent troops to Korea and annexed it in 1910, Japanese military leaders celebrated the annexation as "the restoration of the legitimate arrangement of antiquity." For the next 35 years, Japanese occupation forces tried to eradicate Korean culture and to replace the Korean language with Japanese in schools. The effort was a consequence of a centuries-old attitude of disdain. "Nose tombs" in Japan still contain 20,000 noses severed from Koreans and brought home as trophies of a sixteenth-century Japanese invasion. Not surprisingly, many Koreans loathe the Japanese, and their loathing is returned with contempt.

What really was "the legitimate arrangement of antiquity"? Today, Japan

and Korea are both economic powerhouses, facing each other across the Korea Strait and viewing each other through colored lenses of false myths and past atrocities. It bodes ill for the future of East Asia if these two great peoples cannot find common ground. To do so, they will need a correct understanding of who the Japanese people really are.

Japan's unique culture began with its unique geography and environment. It is, for comparison, far more isolated than Britain, which lies only 22 miles from the French coast. Japan lies 110 miles from the closest point of the Asian mainland (South Korea), 190 miles from mainland Russia, and 480 miles from mainland China. Climate, too, sets Japan apart. Its rainfall, up to 120 inches a year, makes it the wettest temperate country in the world. Unlike the winter rains prevailing over much of Europe, Japan's rains are concentrated in the summer growing season, giving it the highest plant productivity of any nation in the temperate zones. While 80 percent of Japan's land consists of mountains unsuitable for agriculture and only 14 percent is farmland, an average square mile of that farmland is so fertile that it supports eight times as many people as does an average square mile of British farmland. Japan's high rainfall also ensures a quickly regenerated forest after logging. Despite thousands of years of dense human occupation, Japan still offers visitors a first impression of greenness because 70 percent of its land is still covered by forest.

Japanese forest composition varies with latitude and altitude: evergreen leafy forest in the south at low altitude, deciduous leafy forest in central Japan, and coniferous forest in the north and high up. For prehistoric humans, the deciduous leafy forest was the most productive, providing abundant edible nuts such as walnuts, chestnuts, horse chestnuts, acorns, and beechnuts. Japanese waters are also outstandingly productive. The lakes, rivers, and surrounding seas teem with salmon, trout, tuna, sardines, mackerel, herring, and cod. Today, Japan is the largest consumer of fish in the world. Japanese waters are also rich in clams, oysters, and other shellfish, crabs, shrimp, crayfish, and edible seaweeds. That high productivity was a key to Japan's prehistory.

From southwest to northeast, the four main Japanese islands are Kyushu, Shikoku, Honshu, and Hokkaido. Until the late nineteenth century, Hokkaido and northern Honshu were inhabited mainly by the Ainu, who lived as hunter-gatherers with limited agriculture, while the people we know today as Japanese occupied the rest of the main islands.

In appearance, of course, the Japanese are very similar to other East Asians. As for the Ainu, however, their distinctive appearance has prompted more to be written about their origins and relationships than about any other single people on Earth. Partly because Ainu men have luxuriant beards and the most profuse body hair of any people, they are often classified as Caucasoids (so-called white people) who somehow migrated east through Eurasia to Japan. In their overall genetic makeup, though, the Ainu are related to other East Asians, including the Japanese and Koreans. The distinctive appearance and hunter-gatherer lifestyle of the Ainu, and the

undistinctive appearance and the intensive agricultural lifestyle of the Japanese, are frequently taken to suggest the straightforward interpretation that the Ainu are descended from Japan's original hunter-gatherer inhabitants and the Japanese are more recent invaders from the Asian mainland.

But this view is difficult to reconcile with the distinctiveness of the Japanese language. Everyone agrees that Japanese does not bear a close relation to any other language in the world. Most scholars consider it to be an isolated member of Asia's Altaic language family, which consists of Turkic, Mongolian, and Tungusic languages. Korean is also often considered to be an isolated member of this family, and within the family Japanese and Korean may be more closely related to each other than to other Altaic languages. However, the similarities between Japanese and Korean are confined to general grammatical features and about 15 percent of their basic vocabularies, rather than the detailed shared features of grammar and vocabulary that link, say, French to Spanish; they are more different from each other than Russian is from English.

Since languages change over time, the more similar two languages are, the more recently they must have diverged. By counting common words and features, linguists can estimate how long ago languages diverged, and such estimates suggest that Japanese and Korean parted company at least 4,000 years ago. As for the Ainu language, its origins are thoroughly in doubt; it may not have any special relationship to Japanese.

After genes and language, a third type of evidence about Japanese origins comes from ancient portraits. The earliest preserved likenesses of Japan's inhabitants are statues called haniwa, erected outside tombs around 1,500 years ago. Those statues unmistakably depict East Asians. They do not resemble the heavily bearded Ainu. If the Japanese did replace the Ainu in Japan south of Hokkaido, that replacement must have occurred before a.d. 500.

Our earliest written information about Japan comes from Chinese chronicles, because China developed literacy long before Korea or Japan. In early Chinese accounts of various peoples referred to as "Eastern Barbarians," Japan is described under the name Wa, whose inhabitants were said to be divided into more than a hundred quarreling states. Only a few Korean or Japanese inscriptions before a.d. 700 have been preserved, but extensive chronicles were written in 712 and 720 in Japan and later in Korea. Those reveal massive transmission of culture to Japan from Korea itself, and from China via Korea. The chronicles are also full of accounts of Koreans in Japan and of Japanese in Korea—interpreted by Japanese or Korean historians, respectively, as evidence of Japanese conquest of Korea or the reverse.

The ancestors of the Japanese, then, seem to have reached Japan before they had writing. Their biology suggests a recent arrival, but their language suggests arrival long ago. To resolve this paradox, we must now turn to

archeology.

The seas that surround much of Japan and coastal East Asia are shallow enough to have been dry land during the ice ages, when much of the ocean water was locked up in glaciers and sea level lay at about 500 feet below its present measurement. Land bridges connected Japan's main islands to one another, to the Russian mainland, and to South Korea. The mammals walking out to Japan included not only the ancestors of modern Japan's bears and monkeys but also ancient humans, long before boats had been invented. Stone tools indicate human arrival as early as half a million years ago.

Around 13,000 years ago, as glaciers melted rapidly all over the world, conditions in Japan changed spectacularly for the better, as far as humans were concerned. Temperature, rainfall, and humidity all increased, raising plant productivity to present high levels. Deciduous leafy forests full of nut trees, which had been confined to southern Japan during the ice ages, expanded northward at the expense of coniferous forest, thereby replacing a forest type that had been rather sterile for humans with a much more productive one. The rise in sea level severed the land bridges, converted Japan from a piece of the Asian continent to a big archipelago, turned what had been a plain into rich shallow seas, and created thousands of miles of productive new coastline with innumerable islands, bays, tidal flats, and estuaries, all teeming with seafood.

That end of the Ice Age was accompanied by the first of the two most decisive changes in Japanese history: the invention of pottery. In the usual experience of archeologists, inventions flow from mainlands to islands, and small peripheral societies aren't supposed to contribute revolutionary advances to the rest of the world. It therefore astonished archeologists to discover that the world's oldest known pottery was made in Japan 12,700 years ago. For the first time in human experience, people had watertight containers readily available in any desired shape. With their new ability to boil or steam food, they gained access to abundant resources that had previously been difficult to use: leafy vegetables, which would burn or dry out if cooked on an open fire; shellfish, which could now be opened easily; and toxic foods like acorns, which could now have their toxins boiled out. Soft-boiled foods could be fed to small children, permitting earlier weaning and more closely spaced babies. Toothless old people, the repositories of information in a preliterate society, could now be fed and live longer. All those momentous consequences of pottery triggered a population explosion, causing Japan's population to climb from an estimated few thousand to a quarter of a million.

The prejudice that islanders are supposed to learn from superior continentals wasn't the sole reason that record-breaking Japanese pottery caused such a shock. In addition, those first Japanese potters were clearly hunter-gatherers, which also violated established views. Usually only sedentary societies own pottery: what nomad wants to carry heavy, fragile pots, as well as weapons and the baby, whenever time comes to shift camp? Most sedentary societies

elsewhere in the world arose only with the adoption of agriculture. But the Japanese environment is so productive that people could settle down and make pottery while still living by hunting and gathering. Pottery helped those Japanese hunter-gatherers exploit their environment's rich food resources more than 10,000 years before intensive agriculture reached Japan.

Much ancient Japanese pottery was decorated by rolling or pressing a cord on soft clay. Because the Japanese word for cord marking is jomon, the term Jomon is applied to the pottery itself, to the ancient Japanese people who made it, and to that whole period in Japanese prehistory beginning with the invention of pottery and ending only 10,000 years later. The earliest Jomon pottery, of 12,700 years ago, comes from Kyushu, the southernmost Japanese island. Thereafter, pottery spread north, reaching the vicinity of modern Tokyo around 9,500 years ago and the northernmost island of Hokkaido by 7,000 years ago. Pottery's northward spread followed that of deciduous forest rich in nuts, suggesting that the climate-related food explosion was what permitted sedentary living.

How did Jomon people make their living? We have abundant evidence from the garbage they left behind at hundreds of thousands of excavated archeological sites all over Japan. They apparently enjoyed a well-balanced diet, one that modern nutritionists would applaud.

One major food category was nuts, especially chestnuts and walnuts, plus horse chestnuts and acorns leached or boiled free of their bitter poisons. Nuts could be harvested in autumn in prodigious quantities, then stored for the winter in underground pits up to six feet deep and six feet wide. Other plant foods included berries, fruits, seeds, leaves, shoots, bulbs, and roots. In all, archeologists sifting through Jomon garbage have identified 64 species of edible plants.

Then as now, Japan's inhabitants were among the world's leading consumers of seafood. They harpooned tuna in the open ocean, killed seals on the beaches, and exploited seasonal runs of salmon in the rivers. They drove dolphins into shallow water and clubbed or speared them, just as Japanese hunters do today. They netted diverse fish, captured them in weirs, and caught them on fishhooks carved from deer antlers. They gathered shellfish, crabs, and seaweed in the intertidal zone or dove for them. (Jomon skeletons show a high incidence of abnormal bone growth in the ears, often observed in divers today.) Among land animals hunted, wild boar and deer were the most common prey. They were caught in pit traps, shot with bows and arrows, and run down with dogs.

The most debated question about Jomon subsistence concerns the possible contribution of agriculture. Many Jomon sites contain remains of edible plants that are native to Japan as wild species but also grown as crops today, including the adzuki bean and green gram bean. The remains from Jomon times do not clearly show features distinguishing the crops from their wild ancestors, so we do not know whether these plants were gathered in the

wild or grown intentionally. Sites also have debris of edible or useful plant species not native to Japan, such as hemp, which must have been introduced from the Asian mainland. Around 1000 b.c., toward the end of the Jomon period, a few grains of rice, barley, and millet, the staple cereals of East Asia, began to appear. All these tantalizing clues make it likely that Jomon people were starting to practice some slash-and-burn agriculture, but evidently in a casual way that made only a minor contribution to their diet.

Archeologists studying Jomon hunter-gatherers have found not only hard-to-carry pottery (including pieces up to three feet tall) but also heavy stone tools, remains of substantial houses that show signs of repair, big village sites of 50 or more dwellings, and cemeteries—all further evidence that the Jomon people were sedentary rather than nomadic. Their stay-at-home lifestyle was made possible by the diversity of resource-rich habitats available within a short distance of one central site: inland forests, rivers, seashores, bays, and open oceans. Jomon people lived at some of the highest population densities ever estimated for hunter-gatherers, especially in central and northern Japan, with their nut-rich forests, salmon runs, and productive seas. The estimate of the total population of Jomon Japan at its peak is 250,000—trivial, of course, compared with today, but impressive for hunter-gatherers.

With all this stress on what Jomon people did have, we need to be clear as well about what they didn't have. Their lives were very different from those of contemporary societies only a few hundred miles away in mainland China and Korea. Jomon people had no intensive agriculture. Apart from dogs (and perhaps pigs), they had no domestic animals. They had no metal tools, no writing, no weaving, and little social stratification into chiefs and commoners. Regional variation in pottery styles suggests little progress toward political centralization and unification.

Despite its distinctiveness even in East Asia at that time, Jomon Japan was not completely isolated. Pottery, obsidian, and fishhooks testify to some Jomon trade with Korea, Russia, and Okinawa—as does the arrival of Asian mainland crops. Compared with later eras, though, that limited trade with the outside world had little influence on Jomon society. Jomon Japan was a miniature conservative universe that changed surprisingly little over 10,000 years.

To place Jomon Japan in a contemporary perspective, let us remind ourselves of what human societies were like on the Asian mainland in 400 b.c., just as the Jomon lifestyle was about to come to an end. China consisted of kingdoms with rich elites and poor commoners; the people lived in walled towns, and the country was on the verge of political unification and would soon become the world's largest empire. Beginning around 6500 b.c., China had developed intensive agriculture based on millet in the north and rice in the south; it had domestic pigs, chickens, and water buffalo. The Chinese had had writing for at least 900 years, metal tools for at least 1,500 years, and had just invented the world's first cast iron. Those developments were also spreading to Korea, which itself had had agriculture

for several thousand years (including rice since at least 2100 b.c.) and metal since 1000 b.c.

With all these developments going on for thousands of years just across the Korea Strait from Japan, it might seem astonishing that in 400 b.c. Japan was still occupied by people who had some trade with Korea but remained preliterate stone-tool-using hunter-gatherers. Throughout human history, centralized states with metal weapons and armies supported by dense agricultural populations have consistently swept away sparser populations of hunter-gatherers. How did Jomon Japan survive so long?

To understand the answer to this paradox, we have to remember that until 400 b.c., the Korea Strait separated not rich farmers from poor hunter-gatherers, but poor farmers from rich hunter-gatherers. China itself and Jomon Japan were probably not in direct contact. Instead Japan's trade contacts, such as they were, involved Korea. But rice had been domesticated in warm southern China and spread only slowly northward to much cooler Korea, because it took a long time to develop cold-resistant strains of rice. Early rice agriculture in Korea used dry-field methods rather than irrigated paddies and was not particularly productive. Hence early Korean agriculture could not compete with Jomon hunting and gathering. Jomon people themselves would have seen no advantage in adopting Korean agriculture, insofar as they were aware of its existence, and poor Korean farmers had no advantages that would let them force their way into Japan. As we shall see, the advantages finally reversed suddenly and dramatically.

More than 10,000 years after the invention of pottery and the subsequent Jomon population explosion, a second decisive event in Japanese history triggered a second population explosion. Around 400 b.c., a new lifestyle arrived from South Korea. This second transition poses in acute form our question about who the Japanese are. Does the transition mark the replacement of Jomon people with immigrants from Korea, ancestral to the modern Japanese? Or did Japan's original Jomon inhabitants continue to occupy Japan while learning valuable new tricks?

The new mode of living appeared first on the north coast of Japan's southwesternmost island, Kyushu, just across the Korea Strait from South Korea. There we find Japan's first metal tools, of iron, and Japan's first undisputed full-scale agriculture. That agriculture came in the form of irrigated rice fields, complete with canals, dams, banks, paddies, and rice residues revealed by archeological excavations. Archeologists term the new way of living Yayoi, after a district of Tokyo where in 1884 its characteristic pottery was first recognized. Unlike Jomon pottery, Yayoi pottery was very similar to contemporary South Korean pottery in shape. Many other elements of the new Yayoi culture were unmistakably Korean and previously foreign to Japan, including bronze objects, weaving, glass beads, and styles of tools and houses.

While rice was the most important crop, Yayoi farmers introduced 27 new

to Japan, as well as unquestionably domesticated pigs. They may have practiced double cropping, with paddies irrigated for rice production in the summer, then drained for dry-land cultivation of millet, barley, and wheat in the winter. Inevitably, this highly productive system of intensive agriculture triggered an immediate population explosion in Kyushu, where archeologists have identified far more Yayoi sites than Jomon sites, even though the Jomon period lasted 14 times longer.

In virtually no time, Yayoi farming jumped from Kyushu to the adjacent main islands of Shikoku and Honshu, reaching the Tokyo area within 200 years, and the cold northern tip of Honshu (1,000 miles from the first Yayoi settlements on Kyushu) in another century. After briefly occupying northern Honshu, Yayoi farmers abandoned that area, presumably because rice farming could not compete with the Jomon hunter-gatherer life. For the next 2,000 years, northern Honshu remained a frontier zone, beyond which the northernmost Japanese island of Hokkaido and its Ainu hunter-gatherers were not even considered part of the Japanese state until their annexation in the nineteenth century.

It took several centuries for Yayoi Japan to show the first signs of social stratification, as reflected especially in cemeteries. After about 100 b.c., separate parts of cemeteries were set aside for the graves of what was evidently an emerging elite class, marked by luxury goods imported from China, such as beautiful jade objects and bronze mirrors. As the Yayoi population explosion continued, and as all the best swamps or irrigable plains suitable for wet rice agriculture began to fill up, the archeological evidence suggests that war became more and more frequent: that evidence includes mass production of arrowheads, defensive moats surrounding villages, and buried skeletons pierced by projectile points. These hallmarks of war in Yayoi Japan corroborate the earliest accounts of Japan in Chinese chronicles, which describe the land of Wa and its hundred little political units fighting one another.

In the period from a.d. 300 to 700, both archeological excavations and frustratingly ambiguous accounts in later chronicles let us glimpse dimly the emergence of a politically unified Japan. Before a.d. 300, elite tombs were small and exhibited a regional diversity of styles. Beginning around a.d. 300, increasingly enormous earth-mound tombs called kofun, in the shape of keyholes, were constructed throughout the former Yayoi area from Kyushu to North Honshu. Kofun are up to 1,500 feet long and more than 100 feet high, making them possibly the largest earth-mound tombs in the world. The prodigious amount of labor required to build them and the uniformity of their style across Japan imply powerful rulers who commanded a huge, politically unified labor force. Those kofun that have been excavated contain lavish burial goods, but excavation of the largest ones is still forbidden because they are believed to contain the ancestors of the Japanese imperial line. The visible evidence of political centralization that the kofun provide reinforces the accounts of kofun-era Japanese emperors written down much later in Japanese and Korean chronicles. Massive Korean influences on Japan during the kofun era—whether

through the Korean conquest of Japan (the Korean view) or the Japanese conquest of Korea (the Japanese view)—were responsible for transmitting Buddhism, writing, horseback riding, and new ceramic and metallurgical techniques to Japan from the Asian mainland.

Finally, with the completion of Japan's first chronicle in a.d. 712, Japan emerged into the full light of history. As of 712, the people inhabiting Japan were at last unquestionably Japanese, and their language (termed Old Japanese) was unquestionably ancestral to modern Japanese. Emperor Akihito, who reigns today, is the eighty-second direct descendant of the emperor under whom that first chronicle of a.d. 712 was written. He is traditionally considered the 125th direct descendant of the legendary first emperor, Jimmu, the great-great-great-grandson of the sun goddess Amaterasu.

Japanese culture underwent far more radical change in the 700 years of the Yayoi era than in the ten millennia of Jomon times. The contrast between Jomon stability (or conservatism) and radical Yayoi change is the most striking feature of Japanese history. Obviously, something momentous happened at 400 b.c. What was it? Were the ancestors of the modern Japanese the Jomon people, the Yayoi people, or a combination? Japan's population increased by an astonishing factor of 70 during Yayoi times: What caused that change? A passionate debate has raged around three alternative hypotheses.

One theory is that Jomon hunter-gatherers themselves gradually evolved into the modern Japanese. Because they had already been living a settled existence in villages for thousands of years, they may have been preadapted to accepting agriculture. At the Yayoi transition, perhaps nothing more happened than that Jomon society received cold-resistant rice seeds and information about paddy irrigation from Korea, enabling it to produce more food and increase its numbers. This theory appeals to many modern Japanese because it minimizes the unwelcome contribution of Korean genes to the Japanese gene pool while portraying the Japanese people as uniquely Japanese for at least the past 12,000 years.

A second theory, unappealing to those Japanese who prefer the first theory, argues instead that the Yayoi transition represents a massive influx of immigrants from Korea, carrying Korean farming practices, culture, and genes. Kyushu would have seemed a paradise to Korean rice farmers, because it is warmer and swampier than Korea and hence a better place to grow rice. According to one estimate, Yayoi Japan received several million immigrants from Korea, utterly overwhelming the genetic contribution of Jomon people (thought to have numbered around 75,000 just before the Yayoi transition). If so, modern Japanese are descendants of Korean immigrants who developed a modified culture of their own over the last 2,000 years.

The last theory accepts the evidence for immigration from Korea but denies that it was massive. Instead, highly productive agriculture may have enabled

a modest number of immigrant rice farmers to reproduce much faster than Jomon hunter-gatherers and eventually to outnumber them. Like the second theory, this theory considers modern Japanese to be slightly modified Koreans but dispenses with the need for large-scale immigration.

By comparison with similar transitions elsewhere in the world, the second or third theory seems to me more plausible than the first theory. Over the last 12,000 years, agriculture arose at not more than nine places on Earth, including China and the Fertile Crescent. Twelve thousand years ago, everybody alive was a hunter-gatherer; now almost all of us are farmers or fed by farmers. Farming spread from those few sites of origin mainly because farmers outbred hunters, developed more potent technology, and then killed the hunters or drove them off lands suitable for agriculture. In modern times European farmers thereby replaced native Californian hunters, aboriginal Australians, and the San people of South Africa. Farmers who used stone tools similarly replaced hunters prehistorically throughout Europe, Southeast Asia, and Indonesia. Korean farmers of 400 b.c. would have enjoyed a much larger advantage over Jomon hunters because the Koreans already possessed iron tools and a highly developed form of intensive agriculture.

Which of the three theories is correct for Japan? The only direct way to answer this question is to compare Jomon and Yayoi skeletons and genes with those of modern Japanese and Ainu. Measurements have now been made of many skeletons. In addition, within the last three years molecular geneticists have begun to extract dna from ancient human skeletons and compare the genes of Japan's ancient and modern populations. Jomon and Yayoi skeletons, researchers find, are on the average readily distinguishable. Jomon people tended to be shorter, with relatively longer forearms and lower legs, more wide-set eyes, shorter and wider faces, and much more pronounced facial topography, with strikingly raised browridges, noses, and nose bridges. Yayoi people averaged an inch or two taller, with close-set eyes, high and narrow faces, and flat browridges and noses. Some skeletons of the Yayoi period were still Jomon-like in appearance, but that is to be expected by almost any theory of the Jomon-Yayoi transition. By the time of the kofun period, all Japanese skeletons except those of the Ainu form a homogeneous group, resembling modern Japanese and Koreans.

In all these respects, Jomon skulls differ from those of modern Japanese and are most similar to those of modern Ainu, while Yayoi skulls most resemble those of modern Japanese. Similarly, geneticists attempting to calculate the relative contributions of Korean-like Yayoi genes and Ainu-like Jomon genes to the modern Japanese gene pool have concluded that the Yayoi contribution was generally dominant. Thus, immigrants from Korea really did make a big contribution to the modern Japanese, though we cannot yet say whether that was because of massive immigration or else modest immigration amplified by a high rate of population increase. Genetic studies of the past three years have also at last resolved the controversy about the origins of the Ainu: they are the descendants of Japan's ancient Jomon inhabitants, mixed with Korean genes of Yayoi colonists and of the modern

Japanese.

Given the overwhelming advantage that rice agriculture gave Korean farmers, one has to wonder why the farmers achieved victory over Jomon hunters so suddenly, after making little headway in Japan for thousands of years. What finally tipped the balance and triggered the Yayoi transition was probably a combination of four developments: the farmers began raising rice in irrigated fields instead of in less productive dry fields; they developed rice strains that would grow well in a cool climate; their population expanded in Korea, putting pressure on Koreans to emigrate; and they invented iron tools that allowed them to mass-produce the wooden shovels, hoes, and other tools needed for rice-paddy agriculture. That iron and intensive farming reached Japan simultaneously is unlikely to have been a coincidence.

We have seen that the combined evidence of archeology, physical anthropology, and genetics supports the transparent interpretation for how the distinctive-looking Ainu and the undistinctive-looking Japanese came to share Japan: the Ainu are descended from Japan's original inhabitants and the Japanese are descended from more recent arrivals. But that view leaves the problem of language unexplained. If the Japanese really are recent arrivals from Korea, you might expect the Japanese and Korean languages to be very similar. More generally, if the Japanese people arose recently from some mixture, on the island of Kyushu, of original Ainu-like Jomon inhabitants with Yayoi invaders from Korea, the Japanese language might show close affinities to both the Korean and Ainu languages. Instead, Japanese and Ainu have no demonstrable relationship, and the relationship between Japanese and Korean is distant. How could this be so if the mixing occurred a mere 2,400 years ago? I suggest the following resolution of this paradox: the languages of Kyushu's Jomon residents and Yayoi invaders were quite different from the modern Ainu and Korean languages, respectively.

The Ainu language was spoken in recent times by the Ainu on the northern island of Hokkaido, so Hokkaido's Jomon inhabitants probably also spoke an Ainu-like language. The Jomon inhabitants of Kyushu, however, surely did not. From the southern tip of Kyushu to the northern tip of Hokkaido, the Japanese archipelago is nearly 1,500 miles long. In Jomon times it supported great regional diversity of subsistence techniques and of pottery styles and was never unified politically. During the 10,000 years of Jomon occupation, Jomon people would have evolved correspondingly great linguistic diversity. In fact, many Japanese place-names on Hokkaido and northern Honshu include the Ainu words for river, *nai* or *betsu*, and for cape, *shiri*, but such Ainu-like names do not occur farther south in Japan. This suggests not only that Yayoi and Japanese pioneers adopted many Jomon place-names, just as white Americans did Native American names (think of Massachusetts and Mississippi), but also that Ainu was the Jomon language only of northernmost Japan.

That is, the modern Ainu language of Hokkaido is not a model for the ancient Jomon language of Kyushu. By the same token, modern Korean

may be a poor model for the ancient Yayoi language of Korean immigrants in 400 b.c. In the centuries before Korea became unified politically in a.d. 676, it consisted of three kingdoms. Modern Korean is derived from the language of the kingdom of Silla, the kingdom that emerged triumphant and unified Korea, but Silla was not the kingdom that had close contact with Japan in the preceding centuries. Early Korean chronicles tell us that the different kingdoms had different languages. While the languages of the kingdoms defeated by Silla are poorly known, the few preserved words of one of those kingdoms, Koguryo, are much more similar to the corresponding Old Japanese words than are the corresponding modern Korean words. Korean languages may have been even more diverse in 400 b.c., before political unification had reached the stage of three kingdoms. The Korean language that reached Japan in 400 b.c., and that evolved into modern Japanese, I suspect, was quite different from the Silla language that evolved into modern Korean. Hence we should not be surprised that modern Japanese and Korean people resemble each other far more in their appearance and genes than in their languages.

History gives the Japanese and the Koreans ample grounds for mutual distrust and contempt, so any conclusion confirming their close relationship is likely to be unpopular among both peoples. Like Arabs and Jews, Koreans and Japanese are joined by blood yet locked in traditional enmity. But enmity is mutually destructive, in East Asia as in the Middle East. As reluctant as Japanese and Koreans are to admit it, they are like twin brothers who shared their formative years. The political future of East Asia depends in large part on their success in rediscovering those ancient bonds between them.

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