Like most of the social scientists at our meeting, I was treated to a veritable feast of technological speculation and extrapolation on the questions of interstellar colonization. The organizers of the conference on Interstellar Migration have encouraged the social scientists to rein in the space scientists and ground them in the social and historical realities. Taking them at their word, I will focus on two topics commonly left out of the space scientists’ equations: human history is one, the other is human behavior. To paraphrase Santayana, if we do not look seriously into our past and present, history dooms us to repeat our mistakes in the future.

Let us consider examples of past human colonization and try to draw what lessons we can to seek precedents for the problems we will face in colonizing space. I want to look at three kinds of societies: a hunting and gathering people, drawing on my own work with the !Kung San of the Kalahari Desert, and two mercantile peoples, the ancient Greeks and their colonization of the Mediterranean, and the Vikings and their movement into the North Atlantic.
How have human beings reacted in the past to the problems of occupying new territories? There are a number of questions we can ask. First of all, we are interested in the causes of colonization. Is it overpopulation? the desire for plunder? the desire for trade? Are there problems of inheritance laws, for example, that create movements outward? Second, we are interested in the course of colonization from the first reconnaissances or explorations to the planning and execution of major movements of peoples. We are concerned with the means of transportation, the kinds of vessels or land vehicles used, the size of the groups involved, the organization on shipboard, the organization of the new colony, and so on. We can also ask questions about the relation of colony to mother country. Is the colony subject to, independent of, or dominant over the mother country? History gives us examples of each of these. We are interested in relations between colony and colony: warlike or peaceful? We are interested in the question of the destiny of colonies: Do they outgrow the mother country? Do they, alternatively, lose contact with the mother country and die out? There are a range of possibilities between these two extremes. We are also interested in questions of time frame, sequencing, and geography: the rate of spread of the colonizing movement, the shape of the colonizing wave front. We will not be able to cover all these questions for all three case studies, but we will do well to keep them in mind.

Kung Foragers

My first case is not an example of colonization at all. The !Kung San, formerly called the Bushmen, live in Botswana and Namibia (fig. 11.1). Traditionally, they lived by hunting and gathering, the way of life that was, until 10,000 years ago, the universal mode of human existence. The total population of the !Kung today is about 15,000, most of them now living in nonhunting and gathering situations on Herero Tswana cattleposts or European farms. Only about 10 percent continued to live as hunters and gatherers into the 1960s. My work in the Dobe area of Botswana starting in 1963 has totaled about three years of field research.

The Dobe area !Kung are a stable population of about 460, remarkably close to Birdsell’s notion of a stable breeding population of 500. They are dispersed at nine water holes and divided into twenty-five living groups with a mean size of eighteen to twenty people. Subsistence through the 1960s was by hunting and gathering. Given the popular conception of hunting peoples living a life of hardship, one of the surprising things about the !Kung is that they have an
abundant food supply and a lot of leisure time. The main food crop is the wild mongongo nut, millions of which are harvested every year.

Social organization is simple. The main unit is a camp, flexible in composition, around which social life revolves. Females have a rather late menarche—girls don't reach puberty until 15 or 16 and their demography is characterized by very low fertility and high infant mortality. Nancy Howell, in a thorough demographic study, found that mean completed family size was 4.6 and that about 45 percent of those born died before reaching maturity. Low fertility and high mortality yield a very low but still positive growth rate. Howell also found a very long adult life expectancy. If one survived childhood,
one could expect to live well into the upper years. About 10 percent of the population during my fieldwork was more than age 60, a proportion similar to that of elderly in the U.S. population around the turn of the century.

Two key points need to be underlined about the !Kung. First, they are an egalitarian people, with no chiefs or headmen. This rather attractive political system has its advantages and disadvantages. One disadvantage is that there is no central authority for resolving disputes, and they do not have the option that we do of going to court or to the police in the event of a dispute. They have to resolve everything themselves. One advantage is that the core of their adaptation is based on sharing: the giving of food in a familial way without the immediate expectation of return. The !Kung and many other hunter-gatherers carry the sharing principle farthest of any human society. They have a very low development of private property, and it seems that their long-term survival has worked very well based on this principle of sharing.

It is difficult to speak of colonization with reference to societies like the !Kung. Band societies, when they migrate, go through a sort of a hiving-off process; a kind of Brownian motion is involved in their dispersal mechanisms. It is not systematic migration at all. Yet it is worth noting that more of Earth's surface has been peopled by these Brownian movements than by the systematic migrations of later times. When the Europeans began their sea-borne expansion, they found the rest of the world already occupied.

The Greeks and Vikings, by contrast, were organized into chiefdoms and rudimentary states. Colonization here was relatively systematic and often centrally organized. Further, water is a medium similar in some respects to space. Being a foreign medium to air breathers, it requires a certain level of technology to cross effectively and has many of the dangers that space will present to future colonists. In Greek and Viking colonization small groups set out in fragile craft, a situation that would seem to require a strong organization focused around a founder, a central leader. These people, I think we can say, were motivated by a spirit of adventure; they constituted a skewed sample of the population at large, that is, people who were willing to give up their comparative comforts at home and put up with hardship, isolation, and loneliness. The migration of the Greeks and Vikings were high-risk enterprises. The rewards could be great, but some of the colonies failed, others were lost at sea, and others lost contact with the mother country.
Greek Colonization of the Mediterranean

The preclassical Greeks were a textbook example of massive and rapid colonial expansion. The period that interests us most is known in Greek history as the Archaic or Geometric period, 800 to 500 B.C., which was marked by rapid social development after a period of "dark ages." The expansion was triggered around 800 B.C. by three factors: the rediscovery of literacy with the new Phoenician alphabet (the forerunner of the modern alphabet), the diffusion and rapid coming into use of iron technology, and the rapid growth of production and population. The outcomes of this explosive growth of productive forces were several. First, in the home cities of the Greeks, intense social inequality rapidly developed. Peasants were forced off the land and sold into slavery. Second, there was the development of one-man rule, the tyrannies that were so popular in Greece from 700 to 500 B.C. The third outcome was colonization. There was a massive out-migration from the Greek core area, and it clearly must be seen as a response to population pressure. I liked the distinction made earlier in our discussions between two kinds of responses to population pressure: Are we talking about peoples who are fleeing it or relieving it? I think in the Greek case the volume and size of the migration indicate that both aspects were in force. There were some cases where cities actually exported a significant proportion of their population.

The Greek colonization wave is traditionally dated as beginning around 750 B.C. The earliest moves were to Sicily (perhaps the world's oldest colony) and to the northern Aegean. In the early period colonies were usually offshoots of the mother city, which issued foundation decrees (some have been preserved) and which designated a leading citizen around whom the colony revolved. The actual ships employed were simple galleys with one or two rows of oars, and the distances were not long—not more than a two-day maximum between landfalls. The Mediterranean is very much like a pond compared with the central Pacific.

In the first two hundred years of colonization, more than 180 colonies were established. Most colonies were usually city-states, modeled on, but independent of, the mother city. There were exceptions. Corinth, for example, preferred direct control and developed quite a little empire with eight colonies under its control. Trade was clearly a factor in the founding of colonies. From the western regions of the Mediterranean, Greece obtained tin, silver, and gold; from the Black Sea, gold and grain, especially the latter. Much of the food that fed Athens in the Golden Age was grain from what is now the Ukraine.
Unlike the Polynesian islands, all of these lands were populated, and Greeks got along with the natives surprisingly well. In Sicily there were some wars and in some cases the colonists displaced the natives. But more often than not, relations between Greeks and natives were amicable. The native people benefited, it seems, from the Greek presence and trade; they received highly desired trade goods—pottery, wine, and olive oil—as well as exposure to Greek culture. In fact, it is clear that there was more fighting among Greeks than between Greeks and natives. For example, in 660 there was a war between Corinth and one of its main colonies, Korsyra, the modern Corfu. Some of the 180 colonies can be seen in figure 11.2. They stretched from Spain in the west to Egypt in the east and from the Crimea in the north to Libya in the south.

![Figure 11.2: Map of Greek colonies established between 750-500 B.C.](image)

Fig. 11.2. There were 184 Greek colonies established between 750-500 B.C.

Some aspects of the Greek colonization movement strike chords for us and evoke modern and future colonization movements. Colonies tended to be richer than the mother cities. For example, the town of Sybaris, on the toe of Italy founded around 708, was fabulously wealthy. The word *sybaritic*, meaning "rolling in luxury," is derived from this colony. The Sybarites drew wealth from a relatively rich hinterland and animated a whole economic region both through trade and production.

The image of the future in which more humans will live on space colonies than will live on Earth is something that has precedent in the
Greek experience. By 500 B.C. there were more Greeks living outside Greece than there were in nuclear Greece itself. Yet—and this is something we should reflect on too—when we look at the history of Greece, we see that most of the historical material comes from nuclear Greece. Aristotle was based in Athens and not in Sybaris or in Sicily, although it is true that some of the famous philosophers—such as Pythagoras—did work in Sicily and Italy. Philosophy, science, and politics all flourished in the core area, and in that respect the colonies never quite lost their status as rural peripheries.

The Greek data present some interesting perspectives on the question of sequencing. One theme of the interstellar migration conference has been the building of models of an expanding wave front of colonization. I assume such models are based on animal ecology dispersion models as much as anything else. In the Greek data there is a very poor correlation between geographic distance from the mother country and the date of settlement. Distant points were settled first, and later colonies could be much closer in. The Sicilian and southern Italian regions give us some good examples (fig. 11.3). We see that, for example, Syracuse on the east side of Sicily was founded in 734; three other colonies on the same coast were founded about the same time. However, contemporary with these are very early colonies as far north along the western shore of Italy proper as Cumai on the Bay of Naples. Conversely, fairly close in to the nuclear area of Sicily are colonies founded at very late dates such as 598. So I cannot construct a reasonable set of isomorphic lines that would create a wave front model of colonization of the kind we have been looking for. (I should mention that there is another problem, a caveat about these founding dates: They come from ancient sources and they don’t always square with archaeology.)

The point is that the founding of Greek colonies was structured by many factors other than mere distance: the presence of good harbors, the availability of suitable defensive sites, whether the natives were friendly—just to mention a few. Similarly, I would argue, a multiplicity of factors other than distance will shape the choice of colonizing sites in space.

Another complicating factor is that, as we might predict, colonies started founding other colonies almost immediately. For example, only five years after Naxos was founded, it in turn founded a secondary colony named Leotini, and fifty years later primary colonies were still being established elsewhere in Sicily. I cannot see any simple equation that would handle this in a way that would conform to wave front colonization.
Vikings in the Atlantic

Let us now look at the Vikings. Predatory as the Greeks were, the Vikings were much more predatory. The Vikings' career of colonization begins with a violent eruption on the scene around A.D. 800 and involves a great deal of fighting; even the names, like Eric Blood-Ax, conjure up a certain image. The extent of their spread was spectacular. By A.D. 1000 the Vikings stretched from North America to Constantinople. Scandinavian peoples moved both east and west and three divisions can be distinguished, with a great deal of mixing (fig. 11.4).

The Swedes mainly went east and founded the Varangians, who in turn provided the ruling dynasties of what later became Russia. Their great trading cities were Novgorod and Kiev, and they extended their
trading posts to the Black Sea and down the Volga as far as the Caspian Sea. Some of the best material we have on this period is from the Arab chroniclers who encountered the Varangians at the mouth of the Volga.

The Danes went west and fell on England with fury in 793, sacking the monastery at Lindesfarne on the northeast English coast. From there they proceeded to occupy the northern two-thirds of England in an area that came to be called the Danelaw. Later, however, the Danes were defeated by the more indigenous English kings of Mercia, after which they fade from the scene.

The Norsemen proper, who were based in southwestern Norway, had the greatest impact on Western Europe. Initially, they went west to Ireland and Scotland and south to France. They founded Normandy, getting in on the ground floor as the ruling class of high feudalism, and later, of course, conquered England in 1066. They also set up a Norman kingdom in Sicily and North Africa. But the migration that interests us most is the oceanic island hopping that led them to North America.

What set the Vikings in motion first of all was clearly overpopulation. The arable areas of southwest Norway were limited (as was the Greek homeland) and could not sustain a large population growth. There is some evidence that the Vikings overseas and at home had an
extremely high birthrate. The Vikings were polygamous and leading men had ten or more wives and concubines. The Arabs, who were no slouches themselves, devote page after page in their chronicles to the sexual proclivities of the Vikings. They observed the frequent public performances of multiple sexual intercourse on the occasions of funerals and marriages. Highly visible sexuality doesn't necessarily mean a correspondingly high birthrate, but it is suggestive.

The question of whether it was a climatic optimum that facilitated the exploration and settlement of the North Atlantic is a topic that needs investigation. The latter half of the story definitely has to do with a climatic deterioration: The Little Ice Age from A.D. 1200 to 1600 is implicated in the abandonment of settlements in Greenland and elsewhere.

A second factor that set the Vikings in motion was inheritance laws. With a system of primogeniture, first sons inherited all and younger sons were basically out of luck. A similar factor has been noted for Polynesian migrations.

A third factor was political rivalry. Norway was ruled by petty kings at home, and much of the outward movement as described in the sagas was initiated by leading men, chiefs, thwarted in some kind of political maneuver at home, who got on board ship and with their followers set out to look for living space.

The ships were beautiful, magnificent craft of 60 to 90 feet long with prows carved in beastly shapes. They were propelled with a single row of oars and sail power. The keels were built to be flexible, which made them more seaworthy, allowing the ships to absorb the shocks of the waves. They had very shallow draughts and thus could travel upriver long distances. At freeze-up they were hauled out and beached for the winter. Crews numbered around twenty-five, with twelve or so rowers on a side, and there was room for passengers and livestock. The navigators used latitude sailing. By keeping the polestar at a constant height above the horizon, they could cross large spaces of open water between landfalls. They used winds, of course, and bird lore as well. One Icelandic saga mentions a man called Ravenflokli, who around 860 took three birds with him on a trip west. When he released the first raven, it immediately flew back to their starting point. The second bird he released flew up into the air and landed right back on the ship. A few days later the third bird was released and flew straight west and led him to a land which he named "Iceland."

Let us look at the sequencing of the Viking move west. They invaded England in 793; they colonized the Shetland and Orkney islands around 800 and the Faroe Islands in 825. An interesting historical footnote is that on all these remote islands the Vikings
found Irish hermit monks in residence. The monks had discovered these islands long before the Vikings and were there to forsake all human contact and to commune with God. With the Vikings' arrival, the neighborhood went downhill. Then in 860 the Vikings reached Iceland, and by 870 they had begun to settle there. Iceland is a good example of a very rapid filling up process; by 930, after only sixty years of systematic settlement, the land was extensively settled. Some scholars estimate that by then the population may have reached as many as 30,000 to 60,000, impressive numbers particularly since now, after centuries of development, the population is only about 200,000. Whatever the exact numbers, some Icelanders certainly felt crowded and by 930 had begun to think about moving on.

Iceland had forests and excellent grazing for sheep; then there were the wonderful resources of the sea. Unlike Greek colonization, where mostly males went out and married local women, Norse colonization was not an all-male operation. In fact, the Norse trait of migrating in family groups may have contributed significantly to rapid population growth. But population growth was not all natural increase, of course: There was constant traffic between Iceland and Norway and between Iceland and Ireland. The Celts formed part of the slave population; Celtic contribution to the contemporary Icelandic gene pool is estimated at about one-seventh.

At any rate, in 982 an interesting character from our history books named Eirik the Red was banished for homicide from Iceland, after having previously been banished from Norway for the same offense. Unable to go east, he decided to use his three years of banishment usefully and so set off to the west. He sailed to explore Greenland whose sighting had recently been reported. When he returned to Iceland with exciting tales of a vast land teeming with game, settlement fever overtook the Icelanders, and twenty-five boats sailed off in 986, of which fourteen arrived safely in Greenland, bringing about 450 colonists. They set up an initially very successful settlement in Greenland. In the same year, 986, a man named Bjarni Herjolfsson chased the Greenland expedition—he was too late to go off with it—but missed Greenland entirely, and after many days' sailing reached Labrador. Interestingly enough, the sagas relate that he never landed; he just coasted up and down the shore of Labrador, crossed to Baffinland, and by dead reckoning got himself back to Greenland. It was based on his information that Leif Eiriksson set out in 1000 for North America. Leif used Bjarni Herjolfsson's ship and some of his crew. Retracing the same route, he reached North America with landfalls on Baffin Island, then Labrador, and finally Vinland.
There has been much debate about the Vinland story. Clearly, the first settlement was in northern Newfoundland. Helge and Anne Ingstad have been excavating an apparent Norse site at l'Anse aux Meadows at the northern tip of Newfoundland, which is probably the Vinland of Leif Eiriksson.

There were subsequent trips: about four voyages in all during the next decade. A man named Thorfinn Karlsefni married Eirik the Red's daughter and went out with three boats and about 160 men, women and children, and livestock, with the intention of making a permanent settlement in North America. It is not clear where the settlement was situated, but they lasted only three winters before being driven off by the unfriendliness of the climate and the native population. On the plus side, the sagas relate fabulous trading deals, in which the natives give Thorfinn a valuable fur for a cup of cow's milk or several furs for a strip of red cloth. But in spite of these bargains, the colony failed and returned to Greenland. During the next three centuries, there were several other voyages to North America, some voluntary and some involuntary, but it was not until the sixteenth century that the next permanent settlement of Europeans in North America was attempted.

Let us go back to the Greenland settlement, for it offers us some insights. It grew to a maximum size of about 3,000 people, with a dispersed settlement pattern. There was an eastern and western settlement, both of them on the southwest coast of Greenland. After A.D. 1200 ecological and political changes conspired to reduce seriously the colony's chances of survival. The period 900 to 1200 has been called the Little Climatic Optimum, a period of warmer temperatures and receding ice; most of the westward activity was accomplished in the window provided by this climatic change. In the period 1200 to 1600 there were colder temperatures, shorter growing seasons, and advancing ice. The routes of travel between Iceland and Greenland, for example, had to be drastically altered because the old routes were blocked by ice. The Greenlanders had advanced up the coast as far as 79° north latitude, as attested by runic inscriptions on stones found at that latitude, both on the Canadian arctic islands and on the Greenland coast.

But by 1350 the northern of the two major Greenland settlements had to be abandoned; by 1380 Greenland's sole remaining settlement lost regular contact with Iceland and Europe. Very infrequent and intermittent contacts continued every thirty years or so; there was one voyage in 1385, another in 1406, another in 1448, and the last, in 1476, by English merchants from Bristol. Then silence; the colony died out.
There are many theories to account for the dying out of the Greenland colony. One is that the colonists were killed off by the Eskimo. Another theory, citing skeletal evidence, argues that they physically degenerated and died out. Still another argues that they blended with the Eskimo, that is, "went native," and it is probably true that some of them did. This view gains support from a 1637 Vatican document based on an earlier text from 1342, which states: "The inhabitants of Greenland of their own will [have] abandoned the true faith and the Christian religion . . . . and went over to the people of America." Although the Eskimos were in Greenland before A.D. 1000, they were not in southwestern Greenland when the Norse first arrived; they only began moving south after 1200 when the growing cold conditions forced them to move down the coast.

There are some more extravagant theories of the fate of the Greenlanders as well. One fanciful idea is that they made a last desperate escape attempt to America and disappeared into the American wilderness. This is sometimes connected with the supposed findings of Norse relics in such inland locales as northern Ontario and Minnesota.

All these scenarios might have some truth, but the mystery remains. It is a cautionary tale for us: Not everyone wins at the migration game. Colonies can be lost, and Greenland is a well-documented example. A footnote to the story is that Greenland was reoccupied by Danish settlers after 1700 and today has a population of 50,000, who are Scandinavian-Eskimo hybrids, with their own parliament, newspapers, and a thriving culture.

Space Colonization: Sybaris or Greenland?

Before leaving the matter of human colonization, I would like to report some observations on a recently discovered culture—that of the space scientists who were at the Interstellar Migration Conference.

As an anthropologist studying this culture, I find it at least as exotic as the cultures of the !Kung, the Greeks, and the Vikings; in some ways more so. Their view of space gives me an interesting insight into their view of the world. They seem to have a tremendous commitment to and faith in science and technology and their ability to solve our problems. I have the feeling that their visions of space are really a projection of the American free enterprise system into the cosmos. For example, something about these wonderful colonizing wave models stuck in my mind. In a way it is the American utopia and manifest destiny all over again: an unlimited frontier, vast resources—like
winning the West with no Indians. Gerard O'Neill's *The High Frontier* makes this symbolism explicit.

Implicit in the ethos of these space scientists is an interesting view of women contained in the models of rapid population growth. The wave front model, for example, appears to assume a doubling of the population every generation or so. How is this doubling to be achieved? Are they really casting women in the role of reproductive machines? We have focused almost exclusively on the geometric progression of numbers involved in founding colonies and have largely ignored the human implications of such numbers. Some of them may argue that no, we are not casting women in that role at all, that everything will be done in a test tube. But that seems to entail an equally grim view of our future. If the future in space is a choice between women as baby-making machines or machines as baby-making machines, you will have to count me out on both scenarios.

The upshot of all this is to inject a somber note in an otherwise optimistic proceeding. We need to learn a little humility and at least to become aware of our own unexamined assumptions. These scientists aspire to the stars and yet their vision is profoundly limited by the blinds of one culture at one point in history. *History is messy,* and the human material we are working with is messy. Let us at least try to be aware of the triumphalism that I hear again and again: “We’re going to space, it’s our destiny.” Such sloganeering strikes a hollow note for those of us who are far from sure that technology will solve all of our problems.

There are two big unknowns in this whole business of colonizing space, and we have looked at only one. The first, of course, is the extraterrestrial unknown: What is out there? But the second big unknown is the search for terrestrial intelligence: What is down here? If we are as smart as we claim to be and can go to the stars, why can’t we use our considerable intelligence to solve the problems on Earth before we export them to space?

A final word: Why bring the !Kung into this whole discussion at all? They are not an example of colonization. They have been out in the arid interior of southern Africa a long time, and there is no evidence that they have migrated from elsewhere. The !Kung do tell us three important things that we would do well to reflect on. They tell us, first, how to live in a small group. Second, they tell us how to be self-sufficient, and third, how to be able to do this for a very long time. One of the most exciting things about this whole conference for me is the vision of social engineering. I will leave to the rocket men their equations; but what the social scientists could contribute is the
designing of a human experiment: a closed-system, multigenerational human experiment. Imagine twenty groups of twenty-five spacefarers tethered to an interstellar sail, traveling through space, and getting together at a common location once or twice a year for a thousand years! When we are planning a space colony or a space ark to travel to another star, we may well have to rediscover the lessons that people like the !Kung can teach us.

References

"The maps of the census reports show an uneven advance of the farmer's frontier, with tongues of settlement pushed forward and with indentations of wilderness. In part this was due to Indian resistance, in part to the location of river valleys and passes, in part to the unequal forces of the centers of frontier attraction. Among the important centers of attraction may be mentioned the following: fertile and favorably situated soils, salt springs, mines, and army posts."

—Frederick Jackson Turner

"We cannot launch our planetary probes from a springboard of poverty, discrimination, or unrest; but neither can we wait until each and every terrestrial problem has been solved. Such logic two hundred years ago would have prevented expansion westward past the Appalachian Mountains, for assuredly, the Eastern seaboard was beset by problems of great urgency then, as it is today."

—Michael Collins