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THE FIRST AMERICANS: A STUDY OF THE ORIGIN, EVOLUTION AND VARIATION OF THE AMERICAN INDIANS

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ABSTRACT

A well-documented date of entry for the first New World inhabitants has not been established. Evidence shows that man's initial crossing into the New World was by way of the Bering Land Bridge at least 20,000 to 30,000 years ago. Earlier hypotheses attributing biological differences among native Americans to successive waves of migration are not supported by the present findings. There is no evidence that Australoid, Melanesian, Caucasoid or Negroid admixtures have contributed to the formation of the American Indian physical variety. Cultural and/or linguistic similarities between the American Indian and Asiatic Mongoloids have not been fully demonstrated. Studies of living and skeletal morphology have been more useful in reconstructing the past biological affinity of the New World natives. Differences exhibited among modern American Indian groups suggest the possibility that differences in the original Mongoloid stock from which they came have been retained. Since inhabiting the New World, physiological adaptation occurred under a wide range of environmental conditions including subarctic, desert and tropical rain forests, and therefore many of the biological differences can be due to environmental extremes.

INTRODUCTION

The origin and evolutionary history of the American Indians is still a controversial subject argued by archaeologists, prehistorians, geologists, and evolutionary biologists. Despite years of search in the Old and New Worlds for evidence of the origin of the American Indians, a well-documented synthesis of the available information is yet to be offered.

In considering the first New World inhabitants a major problem is the lack of well-dated, comparative osteological material from both Asia and the Americas. When such material is recovered, analysis is limited by several factors. Few

of the reported finds of Paleo-Indian skeletal remains are complete. Often, these finds consist of fragmentary skeletal material that is difficult to reconstruct; so cranial and post-cranial morphology is difficult to determine. Analysis has been further handicapped by the failure of Western scientists to adequately integrate (due to political and linguistic barriers) published data, particularly from Japan and Russia.

It is the intention of this investigation to critically review the available evidence of Paleo-Indian studies and to offer a model by which the present information can be placed into a more useful perspective.

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HISTORICAL REVIEW

Columbus and many of the early Spanish settlers viewed American Indians as less than fully human since they were not mentioned in the Bible. With Las Casa's (1474-1566) appeal, the church gave Indians a human status and agreed that they originated in the Old World. Another widely held theory was that the American Indians were descendants of the "Ten Lost Tribes of Israel." This was first proposed by Amerigo Vespucci after his voyage of 1497. James Adair (Williams, 1930), one of the advocates of this theory, based his hypothesis on phonetics instead of structural similarities between the languages of the two groups. Upon surveying the literature, no biological, linguistic or cultural evidence supporting this theory was found. Jennings, who recently reviewed this theory, concludes,

> "Complete lack of tangible evidence—such as the wheel, Old World grains or domestic animals—makes the theory untenable, to say nothing of the common sense problem of how a group of herdsmen and gardeners with no recorded skills of seamanship could have voyaged to the Americas all the way from the dry hills of Asia Minor." (Jennings, 1968: 44-45).

Father José de Acosta in his *Historia Natural y Moral de las Indians,* first published in Seville in 1590, considered the various theories relating to the American Indian origin. While rejecting Atlantis, the Lost Continent of Mu,

and the Ten Lost Tribes of Israel as possible Indian homelands (Beals, 1957; Wilmsen, 1965), he suggested the possibility of a land bridge or a narrow strait in high northern latitudes, over which small groups of hunters crossed to the New World. This appears to be the first time that an Asiatic origin was hypothesized for the American Indian natives. In 1650 Thomas Gage also suggested a Bering Strait route because the American Indians living near the strait were similar to Asiatics in their customs and habits (Thompson, 1958). Meanwhile, European authors were advancing their own hypotheses with regard to the origin of native American Indians. Hugo Grotius suggested Scandinavians, Ethiopians, Chinese and Moluccans as the American Indian's ancestors. Johannes de Laet and George Horn hypothesized that Scythian, pre-Columbian Spaniards, Moduc's Welsh and Polynesians were the forerunners of the American Indians (Winsor, 1889:369-370).

During the 18th century, even more invalid theories for the origin of the American Indians were advanced. Cotton Mather in his *Magnalia Christi Americana* writes,

> "Probably the devil decoyed these miserable savages hither, in hope that the gospel of the Lord Jesus Christ would never come here to disturb or destroy his absolute empire over them." (Drake, 1880:24-25).

In 1784 Thomas Jefferson (1801) excavated a small site near his home and recovered a large amount of mastodon bones and teeth. This discovery developed his interest in the American Indians. After further study of Indian languages, he concluded that American Indians and northern Asiatics had a common linguistic origin. Similar conclusions were reached by Father Ignaz Pfefferkorn, S.J. (1794-95) who states,

> " . . . in the northern regions America and Asia met or are separated by such a narrow strait that people and animals might pass without difficulty from one continent to the other. To me it is almost certain that the first inhabitants of America really came by way of this strait." (Treutlein, 1949:161).

Lubbock's *Prehistoric Times* was probably the first major work dealing with the history of American Indians. Lubbock (1878) divided their history into four stages: original barbarism, mounds, garden beds, and relapse into partial barbarism. To Lubbock, man's arrival in the New World came as a result of slow population movement, with a few groups entering the New World at any one time. In 1873, Abbott described what may have been a post-Archaic campsite and used it as a basis for explaining the origin of American Indians. After analyzing several hundred artifacts, Abbott suggested an early postglacial date but later (1889:304) concluded, "We are pretty sure of twenty or even thirty thousand years now."

Advocates of the multiple migration hypothesis predominated at the International Congress of Americanists, held at Nancy, France in 1875. Winchell (1880), for example, traced all of mankind from a submerged continent he called Lemuria where he at times even identified the specific tribes who were their descendants. Others gave more valid accounts of the American Indian origin. Dall (1877:93-98) favored a crossing on ice at the Bering Strait and Rau (1822) suggested a land bridge over which man made his crossing to the New World.

After the turn of the century, the fact was established that American Indians did not originate in the New World (Hrdlicka, 1920). For the first time, the question of their origin and evolutionary history was discussed by students with formal anthropological training. New skeletal material was recovered, analyzed and reported. This increased the opportunity for comparative skeletal studies and for communication between researchers interested in American Indian studies. Methods, techniques, and professional treatment and preservation of human skeletal material and artifacts were improved. Systematic site excavations were also employed and more knowledge of past human adaptation became possible. Most important was the rise of anthropological theory with a definite trend toward the integration of various anthropological subdisciplines in Paleo-Indian studies.

During the first half of the twentieth century, polyracialists advanced several theories to explain the origin and physical variability of the New World natives. These theories were based on a typological approach developed in the early days of physical anthropology using cranial measurements and indicial resemblances. Taylor (1946), Gladwin (1947), Howells (1946), Hooton (1947), Imbelloni (1943, 1958) and Rivet (1958) are among such authors.

Taylor (Birdsell, 1951) hypothesized Australoid, Mediterranean and Negroid migrations. Imbelloni (1943) postulated seven distinct human groups entering the New World in the following sequence: Tasmanians, Australians, Melanesians, Proto-Indonesians, Mongoloids, Indonesians and Eskimos. In 1958 Imbelloni revised his earlier hypothesis to include four additional groups. His study was based on stature, robusticity of bone structure, cephalic and head height indices, nasal and facial indices, hair color and form, and skin color. Both skeletal material and observations on living American Indians were used. The eleven varieties were also assigned a chronological order of entry into the New World. Hooton (1947) also attributed physical variability among the New World natives to different migrations. According to Hooton, Eskimos are the most Mongoloid in appearance with a smooth forehead, marked epicanthic eye-folds, a low-rooted and saddled infantile nose and a yellow skin. In North America, and presumably preceding the Eskimo as im-

migrants to the New World, American Indians were characterized by more receding brow ridges, boldly arched noses and coppery skins; in Central and South America are those with wavy hair, very dark skins, and short straight noses. These distributions suggest a series of separate migrations from Asia to the New World, with the earlier waves of immigration being non-Mongoloid (Hooton, 1947).

One of the more controversial arguments to explain the origin of the American Indian natives is that proposed by Birdsell in 1951. Birdsell hypothesized an eastern Asiatic population known as Archaic Caucasoid that was composed of three groups (Murrayians, Carpentarians, and Amurians) during the later part of the Pleistocene. Due to population pressure, Murrayians and Carpenterians were pushed southward where their descendants are today's Australian aborigines. Coon, Garn and Birdsell (1950) suggest that only the eastern branch of the Caucasoids (the Amurians) were represented in northeastern Asia. They further indicate that late in the fourth glacial period in response to stringent environmental conditions, the Mongoloid people evolved from an Archaic Caucasoid stock and spread rapidly. According to Birdsell, the American Indians are hybrids produced by an admixture of Amurian and Mongoloid varieties in which the Mongoloid features became predominant and masked the Caucasoid element. Such admixture, according to Birdsell, is found in groups such as Coahuila tribes of inland southern California and to a certain extent in the Pomo and Yuki of northern California.

Neumann (1952) viewed the differences between American Indian groups as a result of successive migrations. Neumann believes that all but one of his hypothesized eight varieties represent separate migrations to the New World from northeastern Asia. These migrations began with the Otamid variety, a rugged, long-headed people with large mandibles, and continued up to late prehistoric times with the Deneid (Athabaskans) and Inuid (Eskimos) being the latest. Later, however, Neumann (1960) modified his earlier views and offered an evolutionary interpretation to explain the observed physical variability between American Indian groups.

Mourant (1954) and Simmons (1956) suggested that Polynesians and North American Indians could have shared a common gene pool in the not too distant past. Rivet (1958) suggested that the American Indians were the result of four migrations: Mongoloids and Eskimoids (coming through the Bering Strait) and Australoid and Melanesians (coming through the Arctic and Pacific respectively).

W. W. Howells (1946) is not in agreement with the above hypotheses of a non-Mongoloid origin of the American Indians. He argues that the early American Indians were descendants of a generalized Mongoloid stock which

was present during Pleistocene times in northern Asia before the more specialized Mongoloids, such as the Chinese, had developed. Howells further indicates that the groups most similar to the American Indians are those of Indonesia, central Asia and Tibet. Evidence of this generalized American Indian-like Mongoloid variety in Asia is cited by T. D. Stewart (1960) who compared the Late Pleistocene Tzeyang and Liukang crania of western and southern China with American Indian skulls from Florida and California. Stewart also stated that the skulls from the upper cave of Choukoutien (Late Pleistocene) near Peking, China, are similar to those of the American Indians.

Turner (1971), using the incidence of three-rooted mandibular first permanent molars (3RM1), suggested three separate migrations from Asia. The first arrivals were the ancestors of all American Indians except for the Na-Dene (Athabaskans and related groups) who were the second migration. The third group (Proto-Aleut-Eskimo), according to Turner, could have entered the New World at any time during the Upper Paleolithic.

Although linguistic and blood group data support Turner's contention, the use of such data has not been reliable. Swadesh (1960, 1962), on questionable grounds derived from glottochronology, views the majority of American Indian languages to have developed out of the single speech community "Proto-Ancient American." Aleut-Eskimo and Nadenean languages formed a distinctive linguistic group. All North and South American Indians, with the exception of the Athabaskan speakers, show a high incidence of blood group genes O with an extremely low incidence of blood group genes B and A. Athabaskans and related groups show the world's highest known incidence of blood type A. Eskimos and Aleuts are more like Asiatics, particularly in the high incidence of blood type B (Zolatoreva, 1965), with almost equal distributions of blood group genes A, B and O when compared to other American Indian groups. The uncertainty of using blood group gene frequencies in elucidating population affinities and for tracing historical relationships between closely related groups is well-documented (Hanna, 1962; Merbs, 1965). For example, data on the ABO blood systems on Southwestern Indians and Athabaskans (Merbs, 1965) shows Pima Indians to have an incidence more similar to the Ramah Navajo than the latter to other Navajo tribes. Some of the Arizona Apaches of Cibecue and East Fork show distribution more similar to the Pima tribes in Arizona and the Tewan-speaking groups of New Mexico than to the Cedar Creek and San Carlos Apache tribes, also of Arizona.

There are other physical characteristics which clearly distinguish the American Indians from Aleuts and Eskimos. According to Laughlin (1967), Eskimos and Aleuts, along with the Chuckchi, Koryak, and possibly the Kamchadal encircle the Bering Sea and compose a biologically related group, the Bering Sea

Mongoloid. In their physical characteristics, Eskimos and Aleuts (Laughlin, 1950, 1963, 1966, 1967) have many common elements that establish a close affinity with the Chuckchi and Asiatic Mongoloids, rather than with American Indians. Common features are large heads and faces, large mandibles, high frequency of mandibular torii, thickening of the tympanic plate which is often pronounced, and narrow nasal bones often achieving a world extreme in Eastern Eskimos. There are many dental traits common to Eskimos and Aleuts, but not American Indians. Among these are the frequent absence of third molars, the large lateral as well as medial incisors, and the three-rooted mandibular first permanent molars. Physiologically, the Eskimos display differences from Indians in their cold adaptations, especially in their elevated basal metabolism (Milan, 1963). Eskimos also have a high incidence of separate neural arches and other anomalies, again showing a greater affinity with Asiatic Mongoloids than with the American Indians (Merbs, 1963).

THE BERING STRAIT

It is now accepted that man's first crossing from Asia into the New World was by way of the Bering Land Bridge connecting Siberia and Alaska some time during the Late Pleistocene (Hopkins, 1967). Who were these people? How did they get here?

Where the Bering Strait now exists, a broad land area called Beringia (western Alaska, northeastern Siberia and the shallow parts of the Bering Sea and Chuckchi Sea) was present several times during the Wisconsin glacial stage (Butzer, 1971). The Bering Strait is only 56 miles wide at its narrowest point. A land bridge would form if sea level dropped 120 feet below its present level (Solecki, 1951a, 1951b; Creager and McManus, 1967) connecting Siberia and Alaska by way of St. Lawrence Island (Fig. 1).

Geological evidence shows that the Wisconsin glacier reached its maximum about 40,000 years ago and lowered the sea level by about 460 feet (Haag, 1962). The bridge was submerged again approximately 28,000 to 25,000 years ago. On the basis of climatic evidence, the land bridge could have lasted from about 25,000 to about 11,000 years ago. The lowering of the sea level exposed nearly all the Bering-Chuckchi platform connecting Alaska and Siberia by a plain extending from the north shore of the shrunken Bering Sea to the south shore of the Arctic Ocean (Hopkins, 1959). According to Chard (1959), northeastern Asia and Alaska were glaciated only in the mountainous regions even during the maximum extension of the ice sheets. The coastal plains of northeastern Alaska were free of ice and much easier to travel than the mountainous region to the south. Furthermore, neither the Chuckchi Peninsula in Siberia nor the Seward

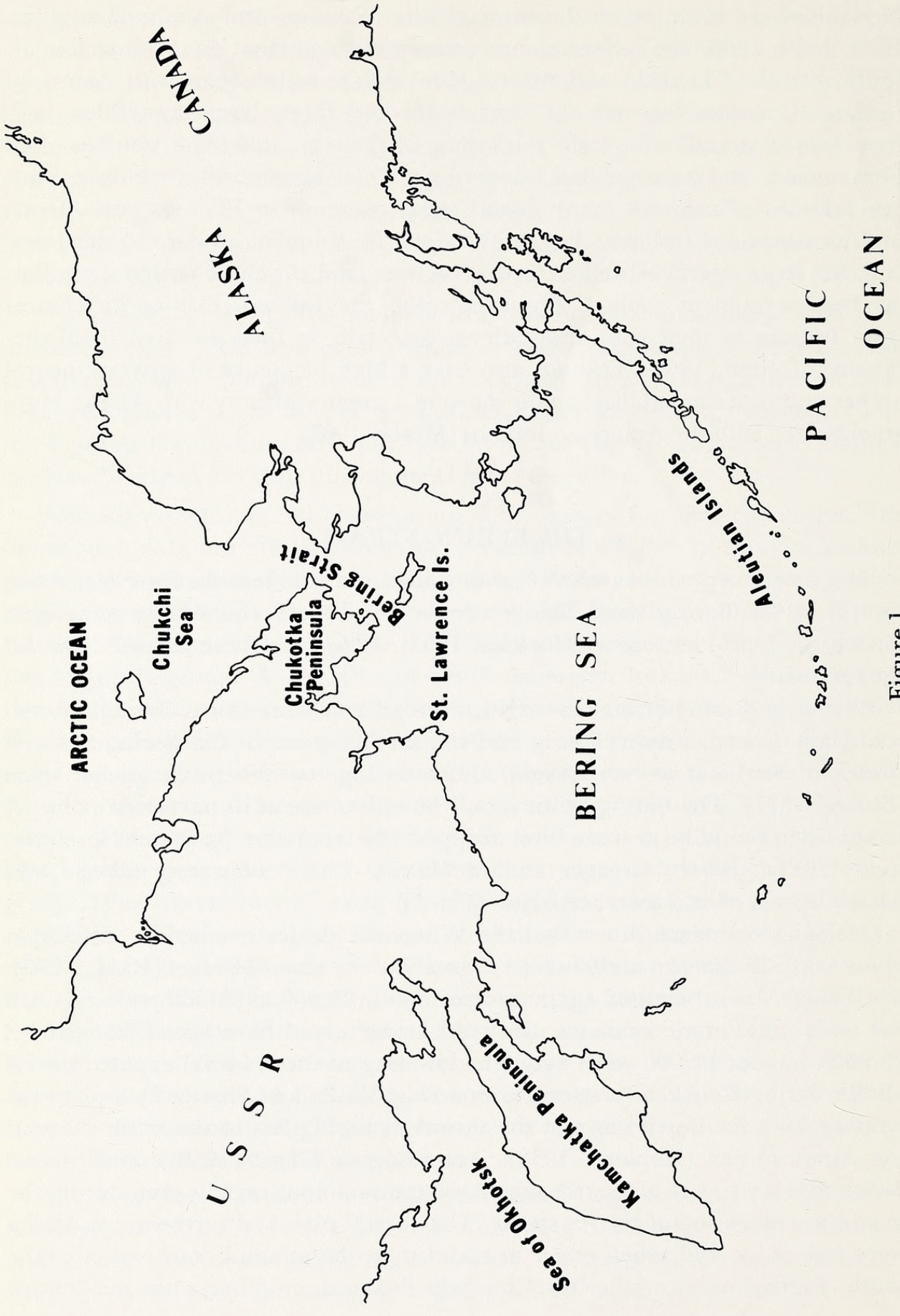
CANADA
ALASKA
ARCTIC OCEAN
Chukchi Sea
Chukotka Peninsula
Bering Strait
St. Lawrence Is.
BERING SEA
Aleutian Islands
PACIFIC OCEAN
U S S R
Kamchatka Peninsula
Sea of Okhotsk

Figure 1.

Peninsula of Alaska were glaciated during the Wisconsin period. The Bering Land Bridge which also existed at the same time was glacier-free, making the crossing even easier. With no physiographic barrier, Asiatic people and animals could have moved freely across the land bridge during most of the Wisconsin Stage. Haag (1962) indicates that fossil evidence for the origin and geographic distribution of North American mammals shows that many animals crossed the Bering Land Bridge to the New World during the Wisconsin Stage. These include mastodon, mammoth, musk oxen, moose, bear, bison, mountain sheep, goats, elk, camels, fox, wolves and horses (Haag, 1962:114).

During the Late Pleistocene the environmental conditions of Beringia were very similar to those of northeastern Siberia (Colinvaux, 1964). The abundance of horse, bison, woolly mammoth, antelope and yak made this area economically attractive to the Asiatic hunters. Following the game, these hunters moved eastward until this pursuit led them unknowingly across the Bering Land Bridge into Alaska and on to North and South America. These migrants may have moved into the New World on the winter pack ice even when the land bridge was submerged. It is also possible these first Americans had developed small sea crafts capable of negotiating the Bering Strait.

It is conceivable that Asiatic hunters deliberately undertook a long journey into an unknown land. Population movement appears to have been sporadic and to have spread slowly. Population pressure, abundance of game and climatic conditions were both motivating and limiting factors which determined the magnitude and rate at which the first migrants moved out of Asia. Those who made the crossing were probably adapted to the conditions of the peri-glacial ecosystem, and had developed adequate tools and hunting techniques. These people spread eastward along the Alaskan foothill country, then southward. The advantages of traveling such a route have been outlined by Irving (1953). These areas (1) are comparatively dry in contrast with the wet lowland tundras, (2) are good for sighting game, (3) offer the advantage of both forest and tundra, being open enough for pursuit of game but with enough tree and bush cover to provide shelter, (4) are preferred routes for major game trails that are otherwise restricted by rugged mountains and soggy grounds. Wilmsen (1965) suggests it is important to note that this was the only type of environment which might be virtually continuous from central Siberia to central North America during glacial periods. Once on Beringia, with the advantages of sea, rivers and nearby forests, some of these human bands may have become established with permanent occupations. As the Bering Sea Platform slowly submerged due to warmer temperatures, some group dispersal to the interior may have occurred. These hunters would not have the tendency to go back to Siberia but rather to push forward toward the interior.

EVIDENCE FROM THE NEW WORLD

The oldest carbon 14 dated New World human skeleton (skull) is Los Angeles Man at 23,600 B.P. (Wormington, 1971), and the Laguna Beach skull dated at about 17,000 B.P. (Berger and Libby, 1969). The best dated skeletal remains are the 10,750 ± 500 B.P.-year-old cranium fragments from Marmes, Washington.

In North America, Indian cultural traditions are usually subdivided into three successive though overlapping horizons on the basis of their style: Llano, Folsom and Plano. The Llano complex, including Clovis and Sandia points, dates some time around 10,000 to 12,000 years ago. The Llano is an early plains hunting complex known mainly from sites in the southwestern United States and Mexico, of which Lehner Ranch (Haury *et al*, 1959) and Blackwater Draw (Sellards, 1952) are typical. Clovis points have been dated at 9250 ± 300 B.P. at the Naco Site in Arizona, and seven other radiocarbon dates at Lehner Site range from 7022 ± 450 to 12,000 ± 450 B.P. (Haury *et al*, 1959). Folsom points seem to have been the regional development of the Llano. A shift from mammoth to bison hunting is evident between the Llano and Folsom Sites, but there seem to be no major structural changes between the artifact assemblages (Willey, 1966). Folsom points have been dated at three places. The Lubbock Site in the Texas Panhandle is dated at 9883 ± 350 B.P. (Sellards, 1952), the Lindenmeier in Colorado at 10,780 ± 375 (Haynes and Agogino, 1960), and Brewster in eastern Wyoming at 10,375 ± 700 (Krieger, 1964). At Graham Cabe, Missouri, and Modoc Rock Shelter in Illinois, points of "plano" types range from 8830 ± 500 to 10,651 ± 651 B.P. A date of 11,200 ± 800 comes from the bottom of the Modoc Rock Shelter (Krieger, 1964).

There is other evidence suggesting that man's arrival in the New World could have occurred much earlier. The evidence for such an early appearance comes from several sites in North and South America, and is based on artifact assemblages. In general, these "hypothesized" tools are crude, percussion-flaked tools, scrapers, and choppers. Most of these claims for the "pre-projectile point" cultural tradition rests on typology alone.

The earliest of the radiocarbon dates for these suggested tools in the New World come from Lewisville, in northern Texas. Twenty-one hearths, fossil bones, charred hackberry seeds and a crude chopper or scraper show some evidence of human occupation (Crook and Harris, 1957). A date of 37,000 B.P. has been determined. The antiquity of this site has been challenged and the hearths are not believed to have been man-made (Heizer and Brooks, 1965). The clovis-type projectile points recovered suggest either a mixture of later material with earlier geological strata or the points were simply "planted"

there. On Santa Rosa Island dwarf mammoth bones and burned bone fragments gave a radiocarbon date ranging from 30,000 to more than 37,000 years ago. Only one specimen of what possibly is a crude chipped-stone has been found with any of the hearths or bone deposits (Orr, 1968). Radiocarbon dates on "presumed" charcoal from Tule Spring in southern Nevada were more than 23,000 and 28,000 years old (Harrington and Simpson, 1961). Recent excavations at Tule Springs do not lend support to the original claims. Laboratory analysis has shown that the dark, carbonaceous materials from the supposed "hearths" may not have been entirely charcoal. The earliest evidence of man's presence at Tule Springs is now placed at about B.C. 11,000 (Bryan, 1964; Shutler, 1965).

The earliest definite proof of man's presence in South America comes from two localities: the Chivateros I complex in the Chillon Valley of the central coast of Peru and Lagoa Santa, Brazil. Radiocarbon dates have placed the end of the Chivateros I occupation at B.C. 8500 (Willey, 1966). At the Lagoa Santa caves and rock shelter, fauna, artifacts and human remains were recovered. Those from levels 2 and 3 averaged 9311 ± 120 B.P. and levels 6 and 7 averaged 10,024 ± 127 B.P. (Hurt, 1962). Cruxent (1968) has proposed an arrival date in South America of 15,000 to 20,000 years ago. This hypothesis was based on the following finds: El Jobo, 10,000 years; Las Lagunas and El Camare, more than 16,000 years; and Muaco, 14,740 to 16,580 years (Rouse and Cruxent, 1962). Lanning and Patterson (1967), estimated the Chuqui complex in Chile and the Tortuga and Red Zone complexes in Peru as the most ancient in the Pacific Andean region, both dating between 13,000 and 14,000 B.P. Other rough stone tool complexes from South America which have been suggested as belonging to a pre-projectile point horizon include: Viscachani in Bolivia (Krieger, 1964); Ghatchi I in northern Chile (La Paige, 1958, 1960; Krieger, 1964); Ampajango in northwestern Argentina (Cigliano, 1961); Tandilense in Argentine Pampas (Menghin and Bormida, 1950); Oliviense in Argentine Patagonia (Menghin, 1952) and early Rio Chico, Tierra del Fuego (Viganti, 1927). An excellent survey of early man in the New World is given by Wormington (1971).

EVIDENCE FROM ASIA

Several lines of evidence (Stewart, 1960) show that during the middle Late Pleistocene, early forms of primitive Mongoloids were present in northeastern Asia. Many of these have been implicated in the origin and evolution of recent Mongoloids and Mongoloid-affiliated human groups. The most primitive, con-

sisting only of a skull cap, was found in 1958 in a limestone cave near the village of Mapa in Kwangtung province in southern China. According to Woo and Peng (Coon, 1962) this is the earliest fossil so far found in China with the exception of the *Homo erectus* material from Choukoutien. Woo believes that the Mapa skull had evolved to the same grade as the European Classic Neanderthals. According to Coon (1962) the Mapa skull stands at the threshold between the two grades of *Homo* and that it is essentially Mongoloid in its morphology. The second find (Liukiang man) was discovered in a cave near Liuchow in the Kwangsi Chuang Autonomous region, also in southern China. According to Woo (Coon, 1962), the Liukiang man represents an early form of the evolving Mongoloid and is the earliest fossil representative of modern mankind so far found in China. The third (Tze-Yang) was found in 1951 in the Szechuan province about 700 to 800 miles southwest of Peking. Woo described the Tze-Yang find as an early form of *Homo sapiens* more primitive than the European Cro-Magnon and the upper cave people of Choukoutien. According to Coon (1962) the Tze-Yang skull falls within the female range of both Metal Age Prehistoric and recent North Chinese series and is essentially a *Homo sapiens*.

There are no archaeological sites in Siberia having carbon 14 dates in excess of 25,000 years (Skimkin, 1968). According to Debetz (1960) all early Siberian sites are of the Upper Paleolithic tradition and are concentrated in the Lake Baikal region. Neanderthal-Mousterian sites have not been found so far in Siberia, even though Mousterian culture remains are the best established ancient occupation in Russia, along the Volga River and in Turkestan (Debetz, 1960).

The earliest Paleolithic sites in eastern Siberia are located around the Lake Baikal region. The oldest of these sites date around B.C. 20,000 (Bushnell and McBurney, 1959). Of the Paleolithic sites, the best known are those reported from the Lake Baikal region including Malta (14,750 B.P., Butzer, 1971) and Buret. Artifacts include points, sidescrapers, knives, burins, semi-subterranean structures employing mammoth bones, a variety of venus figurines and bone needles. Two sites are of particular interest: Duiktai cave with a single date of 13,070 B.P. including bifacial, pressure-flaked projectile points and knives in association with a mammoth fauna, and Uski with a date of 14,300 and 13,600 for levels VI and V with bifacial foliate points and knives.

Other finds in China, particularly those from the Upper Cave of Choukoutien, are of great interest. These remains provide the only information of the terminal Pleistocene population of eastern Asia from which the New World natives most likely came.

The two female skulls were described by Weidenreich (Coon, 1962) as a

Melanesian (102) and an Eskimo (103). This conclusion was based on a preliminary interpretation of the unrestored skulls. His assumption that the male skull (101) is an Ainu has also been questioned. Weidenreich made his comparison on the basis of photographs sent him by S. Kodanei (Coon, 1962) who at the time was working on Ainu craniology in Japan. Comparing skull number 101 with those from a series of Ainu skulls from Hokkaido, Sakhalin and the Kuriles, Coon reports many significant differences. For example, the cranial length of the Upper Cave skull is 16 mm greater than the largest Ainu mean. The minimum breadth of the Upper Cave skull is 11 mm greater and the nasal height is 5 mm higher than any Ainu average, and bi-orbital diameter is 9 mm beyond any Ainu mean. According to Coon (1962), the Upper Cave skull resembles the large-faced tribes of the American Plains Indians. Coon concludes that this is particularly visible in the upper part of the nasal skeleton and the lateral borders of the orbits, but the molars and the lower part of the nasal skeleton are fully Mongoloid in the eastern Asiatic sense. Morphological traits of the Upper Cave skull also appear commonly in various American Indians and the differences may simply reflect the range of variability of these groups. Indeed, these skulls have been referred to by W. W. Howells as "Unmigrated American Indians" (Howells, 1940).

DISCUSSION

The Asiatic origin of the New World natives is now a generally accepted fact. There are few serious students who any longer question either the general genetic or geographic origin of the first human inhabitants of the Americas or the basic routes of their initial entry. All remains recovered thus far in the New World are *Homo sapiens*.

Culturally, linguistically and genetically, American Indians are more closely related to Asiatics than to any other human group. Earlier hypotheses attributing biological differences between American Indian groups to waves of migrations from diverse parts of the Old World are not supported by the present findings. There is no evidence of any element other than Mongoloid in the formation of the American Indian physical variety. All evidence points to an Asiatic homeland for the New World natives.

There is no valid evidence that Australoid, Caucasoid, Negroid and Melanesian migration to and/or admixture in the New World contributed to the American Indian physical variety. For example, if the American Indians are derived from a Mongoloid-Australoid admixture then they should have blood group N which is very common among Australoids. Actually the American In-

dians have one of the lowest incidences of N in the world. Moreover, Australoids have facial and body hair, large teeth (often exceeding those of classic Neanderthal) and they lack the wide, flat faces, heavy noses, and pronounced cheek bones characteristic of the American Indians. The Australoid skin color and hair form are also very different from those of the American Indians. If Negroid genes were present in the American Indians then R_o, the sickle cell and thalassemia genes, the African form of G6PDD, the rare gene V and the Duffy variant, as well as other hemoglobin polymorphisms should be present. None of the above blood characteristics are found in the American Indian. Moreover, skull form characteristics also differentiate American Indians from Negroids.

If Caucasian genes are present, the Rh-negative and blood group type A should be common. These genes are nonexistent in the American Indians with the exception of Athabaskans and related groups who have a high incidence of blood type A. Caucasoid features not found in the American Indian are small teeth, high incidence of Carabelli's cusp, delayed tooth eruption, skin and hair color, sickle cell and thalassemia genes, G6PDD and familial Mediterranean fever. Melanesians differ in physical characteristics from American Indians by having darker skin, and hair that curls, twists and frizzes. There is a higher incidence of G6PDD, blood groups B and N. Melanesians possess the thalassemia gene and are subject to constant selection by a vast number of virulent diseases (Garn, 1972).

On the other hand, the evidence strongly indicates that eastern Asiatics are the most closely related to the American Indians. The straight, dark hair, wide, flat faces, heavy noses, the tendency toward a Mongoloid eye, scant body hair, and the prominence of the cheek bones are characteristics of eastern Asiatics which are always present among American Indian natives.

That today's American Indians differ from living Asiatics in the incidence of certain blood group genes can be explained as follows. First, American Indians crossed the Bering Land Bridge at the time when genetic differentiation in the original Mongoloid stock was taking place, and thus original differences within this stock have been retained. Second, a number of migrations did take place at different times and from separate areas, but still from groups falling within the range of variation of the generalized Mongoloid stock. Third, since the peopling of the New World, American Indians have been evolving on their own, and differences between them and their Asiatic relatives can be attributed to genetic drift and natural selection operating under variable environmental conditions. Fourth, it is only in the simply inherited blood group genes that the differences are most apparent. Multifactorial (polygenic) traits, e.g. hair form, color, facial characteristics, shovel-shaped teeth, etc., do not

show such differences to exist among American Indian groups or between them and their Asiatic relatives.

Viewed as a geographic entity and a physical variety of its own, American Indians consistently show extreme values of several traits such as high shovel-shaped teeth, low Carabelli's cusp, the world's highest incidence of blood group O, Rh-positive gene, high incidence of blood group M, the secretor gene, the Diego positive gene (Di^a) which set them apart from other major geographic groups and suggest basic genetic similarities producing a unique constellation of physical characteristics. T. D. Stewart (1960:262) states, "Indeed, it is safe to say that no population of comparable size has remained so uniform after expanding in whatever time has been involved, over such a large area."

There are no clear-cut cultural or linguistic similarities between American Indians and Asiatics. Boas (1940) indicates some similarity of the absolute pitch of South American and eastern Asiatics' musical instruments, the use of birch bark for making vessels, canoes and for building houses, and the use of slat armor and flat drums. Similarities in religious ceremonials, beliefs and traditions have also been suggested by Boas (1940). Recently, Chard (1960) suggested an apparent late "North Pacific Continuum" from Kamchatka to Puget Sound.

Wilmsen (1964) has considered the possible cultural relationships between the Old and New Worlds. He proposed a cultural-ecological continuum and a technological relationship that extends from Siberia all the way into the interior of North America. Two New World archaeological assemblages were considered as follows (see also MacNeish, 1959): the Kogruk Complex from Anaktuvuk Pass in north-central Alaska, and the British Mountain Complex from the fifth River Delta on the Arctic Coast of Yukon Territory, Canada. Between Siberian and British Mountain materials MacNeish (1959:46) states,

> "The earliest occurrences of these resemblances is the Buryet (Buret)-Malta complex of the Trans-Baikal and perhaps it also occurs at the Chastino site of the Middle Lena. Here are also found tools struck from discoidal cores that include unifacial points both lenticular and lanceolate, hooked gravers, scrapers and central convex-type burins . . . end of blade scrapers and blades and pebble choppers."

According to Campbell (1961:16-17):

> " . . . Kogruk implements somewhat resemble points, perforators, scrapers and blades from the earliest levels of the Malta site . . . Siberian Paleolithic sites in the Lena River Valley have produced artifacts quite closely akin to Kogruk flakecores and blades . . . There are, apparently, even closer connections between the British Mountain complex and these Asian collections, especially in the categories of flake burins and bifaces."

Since little information of the skeletal biology of the Mongoloid stock from which American Indians originated is available, most archaeologists find themselves highly dependent on lithic material for questions of origin. There are certain important limitations in using lithic material for evidence of tracing and reconstructing past biological relationships. Skeletal and genetic data are more useful.

Cultural similarities can be indicative of biological affinity. This relationship is not always valid. Similar cultural developments are known to exist in several parts of the world without any evidence of biological resemblance. Archaeologists must recognize that several thousand years may have elapsed before Asiatic migrants reached the New World. New tools and techniques could have developed en route. Tolstoy (1958) has made an extensive study of Old and New World relationships and has concluded that many Paleo-Indian traits, especially parallel-flaking and fluting, were of New World origin.

Chard (1959a, 1959b) suggests that the only Siberian and far eastern Asiatic Paleolithic cultures that were clearly old enough to have provided the cultural heritage for the early immigrants were the chopping tool industries characterized by rough core tools, choppers and scrapers but lacking both bifacial blades and points. It was this kind of technology, according to Chard, that was carried to the New World, and it was in the Americas over a span of several thousand years that the distinctive bifaced, lanceolate projectile point types evolved independently of any further Asiatic influence. As Wormington (1962) has suggested, archaeologists should not look for duplications of New and Old World tools but rather for prototypes from which New World tools were derived. After all, the American continent was essentially isolated from the Old World for several thousand years. This was time enough for Paleo-Indians to develop a diverse variety of tools which were compatible with the changing environmental conditions ranging from subarctic to high mountains and low deserts.

At present, no evidence of a relationship between the American Indian and Old World languages has been demonstrated (Willey, 1966). Indian-Asiatic linguistic affinity is very distant, if it exists at all. The fundamental structural differences in Siberian languages make it difficult to trace the origin of the American Indian languages. In North America alone, at least six major linguistic stocks are known to exist. The total separate and mutually unintelligible languages exceed 200 (Jennings, 1968:4). The influx of the Tungus and Turkish tribes into Siberia, although recent, also disturbed the earlier distribution in one way or another, making the tracing of such relationships impossible (many aboriginal languages in Siberia are no longer spoken). Shafer's (1952) hypothesis that the Athabaskan language is related to Sino-Tibetan is

only weakly supported. Kiparsky's (1968) suggestion that there was contact between Sahaptian and Chuckchi-Kamchada speakers is also weak, resting on the shared trait of diagonal vowel harmony. Thus it appears that until more information is available any statement concerning linguistic affinity can be no more than speculative.

At this point it is important to recognize that Asiatic Mongoloids and those who migrated to the New World have been independently evolving culturally, linguistically, and biologically since their geographic separation. Individual American Indian groups were generally small and isolated, particularly during pre-Columbian times, thus maximizing the chance for genetic diversity between these groups and decreasing variability within such groups. The picture of only a few small groups actually completing the crossing into the New World is compatible both with geological and environmental conditions and with the observed degree of biological differences among the New World natives. The high frequency of blood group gene O and virtual absence of B and A in North and South America with the exception of Athabaskan speakers and the presence of A, B and O in Eskimos and Aleuts could suggest that early differences have been retained. A more plausible hypothesis is that the simply inherited blood group genes change at a much faster rate than the multifactorial (polygenic) traits, which show similar incidence among all New World natives. Other characteristics of certain American Indian natives, such as large chest, lungs and hearts among Andean groups in South America are primary adaptive responses to the environment. The prominent nose and projecting chin of the Plains Indians, the high frequency of dislocated hip among the Navajos and Apaches, the beard hair among the Paiute and the Coahuila, the albinism among Hopi, Zuni, Jemez and San Blas, and the obesity among Pima and Papago are traits either environmentally determined or were brought about by the action of selection, genetic drift and other genetic determinants acting on small isolated groups.

At present, virtually nothing is known about the rate of evolution among human populations. Genetic differences often observed among prehistoric and recent historic skeletal and/or living American Indian groups can be explained without invoking hybridization and/or multiple migrations. Genetic drift and/or natural selection may have operated singly or in combination to produce the observed differences. The first New World inhabitants arrived during the phase of evolution in which differentiation in the original Asiatic stock was taking place. Since then, physiological adaptations occurred under an extreme range of environmental conditions including subarctic, desert, and tropical rain forests, and therefore, biological differences can simply be attributed to environmental extremes. Under such conditions, genetic varia-

tion, without obscuring the basic assumption of the genetic homogeneity of the American Indians, is expected. Reconstruction of the general Mongoloid physical type, as well as environmental conditions which existed at the same time as the hypothesized migrations, is crucial and must be thoroughly investigated. There is a further need for the recovery of skeletal and cultural materials from submerged sites on the continental shelf, which would shed more light on the nature of migration(s) into the New World.

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