The Indian Population of North America in 1492

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WHEN Columbus arrived in the New World, he found large numbers of people whom he named Indians. As Europeans occupied the Americas, Indians declined in both power and numbers. Over the next 400 years the native population shrank by millions. From the 1500s on, European and Latin American scholars debated the extent of that decline for Central and South America.[1] In the 1870s, scholars turned their attention to North America and began to ask how many Indians had once lived in the area north of the Rio Grande. Over the years, investigators developed eleven methods for answering the question. Three schools of thought emerged, and the conflict among them culminated in a major controversy that involves far more than numbers.

Current United States history textbooks illustrate just how far from settled this issue is: their estimates of aboriginal population in 1492 vary from one to twelve million. Some texts express uncertainty by giving ranges, such as four to six million, while others use disclaimers such as "perhaps" and "may have."[2] Table I summarizes the wide divergence of opinion.

The lack of agreement reflects the diverse conclusions of experts and the inadequacy of historical evidence. In 1492, none of the Indians living in what is now the United States kept written records, and what records they did keep contained no population counts. For contemporary data, researchers must make do with reports by Europeans, whose accounts are invariably defective. Their writers—explorers, soldiers, traders, priests—had other things to do than to count native heads. What they did count, when they counted at all, were towns, villages, houses, warriors, tributes, trade goods, profits, baptisms, and births. The few population figures they

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[1] Russell Thornton, *American Indian Holocaust and Survival: A Population History Since 1492*, Civilization of the American Indian Series, 186 (Norman, Okla., 1987), 16–17.

[2] Some texts limit estimates to the area that the United States now governs in the 48 contiguous states, but that limitation has a negligible effect, because for this purpose the term "North America" includes only the land north of the Rio Grande, thus excluding Mexico and Central America and leaving Canada, Alaska, and Greenland to increase the United States numbers. Thornton, *American Indian Holocaust*, 25.

TABLE I
TEXTBOOK ESTIMATES OF 1492 INDIAN POPULATION IN MILLIONS

Chief Author	*Date of Publication*	*1492 Population*	*Area Covered*
John Garraty	1990	1–2	United States
Richard Current	1987	2+	North America
Alan Brinkley	1991	4	United States
Mary Beth Norton	1990	4–6	North America
James Martin	1989	5–8	North America
Irwin Unger	1989	up to 9	United States
James Davidson	1990	10	North America
Thomas Bailey	1991	10	United States
John Blum	1989	10+	United States
George Tindall	1988	10–12	United States

Current and Brinkley are editions of the same book but are listed separately because they have different chief authors and give different answers.

Sources: John A. Garraty and Robert A. McCaughey, *The American Nation: A History of the United States to 1877*, 7th ed. (New York, 1991), 8; Richard N. Current et al., *American History: A Survey*, 7th ed. (New York, 1987), 5; Alan Brinkley et al., *American History: A Survey*, 8th ed. (New York, 1991), 1; Mary Beth Norton et al., *A People and a Nation: A History of the United States*, 3d ed. (Boston, 1990), 10; James Kirby Martin et al., *America and Its People* (Glenview, Ill., 1989), 9; Irwin Unger, with Debi Unger, *These United States: The Questions of Our Past*, 5th ed., comb. ed. (Englewood Cliffs, N. J., 1992), 4; James West Davidson et al., *Nation of Nations: A Narrative History of the American Republic* (New York, 1990), 18; Thomas A. Bailey and David M. Kennedy, *The American Pageant: A History of the Republic*, 9th ed. (Lexington, Mass., 1991), 7; John M. Blum et al., *The National Experience: A History of the United States*, 7th ed. (San Diego, Calif., 1989), 3; and George Brown Tindall, *America: A Narrative History*, 2d ed. (New York, 1988), 3.

provided are estimates, not counts, and numerous gaps exist.[3] Given the shortage of good evidence, historians have largely left the population question to anthropologists, ethnologists, geographers, archaeologists, demographers, and mathematicians.

Table II summarizes the population estimates that have had a significant impact, either by influencing later debate or by making a major contribution to theory. About half of these estimates cover regions, states, or localities, not North America as a whole. California has drawn special interest, partly because of the abundance of Spanish records on early contacts with the Indians there.[4] All scholars included in the table seemed to believe that their estimates represented the 1492 population, for even

[3] Woodrow Borah, "The Historical Demography of Latin America: Sources, Techniques, Controversies, Yields," in *Population and Economics, Proceedings of Section V of the Fourth Congress of the International Economic History Association, 1968*, ed. Paul Deprez (Winnipeg, Man., 1970), 180–183.

[4] Sherburne F. Cook, *The Aboriginal Population of the San Joaquin Valley, California*, Anthropological Records, 16, no. 2 (Berkeley, Calif., 1955), 31–32.

TABLE II
ESTIMATES OF ABORIGINAL POPULATION IN MILLIONS

Date Made	*Estimator*	*Occupation*	*North America Population*
1841	George Catlin[1]	Artist	16.000
1860	Emmanuel Domenech[2]	Missionary	16.000–17.000
1875	Stephen Powers[3]	Ethnologist	
1894	Census Office[4]		
1905	C. Hart Merriam[5]	Naturalist	
1910	James Mooney[6]	Ethnologist	1.150
1924	Karl Sapper[7]	Geographer	2.500–3.500
1924	Paul Rivet[8]	Linguist	1.148
1925	A. L. Kroeber[9]	Anthropologist	
1928	James Mooney[10]	Ethnologist	1.153
1928	William MacLeod[11]	Ethnologist	3.000
1931	Walter Willcox[12]	Economist	1.002
1934	A. L. Kroeber[13]	Anthropologist	1.001 .900
1934	Clark Wissler[14]	Anthropologist	.750
1943	Sherburne Cook[15]	Physiologist	
1945	Ángel Rosenblat[16]	Linguist	1.000
1945	Julian Steward[17]	Anthropologist	1.000
1952	Paul Rivet et al.[18]	Linguist	1.316
1954	Ángel Rosenblat[19]	Linguist	1.000
1955	Sherburne Cook[20]	Physiologist	
1958	Martin Baumhoff[21]	Anthropologist	
1961	Harold Driver[22]	Anthropologist	1.000–2.000
1962	Henry Dobyns[23]	Anthropologist	
1963	Martin Baumhoff[24]	Anthropologist	
1963	Herbert Taylor[25]	Anthropologist	
1963	Henry Dobyns[26]	Anthropologist	
1964	Sherburne Cook[27]	Physiologist	
1966	Henry Dobyns[28]	Anthropologist	9.800–12.250
1969	Harold Driver[29]	Anthropologist	3.500
1970	Woodrow Borah[30]	Historian	
1974	Douglas Ubelaker[31]	Physical Anth.	
1976	Sherburne Cook[32]	Physiologist	
1976	Sherburne Cook[33]	Physiologist	
1976	Douglas Ubelaker[34]	Physical Anth.	2.171
1976	William Denevan[35]	Geographer	4.400
1980	Russell Thornton[36]	Sociologist	
1980	Dean Snow[37]	Anthropologist	
1981	Fekri Hassan[38]	Anthropologist	1.120
1981	Russell Thornton/ Joan Marsh-Thornton[39]	Sociologist	
1983	J. Donald Hughes[40]	Historian	5.000–10.000
1983	Henry Dobyns[41]	Anthropologist	18.000
1987	Russell Thornton[42]	Sociologist	7.000–8.775
1987	Ann Ramenofsky[43]	Archaeologist	12.000
1988	Douglas Ubelaker[44]	Physical Anth.	1.894
1989	Rudolph Zambardino[45]	Mathematician	2.000–8.000

TABLE II (*CONTINUED*)
ESTIMATES OF ABORIGINAL POPULATION IN MILLIONS

United States Population	*Other Population (Area)*	*Date For*	*Estimate Basis*	*School of Thought*
		1492	GT	
		1492	GT	
	.705 (California)	1770	RA, PD, EC	Area
.500		1492	RD, GT	
	.260 (California)	1800	CM, RA, PD	Area
.846		1600–1845	CM, GT, RD, BR	Bottom
2.000–3.000		1492	GT, CC	Area
.846		1492	BR	Bottom
.719	.133 (California)	1770	CM, GT, RD, BR	Bottom
.849	.260 (California)	1600–1845	CM, GT, RD, BR	Bottom
	.130 (California)	1492	CC, PD	Area
.708	.133 (California)	1650	BR	Bottom
	.133 (California)	1600–1845	CM, GT, RD, PD, BR	Bottom
		1780	BR, RD	Bottom
	.134 (Calif., part)	1770	CM, PD	Bottom
		1492	BR	Bottom
.770		1500	GT	Bottom
		1550	BR	Bottom
		1492	BR	Bottom
	.084 (Calif., part)	1770	CM, PD, RA	Area
	.019 (Calif., part)	1770	CM, RA	Area
		1492	BR	Bottom
	.003 (Ariz., part)	1700	CM, GT	Area
	.350 (California)	1770	RA, CM	Area
	.072 (Northwest)	1780	CM, PD, RA	Bottom
	.002 (Ariz., part)	1700	CM, GT	Area
	.275 (California)	1770	CM, RA	Area
		1492	DR	Top
2.500		1492	DR, BR	Area
	.300 (California)	1769	PD	Area
	.008 (Conoy Tribe)	1492	DA, CM	Bottom
	.310 (California)	1769	CM, PD	Area
	.072 (New England)	1610	CM, GT, PD	Area
1.850		1492	BR	Bottom
		1492	BR, EC	Area
	.230 (California)	1492	BR	Bottom
	.175 (New England)	1600	CM, PD, EC	Area
		1492	CC	Area
1.845		1492	BR, MT	Bottom
	1.000 (California)	1492	CC	Top
	.922 (Florida)	1492	CC, EC, MM	Top
5.000–6.250		1492	DR	Top
		1492	EC, GT, DR	Top
		1500	BR	Bottom
		1492	BR, MT	Area

See next pages for footnotes

[1]Catlin, *Letters and Notes on the Manners, Customs, and Conditions of the North American Indians*, 2 vols. (New York, 1973; orig. pub. 1841), I, 6.

[2]Domenech, *Seven Years' Residence in the Great Deserts of North America* (London, 1860), 429.

[3]Powers, "California Indian Characteristics," *Overland Monthly*, XIV (1875), 297–309.

[4]Department of the Interior, Census Office, *Report on Indians Taxed and Indians Not Taxed in the United States (except Alaska) at the Eleventh Census: 1890* (Washington, D. C., 1894), 28.

[5]Merriam, "The Indian Population of California," *American Anthropologist*, New Ser., VII (1905), 594–606.

[6]Mooney, "Population," in *Handbook of American Indians North of Mexico*, ed. Frederick Webb Hodge, Smithsonian Institution, Bureau of American Ethnology, Bulletin 30, pt. ii (Washington, D. C., 1910), 286–287.

[7]Sapper, "Die Zahl und die Volksdichte der Indianischen Bevölkerung in Amerika vor der Conquista und in der Gegenwart," in *Proceedings of the Twentyfirst International Congress of Americanists, The Hague, August 12–16, 1924*, First Part (Nendeln/Liechtenstein, 1968; orig. pub. 1924), 95–104.

[8]Rivet, "Langues Américaines," in *Les Langues du Monde*, ed. A. Meillet and Marcel Cohen (Paris, 1924), 597–605. Rivet gave 1,000,000 as the North American estimate, but his tribal figures total approximately 1,148,000.

[9]Kroeber, *Handbook of the Indians of California*, Smithsonian Institution, Bureau of American Ethnology, Bulletin 78 (Washington, D. C., 1925), 880–891.

[10]Mooney, *The Aboriginal Population of America North of Mexico*, pref. John R. Swanton, Smithsonian Institution, Miscellaneous Collections, 80, no. 7 (Washington, D. C., 1928), 1–33.

[11]MacLeod, *The American Indian Frontier* (New York, 1928), 15–16.

[12]Willcox, "Increase in the Population of the Earth and of the Continents Since 1650," in *International Migrations*, II, ed. Willcox (New York, 1931), 54–58.

[13]Kroeber, "Native American Population," *Amer. Anthro.*, New Ser., XXXVI (1934), 1–25.

[14]Wissler, "The Rebirth of the Vanishing American," *Natural History*, XXXIV (1934), 415–430.

[15]Cook, *The Conflict Between the California Indian and White Civilization*, vol. 1: *The Indian Versus the Spanish Mission*, Ibero-Americana, 21 (Berkeley, Calif., 1976; orig. pub. 1943), 161–194.

[16]Rosenblat, *La Población Indígena de América Desde 1492 Hasta la Actualidad* (Buenos Aires, 1945), 92, 186.

[17]Steward, "The Changing American Indian," in *The Science of Men in the World Crisis*, ed. Ralph Linton (New York, 1945), 282–305.

[18]Rivet et al., "Langues de l'Amérique," in *Les Langues du Monde*, rev. ed., ed. A. Meillet and Marcel Cohen (Paris, 1952), 946–1065. Rivet gave 1,000,000 as the North American estimate, but his tribal figures total approximately 1,315,800.

[19]Rosenblat, *La Población Indígena y el Mestizaje en América*, vol. 1: *La Población Indígena, 1492–1950* (Buenos Aires, 1954), 102, 280–281.

[20]Cook, *The Aboriginal Population of the San Joaquin Valley, California*, Anthropological Records, 16, no. 2 (Berkeley, Calif., 1955), 31–70.

[21]Baumhoff, *California Athabascan Groups*, ibid., no. 5 (Berkeley, Calif., 1958), 216–224.

[22]Driver, *Indians of North America* (Chicago, 1961), 35–37.

[23]Dobyns, *Pioneering Christians among the Perishing Indians of Tucson* (Lima, 1962), 3–29.

[24]Baumhoff, *Ecological Determinants of Aboriginal California Populations*, University of California, Publications in American Archaeology and Ethnology, 49, no. 2 (Berkeley, Calif., 1963), 155–235.

[25]Taylor, "Aboriginal Populations of the Lower Northwest Coast," *Pacific Northwest Quarterly*, LIV (1963), 158–166.

[26]Dobyns, "Indian Extinction in the Middle Santa Cruz River Valley, Arizona," *New Mexico Historical Review*. XXXVIII (1963), 163–181.

[27]Cook, "The Aboriginal Population of Upper California," in XXXV Congreso Internacional de Americanistas, Mexico, 1962, *Actas y Memorias*. III (México, D. F., 1964), 397–402.

[28]Dobyns, "Estimating Aboriginal American Population: An Appraisal of Techniques with a New Hemispheric Estimate," *Current Anthropology*. VII (1966), 395–416.

[29]Driver, *Indians of North America*. 2d ed. (Chicago, 1969), 63–65.

[30]Borah, "The California Mission," in *Ethnic Conflict in California History*. ed. Charles Wollenberg (Los Angeles, 1970), 1–22.

[31]Ubelaker, *Reconstruction of Demographic Profiles from Ossuary Skeletal Samples: A Case Study from the Tidewater Potomac*. Smithsonian Contributions to Anthropology, 18 (Washington, D. C., 1974), 65–70.

[32]Cook, *The Population of the California Indians. 1769–1970* (Berkeley, Calif., 1976), 1–43, 199–200.

[33]Cook, *The Indian Population of New England in the Seventeenth Century*. University of California, Publications in Anthropology, 12 (Berkeley, Calif., 1976), 1–84.

[34]Ubelaker, "Prehistoric New World Population Size: Historical Review and Current Appraisal of North American Estimates," *American Journal of Physical Anthropology*. New Ser., XLV (1976), 661–665.

[35]Denevan, "Epilogue," in *The Native Population of the Americas in 1492*. ed. Denevan (Madison, Wis., 1976), 289–292.

[36]Thornton, "Recent Estimates of the Prehistoric California Indian Population," *Current Anthro.*, XXI (1980), 702–704.

[37]Snow, *The Archaeology of New England* (New York, 1980), 31–42, 255–256. Snow's figure is actually a range, 158,000 to 191,000, with a midpoint of roughly 175,000.

[38]Hassan, *Demographic Archaeology* (New York, 1981), 82–83. Hassan obtained a very low population estimate similar to those of the bottom-up school, but he used an area-modeling method, so he receives an area-modeling code in the tables.

[39]Thornton and Marsh-Thornton, "Estimating Prehistoric American Indian Population Size for United States Area: Implications of the Nineteenth Century Population Decline and Nadir," *Amer. J. Phys. Anthro.*, New Ser., LV (1981), 47–52.

[40]Hughes, *American Indian Ecology* (El Paso, Tex., 1983), 95–104.

[41]Dobyns, with William R. Swagerty, *Their Number Become Thinned: Native American Population Dynamics in Eastern North America*. Native American Historic Demography Series (Knoxville, Tenn., 1983), 34–44, 291–295.

[42]Thornton, *American Indian Holocaust and Survival: A Population History Since 1492*. Civilization of the American Indian Series, 186 (Norman, Okla., 1987), 30–32.

[43]Ramenofsky, *Vectors of Death: The Archaeology of European Contact* (Albuquerque, N. M., 1987), 160–162.

[44]Ubelaker, "North American Indian Population Size, A.D. 1500 to 1985," *Amer. J. Phys. Anthro.*, New Ser., LXXVII (1988), 289–294.

[45]Zambardino, review of *American Indian Holocaust and Survival* by Russell Thornton, *Journal of Interdisciplinary History*. XIX (1989), 541–544.

though some authors specified later dates, they usually implied that the 1492 figures were roughly the same.[5]

Estimators have used a wide variety of methods. Because these methods are at the heart of the controversy, they require explanation. The estimate basis column of Table II summarizes the estimators' procedures, with twelve codes to represent one expedient and eleven actual methods. The expedient is borrowing (BR). Many scholars have employed it; that code appears in the table more often than any other. Some borrowers had only a passing need for population figures, so they simply used the estimates they regarded as the best. The French linguist Paul Rivet is a case in point; since he sought to produce a summary of the languages spoken in North America, he took the estimates of others to begin his discussion of Indian languages.[6]

Some estimators borrowed figures and corrected them to create a new estimate. Clark Wissler, for example, borrowed the estimate of ethnologist James Mooney but lowered it because he believed that early population reports were even more exaggerated than Mooney had thought.[7] Whatever their motives, such people as Wissler became major figures in the controversy because their works popularized and lent credence to the estimates they borrowed.[8]

The first actual method is guesstimate (GT), which appeared first in time; before scholars began to examine the subject, it was the only method.[9] Even in recent years, when other methods fail for lack of evidence, scholars have used the guesstimate to fill in gaps. The results vary widely, depending on the knowledge of the guesser, and critics can

[5] Some scholars, such as James Mooney, did not assert that their work applied to 1492, but most have operated as if it did. Even Mooney was not clear on the matter. Mooney, "Population," in *Handbook of American Indians North of Mexico*, ed. Frederick Webb Hodge, Smithsonian Institution, Bureau of American Ethnology, Bulletin 30, pt. ii (Washington, D. C., 1910), 286–287; Mooney, *The Aboriginal Population of America North of Mexico*, pref. John R. Swanton, Smithsonian Institution, Miscellaneous Collections, 80, no. 7 (Washington, D. C., 1928), 33; Douglas H. Ubelaker, "The Sources and Methodology for Mooney's Estimates of North American Indian Populations," in William M. Denevan ed., *The Native Population of the Americas in 1492* (Madison, Wis., 1976), 286–288; Thornton, *American Indian Holocaust*, 27–28; Cook, *The Population of the California Indians, 1769–1970* (Berkeley, Calif., 1976), 24, 199. The estimates of those researchers who deliberately worked on later periods do not appear here.

[6] Paul Rivet, "Langues Américaines," in *Les Langues du Monde*, ed. A. Meillet and Marcel Cohen (Paris, 1924), 600, 605.

[7] Clark Wissler, "The Rebirth of the Vanishing American," *Natural History*, XXXIV (1934), 422–423.

[8] Henry F. Dobyns, "Estimating Aboriginal American Population: An Appraisal of Techniques with a New Hemispheric Estimate," *Current Anthropology*, VII (1966), 396; Thornton, *American Indian Holocaust*, 26.

[9] George Catlin, *Letters and Notes on the Manners, Customs, and Conditions of the North American Indians*, 2 vols. (New York, 1973; orig. pub. 1841), I, 6.; Emmanuel Henri Dieudonné Domenech, *Seven Years' Residence in the Great Deserts of North America* (London, 1860), 429.

assess reliability only when the guesser explains the reasoning behind the estimate.[10]

The second method is the count multiple (CM), which consists of multiplying a historical count of some item by a ratio that converts it into a population figure. For example, a scholar might multiply a count of the warriors in a tribe by a ratio of warriors to tribe members to yield the number of tribe members. The ratio might be derived from a later period for which both a warrior count and a population count are available or from cultural information about a tribe. If almost every adult male in a tribe was a warrior, a ratio of one warrior for every three people might be appropriate. If only those who passed rigorous tests became warriors, a ratio of 1:6 might be more accurate. Whatever the source of the ratio, the researcher obtains a population estimate by the count multiple method.[11]

This method has been used more than any other. It relies on such items as warriors, males, villages, houses, house sites, baptisms, even canoes. When the procedure employs only a single ratio, it normally produces reasonable results.[12] Although the original counts may be uncertain, the usual arguments against this method concern the validity of the ratio. For instance, even if an investigator knows how many family dwellings a given tribe had 400 years ago, converting that figure into an accurate population estimate also requires knowing the average family size at the time. Depending on the tribe, such sizes ranged from three to ten, with four and five being the mode.[13] Sometimes, a house count and a population count exist for one village, allowing calculation of a ratio for other villages, but often the investigator has to resort to obtaining a ratio from the later history of the tribe or to estimating a ratio from house sizes.[14]

A third method—actually an extension of the second—can be called the multiple multiple (MM). The few specialists who have used this method began with a count that bore only an indirect relation to population and then applied a series of ratios, one on top of the other. The best-known use of this procedure is in a landmark study of central Mexico: historian Woodrow Borah and physiologist Sherburne F. Cook applied several multipliers to convert an Aztec tribute list into a population figure. Beginning with pictograms that indicated the quantity of goods taken in

[10] An example of the recent use of the guesstimate appears in Cook, *The Indian Population of New England in the Seventeenth Century*. University of California, Publications in Anthropology, 12 (Berkeley, Calif., 1976), 1–84.

[11] Ubelaker, "Sources and Methodology," 257.

[12] Cook, *Aboriginal Population of the Valley*, 49–50.

[13] William A. Haviland, "Family Size, Prehistoric Population Estimates, and the Ancient Maya," *American Antiquity*, XXXVII (1972), 135–139; Cook, *The Conflict Between the California Indian and White Civilization*, vol. 1: *The Indian Versus the Spanish Mission*. Ibero-Americana, 21 (Berkeley, Calif., 1976; orig. pub. 1943), 163–165; William Petersen, "A Demographer's View of Prehistoric Demography," *Current Anthro.*, XVI (1975), 231–232; Robert M. Schacht, "Estimating Past Population Trends," in *Annual Review of Anthropology*, X, ed. Bernard J. Siegel (Palo Alto, Calif., 1981), 125–126.

[14] Cook, *Conflict Between California Indian and White Civilization*, 175–177.

tribute, they applied successive multipliers that converted the goods into money, the money per tribute payment into money per year, the money per year into number of families, and the number of families into number of individuals. They also adjusted their total for towns not on the tribute lists and for people who did not pay tribute.[15] Since each ratio had a degree of uncertainty, this multiplying of uncertainty by uncertainty provoked criticism.[16] Even so, another expert recently adopted the procedure for a study of Florida.[17]

The fourth method is report discounting (RD). Some early workers in the field argued that the soldiers and priests who wrote the majority of the early reports exaggerated their counts in order to impress their superiors: a soldier could make himself look better if he defeated 50,000 warriors rather than 10,000; a priest could enhance his accomplishments if he baptized 10,000 converts instead of 2,000.[18] Scholars who did not trust such reports ignored extremely high counts and lowered moderately high ones. As a result, most early population estimates show the effects of systematic discounting.[19] Some scholars have scathingly rejected this procedure, defending the values of primary sources and accusing the discounters of cultural and racial bias.[20]

The reverse of report discounting is epidemic correction (EC). Some scholars have argued that the first European contacts with Indian peoples occurred too late to measure the full extent of the original population. According to this view, major epidemics of Old World diseases preceded European explorers by a few years or decades and killed a significant percentage of the native population.[21] Epidemic correction usually involves applying estimated mortality rates for the one or two epidemics that the evidence indicates struck areas just before first contact. Some authorities maintain, for example, that a serious epidemic hit the Northeast just before the first English settlers arrived. They have calculated the population for the area using other methods and then applied mortality rates to raise it to a pre-epidemic level.[22] A few estimators have greatly extended

[15] Borah and Cook, *The Aboriginal Population of Central Mexico on the Eve of the Spanish Conquest.* Ibero-Americana, 45 (Berkeley, Calif., 1963), 1–92.

[16] See especially Rudolph A. Zambardino, "Mexico's Population in the Sixteenth Century: Demographic Anomaly or Mathematical Illusion?" *Journal of Interdisciplinary History.* XI (1980), 1–27.

[17] Dobyns, with William R. Swagerty, *Their Number Become Thinned: Native American Population Dynamics in Eastern North America.* Native American Historic Demography Series (Knoxville, Tenn., 1983), 148–209.

[18] Denevan, "Introduction to Estimating the Unknown," in *Native Population of the Americas.* ed. Denevan, 8–9.

[19] A. L. Kroeber, *Cultural and Natural Areas of Native North America* (Berkeley, Calif., 1939), 179–180; Ubelaker, "Sources and Methodology," 243–288.

[20] Cook and Borah, "On the Credibility of Contemporary Testimony on the Population of Mexico in the Sixteenth Century," in *Summa Anthropologica en homenaje a Roberto J. Weitlaner* (México, D. F., 1966), 229–239.

[21] Dobyns, "Estimating," 402.

[22] Dean R. Snow, *The Archaeology of New England* (New York, 1980), 31–42;

this method by postulating that a series of pandemics killed large numbers of natives decades (or even centuries) before first contact with Europeans.[23]

Some methods depend on comparing geographic areas on the basis of culture and ecology. When population can be calculated for one area, while a similar area nearby provides scant data, some scholars have argued that the latter area must have had a population similar to the former. One such method carries the name population density (PD). If a region had a density of one person per square mile, then, the scholar argues, a nearby region with like topography and culture must have had approximately the same density.[24] This reasoning has drawn two major criticisms. Even neighboring areas could have had enough differences to make direct comparisons problematic. Moreover, the method assumes that similar cultures adapted to similar resources by maintaining a similar level of population—a dubious assumption.[25]

A seventh method, a variant of population density, involves comparing resource availability (RA) in two areas. Scholars estimate the availability of food in an area of known population, calculate how much of that same food was obtainable in a nearby area of unknown population, and compute the second population based on simple analogy. One application of this procedure selected salmon fishing as the dominant food-producing activity in two areas and based population estimates on the two areas' miles of salmon streams. More complicated versions have created a resource index, comprising all the kinds of food at hand—game, fish, fruits (including acorns), and agricultural products. This method makes one or both of the following assumptions: different tribes adapted to food resources in the same ways; tribes used every possible food resource.[26] Critics doubt the validity of both assumptions. Since some tribes apparently ignored some ready food sources, and others used alternative ways to limit their population, including infanticide and sexual abstinence, this logic appears faulty.[27]

The drawbacks of the resource availability method have not prevented its expansion into an even more ambitious version, the carrying capacity (CC) method, which is based on the notion that any population will expand to the limits of the accessible food supply. After calculating all food resources and estimating how much food the average individual required, users of this method divide the minimum yearly requirement

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William A. Starna, "Mohawk Iroquois Populations: A Revision," *Ethnohistory*, XXVII (1980), 371–382.

[23] Dobyns, *Their Number Become Thinned*, 8–26.

[24] Cook, *Conflict Between California Indian and White Civilization*, 167–171.

[25] Petersen, "Demographer's View," 228–230.

[26] Martin A. Baumhoff, *Ecological Determinants of Aboriginal California Populations*, University of California, Publications in American Archaeology and Ethnology, 49, no. 2 (Berkeley, Calif., 1963), 155–235.

[27] Petersen, "Demographer's View," 229–230; Schacht, "Estimating Past," 132–133; Baumhoff, *Ecological Determinants*, 173–175, 185–188, 204–205, 214–216.

into the total resources to yield a population estimate. They often invoke the name of Thomas Malthus as authority for the validity of their procedure.[28] This method usually generates extremely large population estimates, but it can also yield very low estimates if low food resources are calculated.[29] Critics reject both the theory and the results, especially when estimators postulate extremely abundant food resources for native populations.[30]

Some scholars use a method that they dub the depopulation ratio (DR). Like epidemic correction, this procedure rests on the belief that disease killed a high percentage of the original inhabitants of the Americas. Unlike epidemic correction, it does not deal with specific tribes and specific epidemics. Users of this method begin with about a dozen tribes for which there are calculated estimates of both their 1492 population and their lowest population since then (the nadir usually occurred in the late 1800s or early 1900s). They divide the low point into the beginning point to obtain a depopulation ratio for each tribe. They then evaluate these tribal ratios to determine a general ratio, usually for all of the Americas but occasionally for smaller areas. Although the method of evaluation is unspecified, the general ratio is often close to an average of the tribal ones. To calculate the 1492 population for a specific area, they determine its nadir population and multiply by the general depopulation ratio.[31]

Without a specified procedure for getting from the tribal ratios to the general one, the method's supporters have chosen their depopulation ratios virtually at will. Since Indian census figures for the late 1800s and early 1900s are far from exact, they also have difficulty selecting nadirs. As a result, scholars have selected general ratios between 5:1 and 25:1 and nadirs for North America from 1870 to 1930.[32] Critics mistrust the validity of grouping together tribes that survived comparatively well with those that did more poorly. Some question the backwards logic of the method. Since these population estimates derive from calculating the nadir population of those Indians who survived, the tribes least affected by disease contribute the most to such counts and have the largest effect on the estimate, while the tribes that disease affected the most either have few survivors or none at all and have little effect on the estimate. Still others argue that this procedure presumes a massive decline in population that no one has yet proven.[33]

[28] Dobyns, *Their Number Become Thinned*, 34–44.

[29] Ibid., 291–295; Fekri A. Hassan, *Demographic Archaeology* (New York, 1981), 82–83.

[30] Petersen, "Demographer's View," 229–230; William C. Sturtevant, Review of *Their Number Become Thinned* by Dobyns, *American Historical Review*, LXXXIX (1984), 1380–1381; Thornton, *American Indian Holocaust*, 21–22.

[31] Dobyns, "Estimating," 410–414; Harold E. Driver, *Indians of North America*, 2d ed. (Chicago, 1969), 63.

[32] Driver, "On the Population Nadir of Indians in the United States," *Current Anthro.*, IX (1968), 330; Dobyns, "Estimating," 415; Thornton, *American Indian Holocaust*, 30–32.

[33] John W. Bennett et al., "Comments on Estimating Aboriginal American

Some scholars have had high hopes for a tenth method, demographic archaeology (DA), but this procedure has had disappointing results. Archaeologists have made population estimates for certain sites. For example, N. C. Nelson, investigating the shellmounds of the San Francisco Bay region early in the twentieth century, calculated the quantity of shellfish people must have eaten to produce that much debris. Although he estimated a population for the mound area, his efforts proved to have only limited application.[34] Since North American Indians seldom maintained permanent villages, it is difficult to find all village sites in a particular area and determine which were occupied when.[35] Even tribes that had permanent sites, like the Pueblo civilizations, have not yielded accurate population figures owing to difficulties in estimating how long Indians occupied those sites.[36]

The final procedure is mathematical (MT). In the 1980s, a few scholars subjected the estimates of others to various analytical techniques. In one example, Russell Thornton and Joan Marsh-Thornton noticed that in the 1800s the United States censuses showed that the Indian population of the country suffered a straight-line decline. Since they believed that these figures are the only reasonably accurate ones before the Indian population began to recover, the Thorntons argued that a straight-line decline should be projected back to 1492, and they presented formulas and figures for a new estimate.[37] In another case, with wider implications, mathematician Rudolph A. Zambardino used statistical analysis to show that the multiple multiple technique of Borah and Cook built up such an accumulated margin of error that their figures are almost meaningless. He calculated that a much lower estimate fits their data better than the high figure they produced.[38]

Fortunately for anyone trying to follow this subject, these eleven methods have not produced eleven approaches to the subject. Instead, scholars have gravitated toward three broad groupings. These clusters are not precise, since the participants in the inquiry occasionally changed their

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Population," *Current Anthro.*, VII (1966), 429 (Denevan), 431 (Farbis), 434–435 (Kehoe and Kehoe), and 436–437 (Kunstadter); Zambardino, review of *American Indian Holocaust and Survival* by Thornton, *J. Interdis. Hist.*, XIX (1989), 542–543.

[34] N. C. Nelson, *Shellmounds of the San Francisco Bay Region*. University of California, Publications in American Archaeology and Ethnology, 7, no. 4 (New York, 1964; orig. pub. 1909), 340–348.

[35] Ann F. Ramenofsky, *Vectors of Death: The Archaeology of European Contact* (Albuquerque, N. M., 1987), 42–71.

[36] Earnest A. Hooten, *The Indians of Pecos Pueblo: A Study of Their Skeletal Remains* (New Haven, Conn., 1930), 331–343, 349–350.

[37] Thornton and Joan Marsh-Thornton, "Estimating Prehistoric American Indian Population Size for United States Area: Implications of the Nineteenth Century Population Decline and Nadir," *American Journal of Physical Anthropology*, New Ser., LV (1981), 47–52.

[38] Zambardino, "Mexico's Population," 1–27.

views or used similar methods to obtain diverse results. Each of the groups, or schools of thought, in Table II reflects a fundamentally different approach to the subject. The names that seem to fit these approaches best are "bottom up" (Bottom), "area modeling" (Area), and "top down" (Top). Final results also differ considerably: bottom up tends to give North American (north of the Rio Grande) estimates in the 500,000 to 2,500,000 range; area modeling, 2,500,000 to 7,000,000; and top down, 7,000,000 to 18,000,000.

The bottom-up school dominated the North American population topic from about 1910 to 1955. James Mooney created this school; indeed, Mooney virtually created the subject with the first scholarly estimate of North American aboriginal population. His initial estimates appeared in a short article in 1910; his detailed analysis followed posthumously in a 1928 article edited by John Swanton for the Smithsonian Institution. Mooney considered each North American tribe, estimating its population individually, and added all the estimates together to produce a grand total.[39] Although the manuscript that Swanton edited did not identify Mooney's methods or the sources of most of his figures, a later analysis of Mooney's notes illuminated his approach. To estimate each tribe, Mooney checked all primary sources, extracted any population counts they contained, applied the count multiple method to other types of data they held, and provided guesstimates when he could find no numbers at all.[40] In a few cases, he borrowed the area estimates of experts he respected, notably the California figures of naturalist C. Hart Merriam.[41]

Mistrusting the high figures of most early sources, Mooney generally used report discounting to make his estimates.[42] He realized, however, that disease had decreased the size of some tribes, so he did not lower his estimates for those tribes as much as he did for others.[43] He also pointed out that his estimates covered the period of first contact between Europeans and Indians, so the dates of his estimates varied from 1600 to 1845, but he apparently thought that the 1492 total could not have been more than 10 percent higher.[44] When his article appeared, most critics argued that his figures were too high.[45] Swanton, for instance, an expert on the southeast, commented in the edited article that the value for the southeastern tribes might be too high.[46]

In 1925, 1934, and 1947, anthropologist Alfred Louis Kroeber published extensive analyses of Mooney, in which he approved the bottom-

[39] Mooney, "Population," 286–287; Mooney, *Aboriginal Population*, 1–4.
[40] Ubelaker, "Sources and Methodology," 243–288.
[41] Kroeber, "Native American Population," *American Anthropologist*, New Ser., XXXVI (1934), 1; Ubelaker, "Sources and Methodology," 286.
[42] Ubelaker, "Sources and Methodology," 286.
[43] Mooney, *Aboriginal Population*, 3, 11, 12.
[44] Ibid., 4, 20, 24–25, 33; Mooney, "Population," 287.
[45] Kroeber, "Native American Population," 2, 24; Maurice A. Mook, review of *Cultural and Natural Areas of Native North America* by Kroeber, *William and Mary Quarterly*, 2d Ser., XXIII (1943), 91.
[46] Mooney, *Aboriginal Population*, 9–10.

up, or additive, approach and spoke favorably of what he dubbed the conservative, "dead reckoning" attitude. Although he suspected that Mooney's figures were too high, he limited his specific criticism to the numbers for California. Mooney had borrowed those figures from Merriam, and Kroeber noted that Merriam had not used a bottom-up approach. In similar fashion, Kroeber himself used primary sources, count multiples, report discounting, and guesstimates to calculate new California figures, which he then substituted for Merriam's. That substitution lowered Kroeber's North American total to just over 1,000,000. Because he believed that Mooney had not discounted some sources enough in calculating for other parts of the country, Kroeber suggested that the final total should go even lower, recommending 900,000.[47] In 1934, anthropologist Wissler carried report discounting even further, proposing 750,000.[48] Through the 1920s, 1930s, and 1940s, however, the Mooney-Kroeber estimate of approximately 1,000,000 Indians was commonly accepted and used by such scholars as Rivet (1924, 1952), Walter F. Willcox (1931), Julian Steward (1945), and Ángel Rosenblat (1945, 1954).[49]

Even after the bottom-up school came under attack, it continued to have adherents. In 1963, anthropologist Herbert Taylor presented a new estimate for the Northwest. Although he raised Mooney's figures, much of his approach still followed that of Mooney.[50] In 1974, physical anthropologist Douglas H. Ubelaker used an analysis of skeletal remains to quadruple Mooney's estimate for a single Tidewater-Potomac tribe, but he did not reject Mooney's lead. In Ubelaker's view, Mooney would have reached the proper answer if he had accepted the evidence he had before him.[51] In 1976, and again in 1988, Ubelaker analyzed the findings of experts writing for the new *Handbook of North American Indians* and almost doubled Mooney's totals. Despite the increase, Ubelaker continued to adhere to Mooney's additive philosophy. In addition, his 1988

[47] Kroeber, *Handbook of the Indians of California*, Smithsonian Institution, Bureau of American Ethnology, Bulletin 78 (Washington, D. C., 1925), 880–891; Kroeber, "Native American Population," 1, 2, 4, 24; Kroeber, *Cultural and Natural Areas*, 179–180.

[48] Wissler, "Rebirth," 422.

[49] Rivet, "Langues Américaines," 600, 605; Rivet et al., "Langues de l'Amérique," in *Les Langues du Monde*, rev. ed., ed. A. Meillet and Marcel Cohen (Paris, 1952), 946; Walter F. Willcox, "Increase in the Population of the Earth and of the Continents Since 1650," in *International Migrations*, II, ed. Willcox (New York, 1931), 54–55; Julian H. Steward, "The Changing American Indian," in *The Science of Men in the World Crisis*, ed. Ralph Linton (New York, 1945), 292; Ángel Rosenblat, *La Población Indígena de América Desde 1492 Hasta la Actualidad* (Buenos Aires, 1945), 92, 186; Rosenblat, *La Población Indígena y el Mestizaje en América*, vol. 1: *La Población Indígena, 1492–1950* (Buenos Aires, 1954), 102, 280–281.

[50] Herbert C. Taylor, Jr., "Aboriginal Populations of the Lower Northwest Coast," *Pacific Northwest Quarterly*, LIV (1963), 158–166.

[51] Ubelaker, *Reconstruction of Demographic Profiles from Ossuary Skeletal Samples: A Case Study from the Tidewater Potomac*, Smithsonian Contributions to Anthropology, 18 (Washington, D. C., 1974), 65–70; Ubelaker, "Sources and Methodology," 247–248, 257.

results lowered his 1976 preliminary figures.[52] The influence of Mooney and Kroeber has waned, but it still survives, as the textbooks of John Garraty et al. and Richard Current et al. testify.[53]

Even while the bottom-up school dominated native American population studies, an opposing school of thought, area-modeling, grew slowly and eventually came to prevail from the mid-1950s to the mid-1980s. Two pioneering studies, issued long before Mooney's articles, began the school by using ecological and cultural models of areas to estimate the precontact population of California Indians. In 1875, Stephen Powers published a very high estimate of 705,000 for the 1770 population of California, basing his findings on resource availability and population density and hinting at the use of epidemic correction.[54] In 1905, Merriam chose 1800 as the precontact date for California, lowered the estimate significantly, and carefully explained the rationale behind comparing one area with another. He reconstructed the populations of the various mission areas of California and then derived the aboriginal population of the state by reasoning that areas with similar resources must have had similar population densities.[55] Merriam's work had little immediate impact; very few scholars adopted the area-modeling approach until the mid-1950s.

Exceptions included geographer Karl Sapper, who in 1924 used the carrying capacity of the continent to argue that the North American aboriginal population must have reached 2,500,000 to 3,500,000, and ethnologist William Christie MacLeod, who in 1928 employed carrying capacity and population density in maintaining that the North American population must have attained the 3,000,000 level. Neither of these short discussions contained enough detail to convince most scholars to abandon Mooney and Kroeber.[56] When significant opposition finally appeared, it came from within the bottom-up school. Sherburne F. Cook published a 1943 analysis in which he modestly raised part of Kroeber's California totals 7 percent by using count multiple and population density techniques.[57] Over the next twelve years, Cook progressed from this mild revisionism to a wholesale rejection of the bottom-up school.

[52] Ubelaker, "Prehistoric New World Population Size: Historical Review and Current Appraisal of North American Estimates," *Amer. J. Phys. Anthro.*, New Ser., XLV (1976), 661–665; Ubelaker, "North American Indian Population Size, A.D. 1500 to 1985," ibid., LXXVII (1988), 289–294.

[53] John A. Garraty and Robert A. McCaughey, *The American Nation: A History of the United States to 1877*, 7th ed. (New York, 1991), 8; Richard N. Current et al., *American History: A Survey*, 7th ed. (New York, 1987), 5.

[54] Stephen Powers, "California Indian Characteristics," *Overland Monthly*, XIV (1875), 307–309.

[55] C. Hart Merriam, "The Indian Population of California," *Amer. Anthro.*, New Ser., VII (1905), 594–600.

[56] Karl Sapper, "Die Zahl und die Volksdichte der Indianischen Bevölkerung in Amerika vor der Conquista und in der Gegenwart," in *Proceedings of the Twentyfirst International Congress of Americanists, The Hague, August 12–16, 1924*, First Part (Nendeln/Liechtenstein, 1968; orig. pub. 1924), 95–104; William Christie MacLeod, *The American Indian Frontier* (New York, 1928), 15–16.

[57] Cook, *Conflict Between California Indian and White Civilization*, 161–194.

From the 1930s to the 1960s, Cook and his colleagues studied the impact of disease on the native populations of Mexico and California. They became convinced that the 1492 numbers must have been much higher than most authorities thought.[58] In 1955, 1956, and 1957, Cook published monographs in which he tripled Kroeber's figures for much of California by using both population density and resource availability comparisons. He also attacked Kroeber for consistently rejecting the reports of early Spanish and Mexican officials.[59]

Gradually, some scholars followed in Cook's methodological footsteps. In 1958, anthropologist Martin A. Baumhoff concurred with part of Cook's California analysis when he used resource availability to extend count multiple figures to undocumented areas.[60] In 1963, Baumhoff developed more sophisticated versions of the same methods to raise the California figure to 350,000.[61] Woodrow Borah, one of Cook's associates, employed the population density methodology in 1970 for the creation of a California estimate.[62] Cook himself made a few more contributions, including a 1964 study that used resource availability to lower Baumhoff's figure for California, followed by a 1976 analysis that used population density to create an estimate in between Baumhoff's and his own.[63] None of these studies, however, applied the methods to other parts of the United States. Only Cook's final effort, a 1976 study of New England, carried area modeling into other regions.[64] In addition, no area modeler attempted to develop a United States estimate. Only the anthropologist Harold E. Driver published a figure that reflected the new thinking, and he seemed to be responding more to the appearance of the third school than to Cook's work.[65]

Since Cook's death in 1976, the school of thought he did so much to advance has acquired only a few adherents. In 1976, beginning with Ubelaker's 1976 figure, geographer William M. Denevan used epidemic correction to produce an estimate of 4,400,000 for North America.[66] In 1980, anthropologist Dean Snow more than doubled Cook's figure for New England, carrying the techniques of population density and epidemic

[58] Cook, *The Extent and Significance of Disease among the Indians of Baja California, 1697–1773*, Ibero-Americana, 12 (Berkeley, Calif., 1937), 19–39.

[59] Cook, *Aboriginal Population of the Valley*, 31–32, 42–70; Cook, *The Aboriginal Population of the North Coast of California*, Anthropological Records, 16, no. 3 (Berkeley, Calif., 1956), 81–82; Cook, *The Aboriginal Population of Alameda and Contra Costa Counties, California*, ibid., no. 4 (Berkeley, Calif., 1957), 146–149.

[60] Baumhoff, *California Athabascan Groups*, ibid., no. 5 (Berkeley, Calif., 1958), 216–224.

[61] Baumhoff, *Ecological Determinants*, 155–231.

[62] Borah, "The California Mission," in *Ethnic Conflict in California History*, ed. Charles Wollenberg (Los Angeles, 1970), 3.

[63] Cook, "The Aboriginal Population of Upper California," in XXXV Congreso Internacional de Americanistas, Mexico, 1962, *Actas y Memorias*, III (México, D. F., 1964), 397–402; Cook, *Population of California Indians*, 1–43, 199–200.

[64] Cook, *Indian Population of New England*, 1–84.

[65] Driver, *Indians of North America*, 2d ed., 63–65.

[66] Denevan, "Epilogue," in *Native Population of the Americas*, 289–292.

correction much further than Cook ever had.[67] Finally, Zambardino employed mathematical methods to generate a North American estimate that fits Cook's general view, though in the process he developed a devastating critique of Cook's Mexican work.[68] Despite the lack of progress for area modeling, Cook's influence continues, as witness the textbooks of Alan Brinkley et al., Mary Beth Norton et al., and James Kirby Martin et al.[69]

The top-down school surfaced in 1966 and gradually displaced area modeling, achieving dominance by the mid-1980s. It was created singlehandedly by one of Cook's most enthusiastic supporters, anthropologist Henry F. Dobyns. After using count multiple methods to produce conventional works in 1962 and 1963, Dobyns set the whole field on its ear in a 1966 article in *Current Anthropology*.[70] He reviewed the entire controversy for all of the Americas, heaped measured scorn on the bottom-up school, and bestowed general approval on the area-modeling school. He also proposed a radical departure at which the work of others had only hinted—the depopulation ratio, applied to the Americas as a whole. After analyzing cases of tribal depopulation ratios from both continents, Dobyns suggested that 20:1 and 25:1 are the best estimates for the hemisphere. He then broke the continents into regions, computed nadirs for each, and generated new estimates by multiplying each nadir by the depopulation ratios. His estimate for 1492 North America was 9,800,000 to 12,250,000.[71] Dobyns defended his results against critics who found them far too high or challenged the process of creating hemispheric ratios and applying them to parts of the hemisphere.[72]

Although few scholars initially accepted Dobyns's estimates completely, some did use his methods, and his views gradually gained acceptance. Thornton's work illustrates how the field changed in the early 1980s. In 1980, Thornton collected tribal estimates from the *Handbook of North*

[67] Snow, *Archaeology of New England*, 31–42.

[68] Zambardino, review of *American Indian Holocaust*, *J. Interdis. Hist.*, XLIX (1989), 541–544.

[69] Alan Brinkley et al., *American History: A Survey*, 8th ed. (New York, 1991), 1; Mary Beth Norton et al., *A People and a Nation: A History of the United States*, 3d ed. (Boston, 1990), 10; James Kirby Martin et al., *America and Its People* (Glenview, Ill., 1989), 9. On the Mexican question, the influence of Cook and Borah remains high.

[70] Dobyns, *Pioneering Christians among the Perishing Indians of Tucson* (Lima, 1962), 3–29; Dobyns, "Indian Extinction in the Middle Santa Cruz River Valley, Arizona," *New Mexico Historical Review*, XXXVIII (1963), 163–181; Dobyns, "Estimating Aboriginal American Population: An Appraisal of Techniques with a New Hemispheric Estimate," *Current Anthro.*, VII (1966), 395–416.

[71] Dobyns, "Estimating," 375–416. A good hint was in Borah, "America As Model: The Demographic Impact of European Expansion Upon the Non-European World," in XXXV Congreso Internacional de Americanistas, Mexico, 1962, *Actas y Memorias*, III (México, D. F., 1964), 381–382.

[72] Dobyns, "Reply," *Current Anthro.*, VII (1966), 440–444; Bennett et al., "Comments," 426 (Bernal), 426–427 (Blasi), 429 (Denevan), 430 (Driver), 431 (Forbis), 433 (Haviland), 434–435 (Kehoe and Kehoe), 435 (Keyfitz and Carmagnani), 436–437 (Kunstadter), 439 (Thompson).

American Indians and used a bottom-up procedure to produce a California estimate that fell between Kroeber's and Cook's.[73] In 1981, he made a mathematical analysis that led to an estimate of slightly under 2,000,000 for the whole United States.[74] In 1984, however, he suggested that he partially agreed with Dobyns, and in 1987 he reversed his position by using depopulation ratios to produce an estimate of 5,000,000 to 6,250,000.[75] In 1983, historian J. Donald Hughes provided additional support for Dobyns by using carrying capacity to estimate 5,000,000 to 10,000,000 for North America and 1,000,000 for California alone.[76]

In 1983, Dobyns returned to the subject in *Their Number Become Thinned,* which carried his estimates to new heights. With massive depopulation as a working hypothesis, he constructed a long list of pandemics that he maintained had affected North America long before the arrival of Europeans in most areas. To support this contention, he employed some of the methods of area modeling but used them to produce results far higher than that school had ever attained. Using epidemic correction, carrying capacity, and multiple multiple methods, Dobyns estimated a population for aboriginal Florida of 922,000, a figure that dwarfed the previous high of well under 100,000. For North America (including northern Mexico), his total now stood at 18,000,000.[77]

Their Number Become Thinned met a mixed reaction. The majority of the reviews have been favorable, though reviewers in three major historical journals blasted the book on methodological grounds.[78] Despite these attacks, Dobyns continued to gain support. The archaeologist Ann F. Ramenofsky analyzed excavations in three sections of the United States. Although her tentative evaluation lowered Dobyns's North American estimate to around 12,000,000, she endorsed his view of massive depopulation.[79] Five of the sample of ten current textbooks essentially have

[73] Thornton, "Recent Estimates of the Prehistoric California Indian Population," *Current Anthro.*, XXI (1980), 702–704.

[74] Thornton and Marsh-Thornton, "Estimating Prehistoric American Indian Population," 47–52.

[75] Thornton, "But How Thick Were They?" *Contemporary Sociology*, XIII (1984), 149–150; Thornton, *American Indian Holocaust*, 15–36.

[76] J. Donald Hughes, *American Indian Ecology* (El Paso, Tex., 1983), 95–104.

[77] Dobyns, *Their Number Become Thinned*, 8–26, 34–44, 119, 148–150, 184–187, 204–208, 291–295.

[78] Favorable reviews include those by Alfred W. Crosby, Jr., in *Pacific Historical Review*, LIII (1984), 219–220, Noble David Cook in *Journal of Southern History*, L (1984), 630–632, Florence C. Shipek in *American Indian Quarterly*, VIII (1984), 365–367, and Ramenofsky in *Amer. Antiq.*, L (1985), 198–199. Unfavorable reviews include those by William Cronon in *Journal of American History*, LXXI (1984), 374–375, Sturtevant, review, *AHR*, LXXXIX (1984), 1380–1381, Daniel K. Richter, review, *WMQ*, 3d Ser., XLI (1984), 649–653, and David Henige, "If Pigs Could Fly: Timucuan Population and Native American Historical Demography," *J. Interdis. Hist.*, XVI (1986), 701–720.

[79] Ramenofsky, *Vectors of Death*, 160–162, 173–176.

TABLE III
ESTIMATE BASES FOR SCHOOLS OF THOUGHT

Estimate Basis	*Bottom Up*	*Area Modeling*	*Top Down*	*Total Uses*
Borrowing	15	3	0	18
Guesstimate	5	4	1	10
Count Multiple	7	10	0	17
Multiple Multiple	0	0	1	1
Report Discounting	5	0	0	5
Epidemic Correction	0	3	2	5
Population Density	3	8	0	11
Resource Availability	1	6	0	7
Carrying Capacity	0	3	2	5
Depopulation Ratio	0	1	3	4
Demographic Archaeology	1	0	0	1
Mathematical	1	1	0	2
Total Bases Used	38	39	9	86
Total Estimates	19	18	5	42

adopted Dobyns's 1966 estimate, though they have not accepted his higher, 1983 figure.[80]

By the beginning of the 1990s, the positions and the methods of the three schools were clear. (Table III summarizes the bases for the estimates of each school.) Mooney, Kroeber, and others who followed the bottom-up approach calculated tribal totals and added them together to obtain overall population estimates. They normally used whatever direct historical evidence was available, although they frequently discounted the numbers. When the counts were not of people, they applied count multiple procedures. Where no counts were obtainable, they guessed or resorted to simple analogy procedures such as population density and resource availability. Their North American results are low, generally in the 1,000,000 to 2,000,000 range.

Cook, Borah, and other area modelers made tribal and area estimates, which they then combined to produce regional figures. They rarely dealt with North American totals. They began with direct evidence, rejected discounting, and frequently increased those numbers on the grounds that disease caused under reporting. They employed count multiple tech-

[80] Irwin Unger, with Debi Unger, *These United States: The Questions of Our Past*, 5th ed., comb. ed. (Englewood Cliffs, N. J., 1992), 4; James West Davidson et al., *Nation of Nations: A Narrative History of the American Republic* (New York, 1990), 18; Thomas A. Bailey and David M. Kennedy, *The American Pageant: A History of the Republic*, 9th ed. (Lexington, Mass., 1991), 7; John M. Blum et al., *The National Experience: A History of the United States*, 7th ed. (San Diego, Calif., 1989), 3; George Brown Tindall, *America: A Narrative History*, 2d ed. (New York, 1988), 3.

niques along with guesstimates, made more extensive use of analogy methods, and added even more complex procedures. When direct evidence was not obtainable, they compared neighboring regions using resource availability, population density, and carrying capacity. They concluded that the Mooney-Kroeber figures were consistently too low. Their few North American estimates usually fall between 3,000,000 and 5,000,000.

Dobyns, Thornton, and other top downers have tended to work with the continent as a whole. The depopulation ratio, based on a hemispheric calculation, is their signature method. They agreed with the logic of epidemic correction, but they applied it with consistently higher results than did the area modelers. They dismissed analogy methods in favor of more complex procedures, such as carrying capacity and multiple multiple. Their estimates raise the 1492 North American population to a figure in the range of 7,000,000 to 18,000,000.[81]

Although the top-down approach now predominates, the debate continues. The discussion has expanded to include two broader issues. The first is culture in its widest sense, involving the ideas, politics, and customs of peoples. As political and social movements challenged the dominance of European culture in North American society, some scholars introduced cultural concerns into academic debates. Until the 1950s, the population question was relatively free of such concerns. The first sign of a culture clash came when the area modelers challenged the bottom-up approach for discounting evidence of large Indian populations from the early contact period. Mooney and Kroeber argued that the first European reporters exaggerated, while Cook and Borah insisted that they did not.[82]

In the 1970s, some investigators suggested that the members of the bottom-up school had an ulterior motive. They alleged that prejudice and a desire to make Indians appear insignificant led to deliberate discounting of evidence of large early native populations.[83] Most of the bottom-up

[81] Dobyns considered himself the successor of Cook and Borah. For their Mexican work he was, because they used more extreme methods in Mexico, such as multiple multiple. For all of the Americas, Borah also estimated very high numbers that were close to those of Dobyns. Cook and Borah were quite sympathetic to Dobyns. Their detailed North American study, however, remained much less exaggerated than Dobyns's. A comparison of Cook's 1976 analysis of New England with Dobyns's 1983 analysis of Florida illustrates this point.

[82] Kroeber, *Cultural and Natural Areas*. 179–180; Ubelaker, "Sources and Methodology," 249–252, 286–287; Cook and Borah, "On the Credibility of Contemporary Testimony," 229–239; Borah, "Historical Demography of Latin America," 182–183; Cook, "Aboriginal Population of Upper California," 398–400; Cook, *Aboriginal Population of the North Coast*. 81–82; Bennett et al., "Comments," 426 (Bennett).

[83] Borah, "Historical Demography of Latin America," 185–186; Wilbur R. Jacobs, "The Tip of an Iceberg: Pre-Columbian Indian Demography and Some Implications for Revisionism," *WMQ*. 3d Ser., XXXI (1974), 127–128; S. Ryan Johansson, "The Demographic History of the Native Peoples of North America: A Selective Bibliography," *Yearbook of Physical Anthropology*. XXV (1982), 137–139.

advocates were long dead and could offer no reply, but since they had spent much of their lives documenting the surviving Indian cultures, they probably would have regarded the charge of cultural bias as absurd. Nevertheless, report discounting has disappeared, and the lowest of the population estimates have gone with it.[84]

As the top-down group became prominent, its practitioners insisted that their findings proved that Indian societies were more complex, less simple and primitive, than had been believed.[85] Some critics began to wonder if Dobyns and his followers were just as biased in favor of the Indians as Mooney and Kroeber supposedly had been against them.[86] Others charged that the top downers were making the false assumption that large populations could not be primitive. The critics pointed, for example, to the very California tribes that area modelers had documented so well.[87] In short, while the top-down school continued to attack Mooney and Kroeber for anti-Indian attitudes, they acquired enemies of their own, who began to think of them as pro-Indian.

The second issue involves the principles of evidence and reasoning. The bottom-up approach is essentially historical; it admits only direct primary evidence and uses only simple deductive logic involving evaluation and comparison of reported data. The school rejects all forms of inference except by simple analogy. For instance, its followers argued that an investigator who employed carrying capacity would have to assume that the local populace expanded until it consumed all food resources. In scholarly terms, they rejected such assumptions as speculative; in everyday terms, they spoke of pulling numbers out of thin air.[88]

The area modelers began by attacking the bottom uppers at the weakest point: the consistent discounting of primary written evidence. For their part, they intended to put all evidence to its fullest use; where direct evidence does not exist, indirect evidence, simple inference, and simple analogy are acceptable, if used with caution. As for the more complex forms of inference, the area modelers believe that the assumptions are correct and the methods appropriate. In their view, carrying capacity rests on a proven idea. As for epidemic correction, direct evidence proves

[84] In the 1940s, even the bottom-up school stopped using exaggerated reporting openly. The last major use of it was by Kroeber in his 1939 work, which was republished in 1947. See his *Cultural and Natural Areas*, 179–180.

[85] Borah, "The Historical Demography of Aboriginal and Colonial America: An Attempt at Perspective," in *Native Population of the Americas*, ed. Denevan, 18–19; Dobyns, *Their Number Become Thinned*, 34–44.

[86] Johansson, "Demographic History," 135–139; Petersen, "Demographer's View," 235–236.

[87] Denevan, "Introduction to Estimating the Unknown," 11.

[88] Petersen, "Demographer's View," 229–230; Sturtevant, review, *AHR*, LXXXIX (1984), 1380–1381; Thornton, *American Indian Holocaust*, 19–22, 30–31; Thornton, "But How Thick Were They?" 149–150; Bennett et al., "Comments," 431–433 (Fuchs), 437 (Kunstadter).

that disease reduced some tribes before the arrival of Europeans, so that only careful application of the method is necessary to obtain valid results.[89]

After the area modelers had loosened the rules of evidence and logic, the top downers actively expanded the use of inference, advocating a broad extension of area-modeling methods like carrying capacity, coupled with the introduction of new inferences like the depopulation ratio. The debate over these procedures proved lively. Critics of Dobyns's 1983 book especially pounced on two applications of evidence and logic in his Florida calculations: his assertion that most Florida tribes must have had roughly equal numbers of warriors because the stronger tribes otherwise would have destroyed the weaker ones, and his borrowing of a Mexican multiplier for use in Florida.[90]

In the late 1980s, Dobyns got into a sharp debate over his use of evidence, focusing on his long list of North American pandemics. When Dean R. Snow and Kim M. Lanphear attempted to show that a number of those pandemics had affected New England in the 1500s, they found that no diseases had struck the area in that period, casting doubt on Dobyns's use of sources.[91] David Henige joined the debate when he analyzed some of the sources Dobyns had used in preparing his list and concluded that Dobyns had misread or misused most of them.[92] Dobyns's reply to all three, coupled with their rejoinders, did not cool tempers; issues of evidence and logic remain keenly disputed.[93] In 1989, a sympathetic observer found the whole field "speculative," "impressionistic," and "in-

[89] Jacobs, "Tip of an Iceberg," 129–130; Johansson, "Demographic History," 148; Bennett et al., "Comments," 427 (Cook); Cook, "Demographic Consequences of European Contact with Primitive Peoples," *Annals of the American Academy of Political and Social Science*, CCXXXVII (1945), 107–111; Borah, "Historical Demography of Latin America," 179–180; Snow, *Archaeology of New England*, 31–42.

[90] Johansson, "Demographic History," 139; Dobyns, *Their Number Become Thinned*, 184–187; Cronon, review, *JAH*, LXXI (1984), 374–375; Sturtevant, review, *AHR*, LXXXIX (1984), 1380–1381; Richter, review, *WMQ*, 3d Ser., XLI (1984), 649–653; Henige, "If Pigs Could Fly," 701–720.

[91] Snow and Lanphear, "European Contact and Indian Depopulation in the Northeast: The Timing of the First Epidemics," *Ethnohistory*, XXXV (1988), 15–33. Snow elaborated his position in Snow and Starna, "Sixteenth-Century Depopulation: A View from the Mohawk Valley," *Amer. Anthro.*, New Ser., XCI (1989), 142–149.

[92] Henige, "Primary Source by Primary Source? On the Role of Epidemics in New World Depopulation," *Ethnohistory*, XXXIII (1986), 293–312.

[93] Dobyns, "More Methodological Perspectives on Historical Demography," ibid., XXXVI (1989), 285–299; Snow and Lanphear, " 'More Methodological Perspectives': A Rejoinder to Dobyns," ibid., 299–304; Henige, "On the Current Devaluation of the Notion of Evidence: A Rejoinder to Dobyns," ibid., 304–307. A similar debate involving the southwest occurred in Dobyns, "Native Historic Epidemiology in the Greater Southwest," *Amer. Anthro.*, New Ser., XCI (1989), 171–174, and Daniel T. Reff, "Disease Episodes and the Historical Record: A Reply to Dobyns," ibid., 174–175.

ferential."[94] An earlier and less sympathetic critic simply called it a "scholarly thicket."[95]

More than a century of debate has produced neither generally accepted population estimates nor consensus on the methods of obtaining them. The majority of current investigators reject the extremely low figures of the early bottom-up school; beyond that point, little agreement exists. Despite all the discussion of rules of evidence and logic, no one has attempted a tribe-by-tribe analysis, taking all direct evidence seriously and using simple inference only when absolutely essential. In order to create a reliable estimate of the North American population in 1492, scholars will either have to find new evidence or develop better methods of handling existing evidence.

[94] C. Matthew Snipp, *American Indians: The First of This Land*, Census Monograph Series (New York, 1989), 5–6.
[95] Johansson, "Demographic History," 137.