10

African Population

Projections, 1850–1960

PATRICK MANNING

This essay focuses on the implications of national era population studies for our understanding of colonial and precolonial populations. In it, I draw upon recent and authoritative estimates of African population totals for the mid-twentieth century in order to estimate African population totals, at regional and continental levels, for each decade from 1950 back to 1850. The principal finding in this study is that colonial era populations in Africa were significantly higher than previously thought. I conclude that the 1950 continental population of just over 220 million—now well documented—is consistent with a 1930 population of 175 million.[1] The latter figure is 25 percent higher than the 140 million for 1930 that John Caldwell and Thomas Schindlmayr have recently labeled, skeptically, as a consensus.[2] Although it is a commonplace among demographic historians of Africa that colonial officials tended to underestimate the size of the populations they ruled, the magnitude of the discrepancy proposed here is surprisingly large. A corollary finding is that the growth rates of colonial era populations in Africa were much lower than has been previously assumed.[3]

The second major finding is for African populations in the precolonial era—especially in the era of large-scale export slave trade from 1650 to the late nineteenth century. These precolonial populations are here projected, similarly, to have been significantly higher than previously thought: an 1850 population of about 150 million for the African continent. This new estimate is roughly 50 percent

higher than previous estimates of the continental population for 1850, which have averaged about 100 million.[4] A corollary finding, parallel to that for the colonial era of the twentieth century, is that precolonial African population growth rates were substantially lower than those implicit in previous estimates.[5]

Precolonial demography is the issue that first attracted me to the estimation of African continental and regional populations: the desire to know the impact of the external slave trade on African population. The analysis of precolonial populations led inevitably to the need to link them credibly to colonial era and national era populations and hence to the present study. I participated in the lively scholarly discussion, especially in the 1980s, about the impact of slave trade on African population.[6] In the course of this discussion, I argued that the slave exports during the eighteenth and nineteenth centuries reduced the growth of African population everywhere and brought decline in many subpopulations. According to this logic, the population of Africa may have been larger in 1700 than it was in 1850. Yet to be calculated are my revised estimates of pre-1850 African populations, based on the higher estimates of 1850 populations that emerge from the present study. Nonetheless, it is clear that, for 1700, they will show African continental population totals substantially higher than the commonly cited figure of 100 million; further, they will show very low and sometimes negative growth rates for the eighteenth century.

The findings of the present study draw attention to the widespread assumptions of past observers that African populations were relatively small and that they were growing rapidly—in both colonial and precolonial eras. These pervasive assumptions were more than demographic estimates: they emerged out of ideologies that treated African societies as technically backward, politically immature, and socially elemental. Such views of African societies enabled observers to make aggregate generalizations without exploring the details of African social interaction. As a result, colonial administrators and even modern scholars have found it easy to assume that African populations "started" (perhaps a thousand years ago) from a small base and were able to grow rapidly throughout the era of slave exports, the wars and epidemics of the nineteenth century, the oppression of the colonial conquest, and the chaotic early days of colonial rule.

The high rates of African population growth since the 1940s cannot reasonably be projected back to earlier times—certainly not the absolute growth rates and not even the relative or comparative growth rates. The methodology underlying my population estimates is laid out here in considerable detail. This methodology combines several elements, yet it relies on standard demographic principles within each element. It compares population totals and demographic rates over time, with attention to rates of change. It relies on relatively recent data as benchmarks—that is, it begins with population estimates for 1950 and 1960. It uses disaggregated data, working with relatively small regions, and pays attention to population breakdown by age, sex, race, and free or slave status. It accounts for migration. It compares population growth rates across regions, assuming that birthrates and death rates rose and fell in similar patterns for various world regions. (Specifically, I have used

growth rates from India, from 1871 to 1951, as proxies for African growth rates, and I offer arguments as to why these are the best available proxies.) As a result, the methodology has definitely compensated for previous errors and oversimplifications in African population estimates, including earlier errors on my own part. There are doubtless remaining errors: I hope the analysis is transparent enough to make them relatively easy to find.[7]

Although I argue that the implications of this study are substantial, its principal purpose is rather basic. It is to develop decennial population estimates for African territories from 1960 back to 1850, in association with crude growth rates by decade.[8] The year 1850, the effective end of the transatlantic slave trade, is chosen as the earliest date of the study. These estimates are developed for modern nations and the preceding colonial territories and for appropriate subcolonial territories where these are relevant to slave trade calculations. These territorial and subcolonial estimates are then aggregated into population estimates for geographic regions and slave trade regions of Africa. Territories of North Africa and South Africa are included in these estimates, though they were not sources of large numbers of slaves, because their inclusion strengthens the basis for the continental comparison of population size, composition, and growth rates.

In the order of presentation, I begin with a discussion and comparison of African population estimates in national, colonial, and precolonial eras. The second section summarizes the methodology of my estimates for colonial era populations. Details of these estimates follow, in eight analytical steps. The concluding section provides a restatement of the main conceptual and methodological issues highlighted by these estimates. Appendices, published separately online, discuss the error margins and summarize the decennial population estimates at territorial, regional, and continental levels.[9]

African Populations: National, Colonial, and Precolonial

African populations in the national era are known in considerable detail. Although most of Africa still does not benefit from regular and systematic enumerations of whole populations, knowledge of African populations has advanced greatly since 1950 through the careful comparison and linkage of an expanding number of surveys and censuses. Estimates reported here for 1950 and after are the 2006 estimates of the United Nations Population Division, although these figures rely in turn on repeated reconsideration of data collections and analyses since 1950.[10] African population estimates for the second half of the twentieth century depend fundamentally on the great advance in the quality of African population data collection and analysis of the 1950s and 1960s.[11] That brief era of optimism and ability to invest in social services brought sample censuses and occasional general enumerations, which in some cases still serve as an effective demographic baseline.[12] The summary reports of the United Nations Economic Commission for Africa (UNECA) in the 1960s provided the first systematic overview of African population.[13]

As shown in table 10.1, the total population of the African continent has now been estimated authoritatively at 800 million for the year 2000 and at roughly 220 million for the year 1950. These figures for Africa's national period confirm a remarkably rapid rate of growth of well over 2 percent per year, brought especially by declining death rates. The life expectancy at birth rose, for sub-Saharan Africa as a whole, from 36.7 years (1950–54) to 48.6 years (1990–94), though it declined thereafter, especially in response to the HIV/AIDS epidemic.[14] This knowledge has been summarized in two comprehensive articles by Dominique Tabutin and Bruno Schoumaker.[15]

For the colonial era (roughly 1890 to 1960), three types of new data are enriching our understanding of African populations. First, the documentation of postcolonial populations sets methodological standards and empirical figures to which the colonial era estimates must be linked. Second, there have been numerous studies of the colonial era, which rely on the exploration of published colonial documents and the surveys underlying them (although there has not yet been any attempt to aggregate these studies into global population estimates for the colonial era).[16] Third, the comparison of colonial African data with the expanding knowledge of contemporaneous data from other parts of the world provides a basis for making improved estimates of African demographic rates.[17] In my analysis of the colonial era, I have drawn on each of these types of evidence and compiled them into an array of estimates of decennial growth rates as they were affected by a range of social, political, economic, and demographic variables.

In light of the newly available information, the estimates of A. M. Carr-Saunders, Walter F. Willcox, and R. R. Kuczynski for the 1930s appear to have been too low—or, equivalently, they require unreasonably high growth rates to be made consistent with the established population figures for 1950. They can only have been consistent with the known 1950 population of Africa if growth rates were well over 2 percent per year during the 1930s and 1940s. Such growth rates have been documented almost nowhere in the world for that time period, though they are not uncommon for Africa in the post-DDT years of the 1950s and 1960s. This comparison demonstrates the need for new estimates of colonial era African populations. Table 10.2 displays 1929–34 estimates of African population by colonial era authorities, and it

Table 10.1. African population in the national era: United Nations estimates

	Population 1950	*Population 2000*	*Average annual growth rate 1950–2000 (%)*
Africa	220,263,472	817,673,000	2.66%
Sub-Saharan Africa	176,150,472	676,586,000	2.73%
West & Central Africa	90,027,000	336,684,000	2.67%
East & Northeast Africa	70,446,595	275,296,000	2.76%

Source: United Nations Population Division, "World Population Prospects: The 2006 Revision."

Table 10.2. African populations in the colonial era, various estimates

Year	*African continental population*	*Source and year of estimate*	*Annual growth rate (%) to 1950 population of 220 million*
1929	140,000,000	Willcox (1931)	2.28%
1930	145,400,000	League of Nations	2.20%
1930	143,315,000	Carr-Saunders (1936)	2.28%
1934	145,074,000	Kuczynski (1937)	2.78%
1930	175,802,302	Manning (2009)	1.13%

contrasts those figures with my estimate for 1930.[18] In addition, the table calculates the growth rate separating each estimate from the 220 million for 1950 currently estimated by the United Nations. It amply corroborates the argument of Caldwell and Schindlmayr, who have deconstructed the estimates of world population created by Willcox, Carr-Saunders, and Kuczynski, tracing their origins and essential circularity.[19] Instead, as they argue, colonial African population estimates were generally too low. (As we will see, exceptions have been documented for French Equatorial Africa and the West African savanna under French rule.)[20]

My estimates, working from national era base populations and projecting back by decade at appropriate growth rates for each African colony, permit detailed comparison with estimates of colonial governments. Table 10.3 contrasts selected populations from British and colonial censuses with my estimates.[21] It shows that the official population figures for 1911 and 1931 were well below the population projections that result from applying appropriate growth rates to the 1950 populations for the two territories listed; comparisons for the French territories of Senegal and Congo (not shown) present smaller discrepancies.

For the precolonial era—the long era ending in about 1890—population studies of Africa must address a situation in which documents are fragmentary and in which there tends to be more information on the migrations of enslaved Africans than on settled populations in Africa. The primary issue in precolonial African population history is the magnitude of African vital rates, especially birth and death rates. On these vital rates and their modification by environmental and nutritional factors, J. C. Caldwell published a thoughtful analysis in 1985; more

Table 10.3. Colonial era population estimates, selected territories

Territory	*1911 govt est*	*1911 Manning*	*1931 govt est*	*1931 Manning*
Gold Coast★	1,503,418	3,319,464	3,163,464	4,205,084
Kenya	2,648,500	4,140,140	2,966,993	4,873,983

★*Note:* Gold Coast in 1911 did not include Trans-Volta Togoland (with a 1911 population of some 350,000), annexed from Germany during World War I.

recently, Dennis D. Cordell has undertaken a major review of precolonial African population.[22] Meanwhile, publication of scattered data on coastal regions has added to the store of information on precolonial African rates of birth and death.[23] Otherwise, we have progressed little beyond the early guesses of European observers on African populations and their birth and death rates.

The secondary issue in precolonial African population history is the impact of slave trade in expanding mortality and out-migration. This is the work that has kept me interested in estimates of African population.[24] That is, the present effort at back-projection to 1850 is associated with another effort at back-projection, aimed at estimating the impact of the export slave trade on African populations from the seventeenth century to the mid-nineteenth century.[25] For three decades, off and on, I have been investigating the demographic impact of slave trade on Africa. I began with slave export estimates from a region of West Africa and turned next to a demographic model for the continent, showing that attention to the age and sex distribution of those enslaved led one to recognize that exports of young adults in slavery could easily cause population decline.[26] I then implemented this model in a simulation and, with the simulation and estimates of African regional populations, concluded that African populations declined because of slave exports—from 1730 to 1850 in West and Central Africa and from 1820 to 1880 in East Africa.[27] As a result, I projected slow growth or even decline in African population for the eighteenth and nineteenth centuries and therefore larger African populations in the seventeenth century than were previously thought.[28] As I argue, our understanding of African population in one era depends on our understanding of African population in other eras.

The discussion that follows advances the case for an African population of about 140 million in 1850. If such an analysis is sustained, its further implication is that African population in 1700 may have been as much as one-seventh of the world population rather than one-tenth. If seventeenth-century Africa is seen as having had a relatively dense and stable population rather than a relatively sparse and growing population, the resulting demographic picture is likely to have substantial implications for the understanding of precolonial African history, of the place of Africa in the world, and indeed of the contours of world population.

Population estimates for other parts of the world have gone ahead, mostly with better documentary bases.[29] In the occasional worldwide summaries of population growth, recent research on African populations has been given little attention. Angus Maddison's widely quoted summary of 2001 is shown in table 10.4.[30] Maddison's figures reaffirm the common assumption that African population was marginal on a world scale but was growing at a rapid rate in both precolonial and colonial eras: he assumed African growth to have averaged 0.86 percent per year from 1820 to 1950. But a closer inspection of these same summary figures suggests some obvious corrections to the assumptions it entails. The only regions with growth rates estimated at over 1 percent per year are South America and "Western Offshoots" (North America and Australasia)—regions known to have received

Table 10.4. Maddison's estimates (2001) of world population

Region	*1820 population*	*1913 population*	*1950 population*	*Growth, 1820–1913 (%/year)*	*Growth, 1913–50 (%/year)*
Africa	74,200,000	124,700,000	228,300,000	0.56	1.65
Asia	710,400,000	977,600,000	1,381,900,000	0.34	0.94
Latin America	21,200,000	80,500,000	165,900,000	1.44	1.97
Europe	224,100,000	496,800,000	572,400,000	0.85	0.38
Western offshoots	11,200,000	111,400,000	176,100,000	2.50	1.25
World	1,041,100,000	1,791,000,000	2,524,500,000	0.58	0.93

massive numbers of immigrants. Europe shows a growth rate of nearly 1 percent and was undergoing significant out-migration in the nineteenth century, but this was also the era of the European demographic transition, in which death rates fell at an unprecedented rate. No reason is given as to what propitious African conditions allowed for growth rates nearly double those of Asia. On the face of it, therefore, Maddison's estimates for African population size in the nineteenth and early twentieth centuries are unreasonably low. In the present study, as will be described, I return to the estimation of colonial and precolonial African populations with better data and more precise methodology than I used before.

Strategy and Procedure of Analysis

The overall strategy of the population estimates is to set a framework for analysis and projection of populations, make an initial set of projections, then revise and update them. I identify a base population for each national or subnational territory in the years 1950 and 1960 and then project backward at high and low rates. In projecting populations back to 1850, I attempt to estimate variations in growth rates for each territory and each decade, relying on available demographic data and hypothesized changes in epidemiology, overseas slave trade, continental slave trade, and other social and political conditions.[31] The details of the territories analyzed, base populations, and decennial growth rates—and their interactions with each other—are described in what follows at two levels of detail. First, the eight bulleted points in this section describe the full analysis in telegraphic form. Then, the remaining sections of the chapter describe the same analysis in more discursive, detailed fashion. Details of the calculations and the results of the analysis—too voluminous to present within a chapter of a collective work—are freely available online and are stored permanently in a world-historical data archive.[32]

- Step 1—Define territories: Identify standard territories (colonies and subcolonies) that can fit with postindependence African nations, colonial era population statistics, and slave trade regions.

See the map in figure 10.1 and the territorial categories in appendix B1 and appendix B2.

- Step 2—Identify base-year populations for 1950 and 1960: From UN estimates as modified by other data, project base populations by nation for 1950 and 1960. Document or interpolate for subcolony regions, and project their populations for 1950 and 1960. Estimates are summarized in appendices B1 and B2.
- Step 3—Explore data and assumptions on growth rates, 1850–1950: For colonies and subcolonies as defined in Step 1, collect available demographic data and consider the range of possible annual growth rates for decennial periods, 1850–1950, based on empirical, comparative, and speculative approaches. This step includes comparison to contemporaneous growth rates in regions of India. The range of assumptions is displayed in figure 10.2; Indian data are summarized in appendix B19.
- Step 4—Set default growth rates, 1850–1950: Select continent-wide default (that is, estimated median continental) growth rates per decade, reflecting average or expected growth rates, 1850–1950. Estimate the decennial African populations associated with these growth rates. Estimates are displayed in table 10.5 and appendix B3, with implications shown in figure 10.3.
- Step 5—Explore regional variations in growth rates. Based on a review of empirical data (from Step 3), propose estimates of positive or negative adjustments to default growth rates caused by such situations as slave trade within sub-Saharan Africa, export slave trade, disorder from slave trade, post–slave trade recovery, migration of free people to or from adjoining colonies, population decline through colonial oppression, benefits of income growth, or varying local health conditions. Summaries of regional variations in growth rates are in table 10.6 and table 10.7; details are in appendices B4–B12.
- Step 6—Estimate growth rates revised for local conditions and slave exports: Working back from 1950 to 1850 for each region, modify growth rates based on varying local conditions including slave trade (Step 5). Revised growth rates are displayed in appendices B13 and B14.
- Step 7—Calculate low-, mid-, and high-population projections, 1850–1950: To the revised growth rates from Step 6, add tolerances of plus and minus 0.1 percent (or one per thousand) to each earlier decennial growth rate for each territory, so that there will be a high and low growth rate at each stage. Calculate low-, mid-, and

high-population estimates for each region in each decade, and aggregate them as appropriate. Table 10.8 of this text compares the populations of the continent's various slave trade regions in 1850 and 1950; full details of projections are displayed in appendices B15–B18.

- Step 8—Review error margins: Discuss sources of error in data and methodology, techniques for verifying or rejecting the hypothesized population estimates, and alternative methods of analysis. This discussion is presented in appendix A.

Step 1—Defining Territories for Analysis

With the increasing availability of regional and subregional data, it is now realistic to conduct the data collection and analysis at low levels of territorial aggregation rather than at continental or subcontinental levels.[33] Results analyzed at the level of colonial territories and subterritories can then be aggregated to the levels of slave trade regions and continental regions and for Africa as a whole. Just as breaking down populations by their age and sex composition increases the precision and accuracy of the analysis, so does breaking down populations by relatively coherent subregions.

In the regional parameters of analysis, I have adopted the convention of relying on colonial and postcolonial boundaries, in an attempt to work with consistent territories throughout the three centuries of the analysis. In a modification of my earlier analysis, the territories are now organized into several types and levels. At the highest level, I identify a fairly standard set of six geographic regions for Africa (see appendix B1).[34] At the next level, I identify eighteen slave trade regions for parts of the continent that exported slaves, plus five demographic regions for North Africa and one for southern Africa (see figure 10.1 and appendix B2). North Africa and southern Africa are included in this analysis partly to achieve comprehensive estimates of African populations from 1850 to 1960 and partly because comparison of these data with other African data may improve the quality of estimates for all regions. The third level is that of colonial and national territories of the continent. But since colonial and national boundaries do not always fit the historical regions of slave trade, the fourth level consists of relevant subcolonial territories and populations by racial designation (see figure 10.1 and appendices B1 and B2). Thus, the northern portions of Gold Coast, Togo, Dahomey, and Nigeria are broken out from the southern portions of those territories, as the northern portions functioned as parts of the slave-trading system of the savanna rather than of the Atlantic coast. Similarly, Cabinda is broken out from Angola because its slaves were exported through Loango; Katanga is broken out from Congo because its slaves were exported through Angola. Further, for Mozambique, Lesotho, and South Africa, people labeled as Europeans and Asians, not liable to enslavement, are calculated separately from those labeled as Africans and Coloured, from

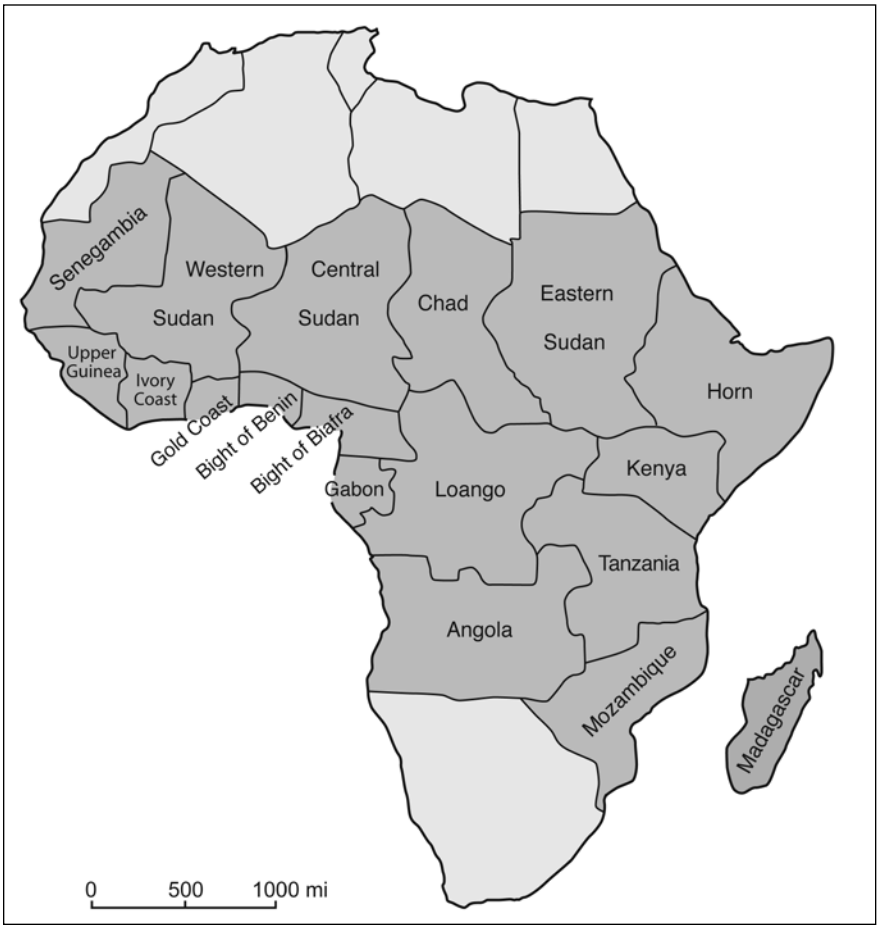

Figure 10.1. Slave-trade regions of Africa. *Map by Claudia Walters*

whom slaves were drawn.[35] In practice, this fourth and lowest level of territorial aggregation—consisting of a mix of colonial territories, subterritories, and racial groups within them—is the level at which data collection and analysis takes place. In appendixes B4–B18 and the spreadsheets that underlie them, data and calculations are processed at the level of individual cells, and then they are aggregated geographically for each time period. The results are presented for colonial territories, slave trade regions, and continental regions.

A further set of considerations has been used in defining the slave trade regions and their constituent subregions. Although estimation of slave exports is not a principal or immediate objective of this study, the regions must be designed so that they are appropriate for such estimates at a later stage. Some territories exported captives uniquely into the Atlantic market, whereas others exported captives into both the Atlantic market and the trans-Saharan market. Transatlantic captives were

dominantly male, but trans-Saharan captives were dominantly female. Slave exports across the Atlantic and the Sahara for each decade are therefore broken down by region of origin and also by sex, in order to project the impact of slave exports on the population of each region.[36] A second problem in the accounting of the slave trade involves regions that exported few slaves or no slaves. Such regions included southeast Cameroon, Gabon, parts of Ubangi-Shari, Southern Rhodesia, Rwanda, Burundi, Uganda, and the Orientale and Kivu regions of Congo. So far, I have included each of these regions within an adjoining slave trade region; the alternative would be to make them into separate regions. Though these regions were not active in slave exports, analyzing their population growth is important in order to yield a conclusion on whether their demographic rates were similar to or different from those of slave-exporting regions. Shona territories of Southern Rhodesia, for instance, seem to have avoided the slave trade of neighboring areas of Mozambique during the nineteenth century. Does that mean that Shona populations rose significantly in proportion to those of Mozambique in that century? Life expectancy seems to have been higher among the Shona; did their birthrates decline in compensation? I have tended to assume "natural fertility rates," which could not easily be adjusted, but this analysis of colonial era populations offers an opportunity to reconsider that issue.[37]

Step 2—Identifying Base Populations

I have chosen to identify base populations for 1950 and 1960, thus including the growth rate linking them, on the argument that this provides the most robust statement of each base population. I have based my estimates first on UN estimates of 2006.[38] (For Ghana, where the 1960 census was exceptionally strong, one may still ask whether the current UN estimates are improvements over the initial figures; for Nigeria, population estimates for 1950 and 1960 remain problematic.)[39] Both 1950 and 1960 are treated as base years, but in practice, the 1950 population estimate for each territory is used as the basis for projection of earlier populations. These figures show African continental populations of 220 million in 1950 and 278 million in 1960, linked by an annual growth rate of 2.4 percent; in that interval, regional growth rates ranged from 2.1 percent in Central Africa to 2.9 percent in southern Africa.

Step 3—Exploring Data and Assumptions on Growth Rates, 1850–1950

The main authorities with which to begin in making estimates of African demographic rates before 1950 are (1) colonial era annual reports and compilations, plus occasional large-scale reviews, notably the massive 1948 survey by R. R. Kuczynski, and (2) postcolonial scholarship reviewing the documents of the colonial era, notably the 1987 collection of essays edited by Dennis Cordell and Joel Gregory and the 1990 collection edited by Bruce Fetter.[40] There are many other commentaries on aspects of colonial African demography, on which I have drawn in varying degrees.[41] Official reports on colonial era populations are the principal

sources with which the authorities have worked; the censuses and estimates for South Africa provide the longest time frame.[42]

The clear judgment of recent authorities is that colonial era population estimates systematically underestimated the size of African populations: low estimates of African population characterized censuses in South Africa as elsewhere on the continent.[43] Several related types of bias kept estimates low, and these downward biases had not been overcome even by the end of the colonial era. First, officials estimating populations did not visit or estimate for all the regions within their territory. Second, they gave prime attention to counting taxable male adults. Third, when they included female adults, they still tended to underestimate the number of children. Fourth, where populations were dispersed, many households were left out even in areas that were enumerated. Colonial officials sought to use rules of thumb—ratios of family size per house or per head of household—but these did not generally overcome the downward bias.

However, some areas under French rule were exceptions to this pattern. In West Africa, the savanna and sahelian territories that are now Mali, Burkina Faso, and Niger may have been overestimated in population, and the Central African territories that are now Central African Republic, Gabon, and Congo-Brazzaville were similarly at risk for overestimates in population. The analyses of Dennis Cordell, Joel Gregory, and Raymond Gervais are distinctive in making the case for colonial overestimation rather than underestimation of population in these territories.[44] At the same time, these studies are among the most detailed in arguing that colonial records exaggerated the rate of growth of African populations—a conclusion that is implicit in the work of all recent scholars on African population.[45]

Further, recent authorities appear to agree that colonial population estimates were often erratic and arbitrary. Annual repetitions of unchanging population figures for a region or, more commonly, annual growth at an unchanging rate provide the most common examples of arbitrary reporting. Ratios of family size per household varied sharply by year and from official to official.[46] Shifts in territorial organization compounded the inconsistencies in reporting. Tabulating and aggregating colonial estimates does not in itself provide any way of checking or correcting these distortions. As a result, the alternative adopted here—projecting back from 1950 population estimates using hypothesized growth rates—has some clear advantages as a way of estimating African populations before 1950.[47]

For the period from the 1930s to the 1960s, colonial reports on population are relatively comprehensive, including some censuses and commonly including useful qualitative descriptions of population characteristics such as migration. Prior to the 1930s, from the beginning of the twentieth century through the 1920s, colonial statistics are scattered but may include qualitative descriptions and useful comments on migration. Small colonies and urban areas, such as Gambia and Lagos, tend to have the best reports. For the nineteenth century, some statistics are available for the limited regions under colonial rule, such as Natal and parts of Senegal, but for most of the continent, one is left with guesswork. During the last

half of the nineteenth century, populations were disturbed by large-scale enslavement and migration in many areas of the continent, making them more difficult to estimate. Nonetheless, imperial and colonial observers recorded useful estimates of the volume of slave trade in that era.[48]

North African populations included many people with ancestry in sub-Saharan Africa. Trans-Saharan slave trade reached a nineteenth-century plateau of some 20,000 persons per year into the 1860s and then declined; many other black people had gone to North Africa in times before 1850. North African population figures, at the aggregate level, give no breakdown by color, so it will require some more indirect methods to trace the links between sub-Saharan and North African populations. Meanwhile, the aggregate estimates of population size and growth for North Africa, along with contemporary commentaries on demographic rates, will make it possible to assess the North African portion of the continent's population back to 1850.

These qualitative and quantitative data, in association with demographic assumptions, are now to support estimates of net population growth rates for African territories from 1960 back to 1850. To convey a sense of the outside limits of such speculation, figure 10.2 displays estimates of population growth at low, medium, and high rates. The figure begins (at right) with a 1960 population of 278 million and a 1950 population of 220 million and projects population back to 1850 at constant annual rates from a low of 2 per thousand (0.2 percent) to a high of 20 per thousand (2 percent). It shows that, at 0.2 percent annual growth, a 1950 population of 220 million corresponds to an 1850 population of 180 million, whereas at 2.0 percent annual growth, the same 1950 population corresponds to an 1850 population of just over 30 million. Clearly, the reality we seek lies somewhere between these extremes.[49]

If it may be assumed that changes in population growth rates throughout the tropics were somewhat similar, then it is relevant to consider growth rates in the well-documented population of India as proxies for African growth rates.[50] Appendix B19 shows decennial growth rates calculated from census returns for

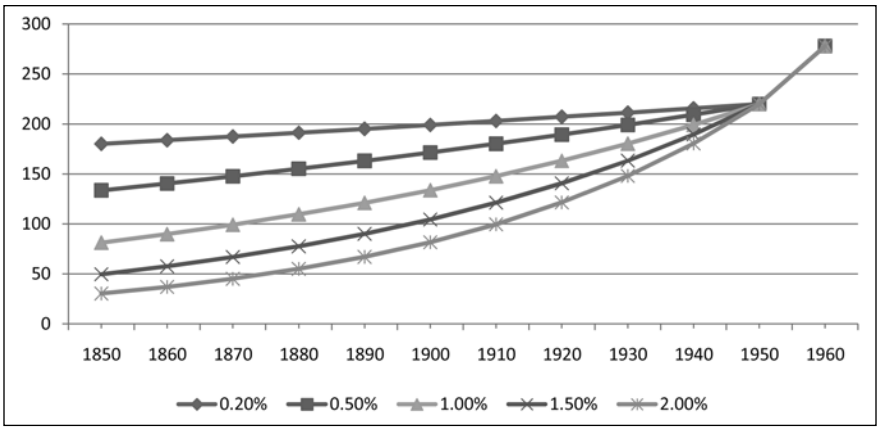

Figure 10.2. Constant growth rates, 1950 back to 1850

regions of south and central India for which the administration was consistent. The Indian case suggests that there were no growth rates as high as 2.0 percent before 1940 and that growth rates as high as 1.0 percent were rare before 1920. Of forty-one observations from 1871 to 1921, ten showed annual growth rates of over 1 percent, eight showed growth rates between 0.5 percent and 1.0 percent, nine showed growth rates between zero and 0.5 percent, and fourteen showed negative growth rates. The apparently high growth rates of the 1880s (averaging 1.2 percent) are probably an artifact of improved enumeration in 1891.[51]

India cannot, of course, be taken as a straightforward model for Africa. It was under stable British administration from the early nineteenth century. There are reasons to expect that African growth rates should have been lower than those for India, especially in the nineteenth-century circumstances of slave trade and in the tumultuous era of conquest and establishment of European administration.[52] Overall, however, the available Indian growth rates are very helpful in suggesting the range of African growth rates in contemporary periods.

Step 4—Setting Default Growth Rates

After evaluation of the data and alternative assumptions summarized in Step 3, I have chosen to project preliminary or "default" decennial growth rates for Africa as a whole, ranging from a low of 0.2 percent per year for the 1850s to a high of 1.5 percent per year for the 1940s. These are estimates of average or expected crude growth rates, not accounting for export slave trade. My overall assumption is that death rates declined at an accelerating rate from the mid-nineteenth to the mid-twentieth century, while birthrates remained relatively constant, so that net rates of population growth increased over time throughout the continent.[53] For the 1910s and 1930s, I assumed slight declines in growth rates from preceding decades because of war, economic depression, and fertility decline, in parallel with apparent declines in India. I assumed growth rates of no more than 0.2 percent in the mid-nineteenth century because of the high insecurity of that era.

Table 10.5. Africa: default growth rates

Decade	*Annual growth rate in percent*
1951–60	2.4
1941–50	1.5
1931–40	0.8
1921–30	1.0
1911–20	0.2
1901–10	0.3
1891–1900	0.3
1881–90	0.3
1871–80	0.3
1861–70	0.2
1851–60	0.2

Figure 10.3 shows these default growth rates and also shows the tolerance that would result from adding and subtracting a growth rate of 0.1 percent cumulatively, each decade. In appendix A, this elementary estimate of an error tolerance is shown to be consistent with a more sophisticated test of the limits of the expected error in these estimates.[54] The projection based on these

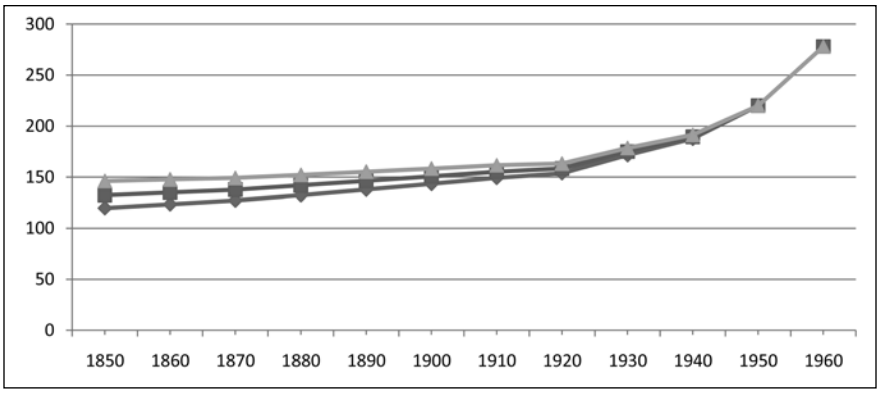

Figure 10.3. Projected continental African population at default growth rates, showing tolerances

assumptions shows low and high continental African populations of 119 and 149 million, respectively, for 1850 as compared with 220 million for 1950 and 278 million for 1960. The resulting mid-level estimates for African population—133 million in 1850 and 152 million in 1900—are significantly higher than the received estimates of Willcox, Carr-Saunders, Jean-Noël Biraben, and others.[55] The assumption of relatively low growth rates for the nineteenth century leads logically to these higher estimates of African population size in the nineteenth century and, indeed, in earlier times. (As we will see, further specification of regional growth rates yields still higher estimates of African population.) One implication is that, since these population estimates are higher than previous estimates, the negative impact of slave trade on these populations will tend to be estimated as less severe than in my previous estimates.[56]

Step 5—Exploring Data and Assumptions on Local Conditions

I turn now to the issue of regional variations in growth rates according to any specific circumstances that can be identified. Before attempting a detailed analysis of the available data, I propose a list of social circumstances for which one can project increases or decreases in population growth rates. Table 10.6 lists the eight

Table 10.6. Situational modification to growth rate

Type of modification	*Maximum annual magnitude (percent)*
a. Slave-trade disorder	-0.2
b. Sub-Saharan slave exchanges	+ or -0.3
c. Sub-Saharan slave exports	-0.6
d. Post-slave-trade recovery	+0.4
e. Colonial disorder	-0.4
f. Income growth	+0.2
g. Migration of free people	+ or -0.6
h. Epidemic and famine	-0.5

situations I propose, along with estimates of the magnitude of the annual effect of each situation on population growth.[57]

The first three situations or categories of modification account for the impact of slave trade. Enslavement and its demographic impact are known to have been at a high level for many African regions in the nineteenth century. Though the export slave trade across the Atlantic ended in the 1850s, exports across the Indian Ocean continued into the 1890s, and exports to the Sahara and North Africa continued to 1900. The retention of captives within sub-Saharan Africa, long a by-product of slave exports, grew as a proportion of total enslavement and continued in some regions well past 1900. The flows of captives included those from the West African savanna to Saharan oases, the enslavement of people from the periphery of the great West African states of Sokoto and Samori, and the settlement of slaves along the routes from the Upper Congo and Lake Malawi to the Swahili coast. The task of assessing these regional flows and the overall magnitude of this nineteenth-century forced migration is intractable, and few serious efforts have been made to quantify it.[58] For instance, up through the eighteenth century, the number of slaves exported from Africa may serve as an adequate index of the overall volume of African enslavement, but this approximation is no longer satisfactory for the nineteenth century.[59] The regions with the greatest slave exports after 1850 were Mozambique, Tanzania, the Horn, the Eastern Sudan, and the Central Sudan. In earlier estimates, I concluded that populations declined significantly as a result of slave exports as late as the 1880s in Mozambique and Tanzania and that growth rates were slowed significantly for the remaining slave-exporting areas in the last half of the nineteenth century.[60]

To account for the impact of enslavement, I have prepared matrixes for each African territory and each decade from the 1850s through the 1890s, and I have made rough estimates of eight variables for each cell:[61]

i. numbers enslaved
ii. number of captives retained within the territory
iii. mortality upon enslavement
iv. seasoning mortality of retained captives[62]
v. number of captive out-migrants from the region
vi. number of captive immigrants to the region
vii. seasoning mortality of immigrant captives
ix. number of out-migrants from sub-Saharan Africa

Of these factors, *slave trade disorder* is taken to be the sum of (iii) and (iv), the enslavement-induced mortality within each region.[63] The *sub-Saharan slave exchanges* are taken to be the difference between exports and imports of captives within any region, or the level of (vi) less the sum of (v) and (vii). The *sub-Saharan slave exports*

(viii)—exports across the Sahara and the oceans—have been estimated, with decennial totals shown in appendix B6.[64] These estimates begin as a mix of population sizes and rates of migration and mortality; they are converted into estimated changes in annual population growth rates for each region in each decade. The big difference here was that export slave trade and its impact halted in West and Central Africa from the 1860s but continued until 1900 in East Africa, the Horn, and the northern savanna.

The remaining five regional variations in growth rate were important especially for the twentieth century. The end of slave trade commonly coincided with the colonial conquest, at times ranging from the 1870s to after 1900: see appendices B4–B6 for the timing of colonial conquest and the end of slave trade in each territory. Once slave trade ended, the return in security is presumed to have led not only to a decline in death rate but also to an increase in birthrate. This *post–slave trade recovery* enabled growth rates to rise from default levels by an estimated 0.4 percent per year for one or two decades.

But colonial regimes, though they brought an imperial peace, also brought their own disorder. Especially for French and perhaps Belgian Central Africa, colonial regimes brought population decline, largely through fertility decline, which in turn was notably a result of disease spread in particular by African and European colonial officials. More generally, colonial recruitment of forced labor had negative effects on seasonal production cycles, thus affecting nutrition and mortality. For this type of situation, I project that *colonial disorder* brought reductions in growth rates by as much as 0.3 percent per year, for periods from a decade to as much as thirty years (see appendix B8). For other colonies, such as West African coastal colonies, *income growth,* especially through expansion of agricultural exports, brought higher fertility, adding to default rates by up to 0.2 percent per year for as long as the boom lasted. Epidemic and famine, finally, could have impacts that brought high mortality, reducing population growth rates by as much as 0.5 percent per year but usually for no more than one to three years at a time.[65]

Having established a typology of varying modifications to the prevailing rates of population growth for each time period, the next step is to apply it and categorize each African region according to the situation it faced in each period. Table 10.7 provides a qualitative summary of the modifications I have made, for each territory and each decade, to the default growth rates displayed in table 10.5. In cases where a cell is left blank, it is assumed that the default growth rate for that period is applicable to the region. Quantitative details of these modifications are shown in appendices B13 and B14, which display the categories and magnitudes of growth rate modifications that I estimated for each decade, by territory. These estimates, though preliminary and speculative, are at least explicitly identified, to encourage updating based on more thorough evaluation of the descriptive literature for each territory.

Table 10.7. Outline of modifications to growth rate

Region	*1850s–90s*	*1900s–20s*	*1930s–50s*
North Africa	c) slave immigration g) free immigration	g) free immigration	
West African savanna	a) slaving disorder b) slave exchanges c) slave emigration	d) post-slaving recovery e) colonial disorder g) free out-migration	g) free out-migration
West African coast	b) slave exchanges d) post-slaving recovery	f) income growth g) free immigration	f) income growth g) free immigration
Central Africa	a) slaving disorder b) slave exchanges d) post-slaving recovery	e) colonial disorder h) epidemic	
Northeast Africa	a) slaving disorder b) slave exchanges c) slave emigration h) epidemic	d) post-slaving recovery e) colonial disorder h) epidemic	
East Africa	a) slaving disorder b) slave exchanges c) slave emigration h) epidemic	d) post-slaving recovery e) colonial disorder h) epidemic	f) income growth
Southern Africa	e) colonial disorder	f) income growth g) free immigration	g) free immigration

Note: See Appendix B14 for details.

Step 6—Exploring Growth Rates Revised for Local Conditions and Slave Exports

Summarizing the estimates of Step 5 makes it possible to estimate growth rates and then populations for each territory and subterritorial region, working decade by decade from the 1940s back to the 1850s. That is, for each region within each decade, I locate and summarize the modifications to growth rate because of local conditions and slave exports (from Step 5). This process yields a revised growth rate for each decade, as well as a revised population for the beginning of each decade. Appendixes B12–B14 display the data on regional growth rates calculated as a result of this process for each of the slave trade regions and for four of the ten decades under consideration.[66]

Step 7—Calculating High- and Low-Population Projections, 1850–1960

Results of the previous sections are computed for each territory and then are tabulated for geographic and slave trade regions. Although the detailed analysis and revision of growth rates is best conducted at the localized level of the colony or subcolony, one can also learn from review and critique of aggregate results of the estimations.[67] For instance, table 10.8 compares these estimates of

Table 10.8. Mid-level estimated populations, by slave-trade regions

	1850	*% 1850 Population*	*1950*	*% 1950 Population*	*Difference in %*
Senegambia	2,020,997	1.9%	3,529,000	2.2%	+0.3%
Upper Guinea	3,562,752	3.3%	5,892,000	3.6%	+0.3%
Ivory Coast	1,568,935	1.5%	2,505,000	1.5%	+0.0%
Gold Coast	3,043,167	2.8%	5,381,839	3.3%	+0.5%
Bight of Benin	4,114,997	3.8%	7,222,478	4.4%	+0.6%
Bight of Biafra	6,162,335	5.7%	10,852,100	6.7%	+1.0%
Forest	433,858	0.4%	639,856	0.4%	+0.0%
Loango	7,487,167	7.0%	10,555,304	6.5%	-0.5%
Angola	4,015,345	3.7%	6,377,597	3.9%	+0.2%
Mozambique	8,392,608	7.8%	10,540,905	6.5%	-1.4%
Madagascar	2,816,274	2.6%	4,234,000	2.6%	+0.0%
Tanzania	11,208,394	10.4%	14,500,789	8.9%	-1.5%
Kenya	8,260,923	7.7%	13,691,000	8.4%	+0.7%
Horn	13,522,949	12.6%	21,901,000	13.4%	+0.8%
Eastern Sudan	6,557,378	6.1%	9,190,000	5.6%	-0.5%
Chad	2,442,180	2.3%	3,086,000	1.9%	-0.4%
Central Sudan	15,940,740	14.8%	24,564,422	15.1%	+0.3%
Western Sudan	5,823,418	5.4%	8,502,161	5.2%	-0.2%
Total[1]	107,374,417	100 %	163,165,451	100 %	

Source: Appendix B18

[1] The totals refer to populations for the African regions from which captives were exported, and thus exclude North Africa and Southern Africa; the percentages refer to portions of those totals.

population by slave trade regions for 1950 and 1850. Figures for slave trade regions in table 10.8 are for black populations (those that were liable to enslavement), and the regions listed are limited to those in which people were enslaved. Regional percentages of continental population, shown for 1850 and 1950, indicate which regions grew and which declined during that century in relative terms. Those for which projected populations *grew* relatively included especially the Bight of Biafra and Bight of Benin but also Kenya, Gold Coast, Upper Guinea, Angola, and Senegambia. Those that *declined* relatively included especially Tanzania and Mozambique but also Loango, Eastern Sudan, and Chad. Relatively unchanged were the Horn, Ivory Coast, Madagascar, Central Sudan, and Western Sudan. For the Bights of Biafra and Benin, slave exports ended relatively early, and prosperity fed colonial era growth rates. For Tanzania and Mozambique, the prolonging of slave exports to the end of the nineteenth century slowed long-term growth.

The three Sudan regions and the Horn, though they exported slaves until the end of the nineteenth century, exported smaller proportions of their population than Tanzania and Mozambique.

A New View of African Demographic History

This essay has combined available data and updated assumptions to provide a new view of African demographic history from 1850 to 1950. This view is strikingly at variance with the picture given in previous global assessments of African population. This concluding section restates the results of the analysis, restates the methods that have led to these results, and identifies the further research needed in order to verify and pursue the results.

Results of the analysis indicate a continental African population of 140 million in 1850 that changed little to 1920, then began accelerating in its growth to a 1960 population of 280 million and a 2000 population nearing 800 million. Growth rates reached a peak in the 1960s and have since declined only slowly from that peak. The biggest numerical change in African population took place from 1950 to 2000, but the biggest change in the structure and organization of African population—the demographic regime—took place from 1900 to 1950.

The century beginning in 1850 (but especially the period after 1900) was unquestionably an era of massive demographic transformation. This analysis argues that African growth rates for the nineteenth and early twentieth centuries were lower than previously thought, with the result that African populations in the nineteenth and early twentieth centuries were considerably higher than previously thought.[68] African population thus went from a brutal steady state in the nineteenth century to an era of initiation and expansion of growth, but under colonial conditions, that by no means eliminated brutality. Africans in this period experienced dramatic changes in vital rates, accelerating rates of growth, sharp changes in migration patterns, and the beginnings of spectacular urbanization. African life expectancies—though low in comparison with those of other regions and perhaps changing with a lag—nonetheless lengthened impressively. For the early nineteenth century, life expectancies at birth are estimated to have been in the range of 20 to 25 years; life expectancies had risen to 35 years by 1950.[69] Similarly, African populations went from crude growth rates of no more than 0.2 percent to rates averaging over 2.0 percent. Of course, there was almost equally massive demographic change, far better documented, for Africa from 1950 to the present. By 1990, the life expectancy at birth was commonly over 50 years. (The subsequent HIV/AIDS epidemic, however, has reduced life expectancies in several countries back to levels of the 1960s—a devastating reversal.)

This new view of African demographic history arises not as the result of a single discovery but from the application of comprehensive methods that reach across time, space, and topics to achieve greater internal consistency and empirical fit for the interpretation. This work with scanty evidence involves the assembly of official documents

and scholarly studies, but it also entails systematic modeling of demographic patterns and the comparison of data and assumptions over space and time.[70]

Most obviously, linking postcolonial to colonial African history clarified a gap in previous reasoning. For too long, scholars ignored the discrepancy between the dense populations documented since the 1960s and the much smaller populations estimated for the 1930s and before, though Caldwell and Schindlmayr sounded the alarm on the issue in 2002. The estimates proposed here, based on modifications of proxies drawn from India, yield populations that can reasonably be linked to those known for the late twentieth century. These new and higher figures for 1900–1950 are generally consistent with the understanding that official counts were systematically too low. The substantial underestimation by colonial era administrators and demographers was partly a result of their limited skills and resources. But their undercount also resulted from widely shared European views of African backwardness.

The ideological dimension to African population history has thus been significant, and it may remain so. Despite wide recognition of the high level of violence in precolonial Africa, some scholars have been willing to assume robust population growth for the eighteenth and nineteenth centuries. For the colonial era, assumptions of relatively small and rapidly growing populations were consistent with visions of African regions as frontier zones where newly arrived populations grew rapidly, and they were consistent as well with visions of colonial rule as benign and socially progressive. The more complex realities of conquest and forced labor fit better with the larger populations and slower growth rates proposed here.

The present overview of changes in African population would benefit from additional work to corroborate its outlines and, especially, to develop more detailed demographic analyses by region, time period, and topic. The overall changes in African population, dramatic though they have been, are known only in vague and inconsistent detail. When and how did the crucial transformations in fertility and mortality take place? At local levels, observers have argued that fertility rates rose in the twentieth century, though demographers tend to assume that the rise was in infant survival rather than fertility. But even if population growth came more from decreased mortality rather than increased fertility, what was the age profile of the declining mortality? How do increased African growth rates compare to those from other world regions? I hope that further efforts to identify territorially specific rates of crude population growth rates, along the lines of this exploration, may do much to indicate whether estimates of sufficient precision can be developed to yield answers on these questions. Although dispersed censuses and other enumerations exist for African populations in the nineteenth century and before, they are not set in clear context.[71] Demographic data are scattered (as with so many records on Africa) in documents created and held by a welter of individuals, agencies, and governments, in many languages and with inconsistent terms of reference. Records of European governments are more numerous from the late nineteenth century, but they are focused on tax collection rather than a systematic demographic concern. Even as censuses became more thorough in the

1960s, they were less than exhaustive, and in any case, they documented populations that had changed greatly in structure from earlier times. Research on African demographic history is not simple work, but it is valuable work, and it is to be hoped that skilled and adequately funded research teams can be supported.

Understanding the causes of Africa's pervasive demographic change, especially from 1900 to 1950, is of great importance for learning about the African past and also for historical demography in general. The possible causes of demographic change include changes in nutrition, the rise and fall of social violence, epidemics, changing immunities, the nature and effectiveness of government, public health practices, changes in the nature and availability of traditional and modern medicine, and the connections brought by commerce and communication. The commonly offered explanations for demographic transition extend only with difficulty to colonial Africa, so that further analysis of African population change may be relevant for other regions. Modern medical and public health practices, though valuable where applied, were simply not applied in sufficient degree to have brought the reductions in death rates that took place in Africa before 1940. Antimalarial campaigns beginning in the 1940s—the spraying of DDT along with the dissemination of chloroquine and antibiotics—brought rapid declines in mortality, but these changes do not explain the earlier declines in mortality. These new measures were applied unevenly across the continent, so that DDT seems to have been most effectively used in southern Africa whereas chloroquine was more important for malaria reduction in East Africa.[72] Other possible causes of demographic change include natural transformations in the epidemiological atmosphere (that is, diseases may have become less virulent), social changes resulting from the end of large-scale enslavement, improved nutrition resulting from declining oppression and expanding markets, and perhaps development of new African healing practices.

Finally, the results of this study, in arguing that nineteenth-century African population was at least 40 percent higher than the commonly cited aggregate figures, challenge the relative marginalization of Africa in studies of world history. The larger population figures imply that African societies had higher levels of productivity than is commonly attributed to them. At the same time, the stasis and even decline in African populations of the nineteenth century suggest that a combination of global conditions and domestic crises were constraining life in Africa in this era of imperialism and industrialization, when populations elsewhere in the world were growing at robust rates.

Notes

I wish to express my deep appreciation to Karl Ittmann, Dennis D. Cordell, and Ian Pool for their detailed and insightful critiques of earlier versions of this study and to Gregory Maddox for engaging me in this project and seeing me through its early stages. In addition, I am grateful to John C. Caldwell for a discussion that clearly conveyed the work of early demographers of Africa and inspired certain key analytical devices in this

study. None of these individuals, however, are responsible for the specific arguments advanced here. In addition, Scott C. Nickleach verified all of the calculations and coauthored appendix A on error margins.

1. The UN 2006 estimates for continental African population are 223 million for 1950 and 281 million for 1960. UN Population Division, "World Population Prospects: The 2006 Revision," available at http://esa.un.org/unpp/.

2. John C. Caldwell and Thomas Schindlmayr, "Historical Population Estimates: Unraveling the Consensus," in *Population and Development Review* 28, no. 2 (2002): 183–204.

3. By "finding," I mean a mix of empirical, comparative, and deductive findings, rather than strictly empirical documentation. The purpose of this study is to detail the various findings and how they have been linked together.

4. Willcox estimated the 1850 population of Africa at 100 million; Carr-Saunders reduced the figure to 95 million. See Walter F. Willcox, "Increase in the Population of the Earth and of the Continents since 1650," *International Migrations,* vol. 2, *Interpretations* (New York: National Bureau of Economic Research, 1931), 76; A. M. Carr-Saunders, *World Population* (London: Frank Cass, 1964), 34–35, 42.

5. Willcox projected no population growth for Africa from 1500 to 1850; Carr-Saunders even projected population decline in that period. Both assumed rapid growth thereafter. I am certain that their growth rates for the period 1850–1930 are too high; it is even possible that their estimates of flat or negative growth rates for the period before 1850 are too high. See Willcox, "Increase in the Population," 78, and Carr-Saunders, *World Population,* 42.

6. Patrick Manning, "The Enslavement of Africans: A Demographic Model," *Canadian Journal of African Studies* 15, no. 3 (1981): 499–526; John K. Thornton, "The Demographic Effect of the Slave Trade on Western Africa, 1500–1800," in *African Historical Demography,* ed. Christopher Fyfe and David McMaster (Edinburgh: African Studies Centre, 1981), 2:691–720; Joseph Inikori, "Introduction," in *Forced Migration: The Impact of the Export Slave Trade on African Societies,* ed. Joseph Inikori (New York: Africana Publishers, 1982), 13–60; Roger Anstey, *The Atlantic Slave Trade and British Abolition* (Cambridge: Cambridge University Press, 1975); John D. Fage, "Slavery and the Slave Trade in the Context of West African History," *Journal of African History* 10, no. 3 (1969): 393–404.

7. See Step 8, in a later section of this chapter, for fuller discussions of errors.

8. In accordance with the current practice of the UN Population Division, I have defined census points as 1950, etc., and decades as 1950–59, 1940–49, etc.

9. Patrick Manning, "African Population Estimates, 1850–1960: Appendices," archived in the World-Historical Dataverse, www.dataverse.pitt.edu/archive/users.php. Included in this archive are appendix A, "Review of Error Margins," by Scott Nickleach and Patrick Manning, and appendix B, "Statistical Tables," including appendices B1 through B19 as identified in the text and notes of this chapter. The same material is also available on the Ohio University Press/Swallow Press Web site at http://www.ohioswallow.com/author/Karl+Ittmann. **<supply full url when available>**

10. Through the work of the UN Population Division, documentation on populations since 1950 has been reworked repeatedly, so that updates as recently as 2006 have revised estimates for 1950 and all the years thereafter; see www.un.org/esa/population/unpop.htm.

11. For major collections of demographic analysis conducted during the era of decolonization, see K. M. Barbour and R. M. Prothero, eds., *Essays on African Population* (Westport, CT: Greenwood, 1961); William Brass, Ansley J. Coale, Paul Demeny, Don F.

Heisel, Frank Lorimer, Anatole Romaniuk, and Etienne Van de Walle, *The Demography of Tropical Africa* (Princeton, NJ: Princeton University Press, 1968); John C. Caldwell, *Population Growth and Family Change in Africa: The New Urban Elite in Ghana* (Canberra: Australian National University Press, 1968); and John C. Caldwell and Chukuka Okonjo, eds., *The Population of Tropical Africa* (London: Longman, 1968). See also Ansley J. Coale and Paul Demeny, with Barbara Vaughan, *Regional Model Life Tables and Stable Populations,* 2nd ed. (New York: Academic Press, 1983), and R. P. Moss and R. J. A. R. Rathbone, eds., *The Population Factor in African Studies* (London: University of London Press, 1975).

12. Chukuka Okonjo, "A Preliminary Medium Estimate of the 1962 Mid-year Population of Nigeria," in *The Population of Tropical Africa,* ed. John C. Caldwell and Chukuka Okonjo (London: Longman, 1968), 78–96; B. Gil and K. T. de Graft-Johnson, *1960 Population of Ghana,* vol. 5, *General Report* (Accra: Census Office, 1964).

13. UN Economic Commission for Africa, *Demographic Handbook for Africa* (Addis Ababa: Economic Commission for Africa, Population Division, 1968); United Nations, "World Population Prospects."

14. By 2000, life expectancies at birth declined to levels near those of 1960 in much of southern Africa.

15. Dominique Tabutin and Bruno Schoumaker, "La démographie de l'Afrique au sud du Sahara des années 1950 aux années 2000: Synthèse des changements et bilan statistique," *Population* 59, nos. 3–4 (2000): 521–621; Tabutin and Schoumaker, "La démographie du monde arabe et du Moyen-Orient des années 1950 aux années 2000: Synthèse des changements et bilan statistique," *Population* 60, nos. 5–6 (2005): 611–724. For an authoritative overview of advances in demographic studies of Africa, see Etienne van de Walle, Patrick O. Ohadike, and Mpembele D. Sala-Diakanda, eds., *The State of African Demography* (Brussels: IUSSP, 1988).

16. Dennis D. Cordell and Joel W. Gregory, eds., *African Population and Capitalism: Historical Perspectives,* 2nd ed. (Madison: University of Wisconsin Press, 1994); Bruce Fetter, ed., *Demography from Scanty Evidence: Central Africa in the Colonial Era* (Boulder, CO: Lynne Rienner, 1990). The present study develops continental estimates, but it does so deductively from aggregate populations and estimated growth rates, rather than inductively through aggregation of local studies.

17. For a convenient list of major summaries of world population data and estimates, see Angus Maddison, *The World Economy: A Millennial Perspective* (Paris: Development Centre of the Organisation for Economic Co-operation and Development, 2001).

18. Sources for table 10.2 are: Willcox, "Increase in the Population," 78; Carr-Saunders, *World Population,* 18, 34–35; R. R. Kuczynski, *Demographic Survey of the British Colonial Empire,* 3 vols. (London: Oxford University Press, 1948), 1. For other estimates of African continental population, see Maddison, *World Economy;* Jean-Noël Biraben, "Essai sur l'évolution du nombre des hommes," *Population* 34, no. 1 (1979): 13–25; C. McEvedy and R. Jones, *Atlas of World Population History* (Harmondsworth, UK: Penguin, 1978); and John D. Durand, "The Modern Expansion of World Population," *Proceedings of the American Philosophical Society* 111 (1967): 136–59.

19. Caldwell and Schindlmayr, "Historical Population Estimates."

20. See note 44.

21. Table 10.3 sources are: For Gold Coast—Kuczynski, *Demographic Survey,* 1:418–419; for Kenya—Kuczynski, *Demographic Survey,* 2:144–45; for Manning estimates—table B5.

22. J. C. Caldwell, "The Social Repercussions of Colonial Rule: Demographic Aspects," in *General History of Africa,* vol. 7, *Africa under Colonial Domination, 1880–1935,* ed. A.

Adu Boahen (Berkeley: University of California Press, 1985), 458–86. Caldwell's chapter was completed some years before the publication date. Dennis Cordell's forthcoming analysis of the past millennium of African population trends will update Caldwell's interpretation. See Cordell, *Rhythms of Life: Population in African History* (Cambridge: Cambridge University Press, forthcoming).

23. Antonio McDaniel's study of Liberia provides the best set of data on population in Africa before 1850, but the data center much more on immigrants to Africa rather than on locally born people; see McDaniel, *Swing Low, Sweet Chariot: The Mortality Cost of Colonizing Liberia in the Nineteenth Century* (Chicago: University of Chicago Press, 1994). For population on Angola, see José Curto and Raymond Gervais, "The Population History of Luanda during the Late Atlantic Slave Trade, 1781–1844," *African Economic History* 29 (2001): 1–59.

24. For a bibliography of major monographs and collective works on the history of the slave trade, see Patrick Manning, "Introduction," in *Slave Trades, 1500–1800: Globalization of Forced Labour,* ed. Patrick Manning (Aldershot, UK: Variorum, 1996), xv–xxiv.

25. Patrick Manning, "Local vs. Regional Impact of Slave Exports on Africa," in Cordell and Gregory, *African Population and Capitalism,* 35–49; Manning, *Slavery and African Life: Occidental, Oriental, and African Slave Trades* (Cambridge: Cambridge University Press, 1990). *Retrojection* was the charming term proposed by the late Joel Gregory for this sort of demographic speculation.

26. Patrick Manning, "The Slave Trade in Southern Dahomey, 1640–1890," in *The Uncommon Market: Essays in the Economic History of the Atlantic Slave Trade,* ed. Henry A. Gemery and Jan S. Hogendorn (New York: Academic Press, 1979), 109–141; Manning, "Enslavement of Africans."

27. Patrick Manning and William S. Griffiths, "Divining the Unprovable: Simulating the Demography of African Slavery," *Journal of Interdisciplinary History* 19, no. 2 (1988): 177–201; Manning, "The Impact of Slave Trade Exports on the Population of the Western Coast of Africa, 1700–1850," in *De la traite à l'esclavage,* ed. Serge Daget, 2 vols. (Paris: Société Française d'Histoire d'Outre-Mer, 1988), 2:111–34; Manning, "Slave Trade: The Formal Demography of a Global System," *Social Science History* 14, no. 2 (1990): 255–79; Manning, *Slavery and African Life.*

28. This project is the fourth iteration in my estimates of African populations for colonial and earlier times. Initially, I projected the impact of slave exports on the Bight of Benin, by ethnolinguistic group, from the 1930s to the 1650s. Second, I focused a broader but still simplified effort at projection on West and Central Africa. In it, I drew on colonial estimates of African populations for the 1930s and projected them back to the 1850s at constant rates of 1.0 percent per year (as a high estimate of growth) and 0.5 percent per year (as a low estimate). This approach resulted in projections that the slave trade of the Bight of Benin, for instance, drew in 1850 on a population ranging between 2.4 million and 3.5 million located in a "catchment area" including colonial Dahomey, Western Nigeria, and a portion of the Central Sudan. My third effort at projection extended this same procedure to the entire African continent, in order to estimate the effects of slave trade in all directions on African population. This fourth iteration relies on a revised and elaborated strategy of projecting populations for the years 1850 to 1950.

29. Maddison, *World Economy.*

30. Table 10.4 source is: Maddison, *World Economy,* 175, 183. Maddison's "Western Offshoots" include the United States, Canada, Australia, and New Zealand; "Europe" includes the entire territory of the former Soviet Union. I calculated the growth rates shown.

31. I retain the practice of identifying a base population for each territory at a given date and then projecting backward at high and low rates. But I have modified the procedure by identifying smaller and more specific regions within which to analyze population growth, and I have moved to identifying base populations for 1950 and 1960, rather than 1931. In projecting populations back to 1850, I now attempt to estimate variations in growth rates for each decade, through greater detail in assumptions and review of available demographic data.

32. See note 10.

33. When subterritorial data are lacking for 1950 or 1960, they may be estimated by interpolation from subterritorial data available for nearby years. This technique was used for Angola, Mozambique, and Sudan, for instance.

34. Here are the countries included in each of the six regions: North Africa—Western Sahara, Morocco, Algeria, Tunisia, Libya, and Egypt; West Africa—Mauritania, Senegal, Gambia, Guiné-Bissau, Guinea, Sierra Leone, Liberia, Mali, Burkina Faso, Côte d'Ivoire, Ghana, Togo, Benin, Niger, and Nigeria; Central Africa—Chad, Cameroon, Central African Republic, Equatorial Guinea, Gabon, Congo-Brazzaville, Congo-Kinshasa, Angola, and Zambia; Northeast Africa—Sudan, Ethiopia, Djibouti, and Somalia. East Africa—Uganda, Kenya, Burundi, Rwanda, Tanzania, Malawi, Mozambique, and Madagascar; and Southern Africa—Zimbabwe, Namibia, Botswana, South Africa, Lesotho, and Swaziland.

35. For this reason, the African continental totals shown in table 10.5 are lower by roughly 3 million than the totals in table 10.1 and table 10.4; the difference arises entirely from southern and eastern Africa.

36. Thus, captives taken in Upper Guinea were exported only across the Atlantic, captives taken in Senegambia were exported across both the Atlantic and the Sahara, and captives taken in the Western Sudan were exported in several directions—across the Sahara, to settlements within the Sahara, and across the Atlantic through Senegambia, Upper Guinea, and Gold Coast. Anticipating this procedure has reaffirmed the choice to subdivide the populations of Gold Coast, Togo, Dahomey, and Cameroon into northern and southern subgroups, as well as dividing Nigeria into its old regions of West, East, and North. (Similar adjustments are made for captives flowing in multiple directions from Chad, Sudan, Ubangi-Shara, and Mozambique.)

37. "Natural fertility rate" refers to the assumption that females were exposed without restriction to the risk of fertility. If they did not restrict their fertility, they could also not voluntarily increase their fertility. The assumption is plausible, since African women commonly married early and remarried at the death of their spouses. But there may be reasons to revise this assumption: for instance, there have been arguments that slave women had lower fertility than free women. See Martin A. Klein, *Slavery and Colonial Rule in French West Africa* (Cambridge: Cambridge University Press, 1998).

38. United Nations, "World Population Prospects." I have relied upon the 2006 estimates of territorial population for 1950 and 1960. The Tabuthin-Schoumaker survey of sub-Saharan Africa relied on the 2002 estimates, and the same authors in surveying North Africa and the Middle East relied on the 2004 estimates. I have accepted the argument that the 2006 estimates, which differ in various details from the earlier series, are to be preferred. I am thankful to Sabine Henning of the UN Population Division for generously providing a set of total African national populations for 1950 and 1960 as estimated in 2002, 2004, and 2006.

39. The official Nigerian census results for 1953 and 1962–63 are generally understood to have exaggerated the population, especially for Northern Nigeria, through an alliance

of British and Northern Nigerian figures who managed thereby to guarantee northern dominance of Nigeria at independence in 1960. The Okonjo estimate of Nigeria's 1962 population is understood to be a summary of the unrevised results from the field and hence the best available estimate. Gil and de Graft-Johnson, *1960 Population of Ghana;* Okonjo, "Preliminary Medium Estimate." Other countries for which discrepancies arose between the 1967 UNECA figures and later UN figures are Guiné-Bissau, Central African Republic, Gabon, Congo-Brazzaville, and Mozambique: in these cases, I relied on the later UN figures. Growth rates in the 1950s appear generally to have been higher in East Africa and North Africa than in West Africa. My thanks to J. C. Caldwell and Ian Pool for advice on these points.

40. Kuczynski, *Demographic Survey;* Cordell and Gregory, *African Population and Capitalism;* Fetter, *Demography from Scanty Evidence.*

41. Gilles Sautter, *De l'Atlantique au fleuve Congo: Une géographie de sous-peuplement: République du Congo, République gabonaise,* 2 vols. (Paris: Mouton, 1966); Dennis D. Cordell, *Dar al-Kuti and the Last Years of the Trans-Saharan Slave Trade* (Madison: University of Wisconsin Press, 1985).

42. Union of South Africa, *Official Year Book of the Union* (Pretoria: Government of the Union of South Africa, 1916–60). For a major recent assessment, see Tukufu Zuberi, Amson Sibanda, and Eric O. Udjo, eds., *Demography of South Africa* (Armonk, NY: M. E. Sharpe, 2005).

43. On the underestimates of colonial African censuses, see Caldwell and Schindlmayr, "Historical Population Estimates"; Tabutin and Schoumaker, "La démographie de l'Afrique au sud du Sahara," 526–29; Bruce Fetter, "Demography in the Reconstruction of African Colonial History," in *Demography from Scanty Evidence: Central Africa in the Colonial Era,* ed. Bruce Fetter (Boulder, CO: Lynne Rienner, 1990), 6–8; and Caldwell, "Social Repercussions of Colonial Rule," 482–83. In South Africa, enumerations of populations designated as European, Indian, and Coloured were fairly accurate in the early twentieth century, but African populations were underestimated there as elsewhere until midcentury.

44. On the population of French West Africa, especially colonial Upper Volta, see Dennis D. Cordell and Joel W. Gregory, "Labour Reservoirs and Population: French Colonial Strategies in Koudougou, Upper Volta, 1914 to 1939," *Journal of African History* 23, no. 2 (1982), 205–24; Raymond Gervais, "Vérités et mensonges: Les statistiques coloniales de population," *Canadian Journal of African Studies* 17, no. 1 (1983): 101–3; Dennis D. Cordell and Joel W. Gregory, "Vérités et mensonges: Les statistiques coloniales de population—A Response," *Canadian Journal of African Studies* 17, no. 1 (1983): 105–6; Raymond R. Gervais, *Contribution à l'étude de l'évolution de la population de l'Afrique occidentale française, 1904–1960* (Paris: CEPED, 1993); and Issiaka Mandé, "Labor Market Constraints and Competition in Colonial Africa: Migrant Workers from Upper Volta, 1920–1932," in Toyin Falola and Aribidesi Usman, eds., *Movements, Borders, and Identities in Africa* (Rochester, NY: University of Rochester Press, 2009), 285–304.

On French Equatorial Africa, see Dennis D. Cordell, "Où sont tous les enfants? La faible fécondité en Centrafrique," in *Population, reproduction, sociétés: Perspectives et enjeux de démographie sociale—Mélanges en l'honneur de Joel W. Gregory,* ed. Dennis D. Cordell, Danielle Gauvreau, Raymond R. Gervais, and Céline Le Bourdais (Montreal, Canada: Les Presses de l'Université de Montréal, 1993), 257–82; Gervais, *Contribution à l'étude de l'évolution.* See also Rita Headrick, ed. Daniel R. Headrick, *Colonialism, Health and Illness in French Equatorial Africa, 1885–1935* (Atlanta, African Studies Association Press, 1994);

Catherine Coquery-Vidrovitch, *Le Congo au temps des grandes compagnies concessionaires 1898–1930* (Paris: Mouton, 1972); and Sautter, *De l'Atlantique au fleuve Congo*.

45. Cordell, "Où sont tous les enfants?" In fact, the population growth rates of Gabon, Congo-Brazzaville, and Central African Republic have remained relatively low in the national period. In contrast, those in the West African sahel rose to comparatively high levels after 1950.

46. In Ruanda-Urundi under Belgian rule, from the 1920s through the 1940s, the administration made efforts to enumerate adult males, then estimated total population by multiplying the adult male total by a factor set for each year, estimating the ratio of total population to adult males. For Burundi, this factor ranged from a low of 3.602 in 1931 to a high of 4.649 in 1935—a difference of almost 30 percent within four years. See Belgium, Ministère des Colonies, *Rapport sur l'administration belge du Ruanda-Urundi* (Brussels: F. Van Gompel, 1921–39).

47. See table 10.3 and appendix B.

48. See table 10.9 for a summary of the results of those observations.

49. In the second and third iterations of my population estimates, I began with base populations taken from 1931 colonial estimates and projected them back at rates of 0.5 percent and 1.0 percent. See note 29.

50. There has been insufficient comparison of demographic rates among tropical regions. Although each region necessarily has its demographic specifics, the general parallels in ecology, disease environment, colonial domination, and scanty records require that comparative work be expanded in order to ensure that advances in the demographic study of any one region can be considered for application to other regions. Thus, the application of Indian proxies for African data is the utilization of detailed data—although from a distant and distinctive region—in place of sheer speculation on African demographic rates. In addition, as the remainder of this section shows, I proposed modifications to Indian data based on known distinctions between Indian and African demography.

51. For decennial growth rates by Indian province, from 1871 to 1961, see appendix B19. These growth rates were calculated only for Indian territories for which the boundaries remained virtually unchanged over the full century. Sources for this information are: Census of India (various titles and publishers, for decades ending 1881 to 1961); Leela Visaria and Pravin Visaria, "Population (1757–1947)," in *Cambridge Economic History of India,* vol. 2, ed. Dharma Kumar (Hyderabad, India: Orient Longman, 1984), 463–532; N. Gerald Barrier, ed., *The Census in British India* (New Delhi: Manohar, 1981); Ira Klein, "Population Growth and Mortality in British India, Pt. 1: The Climacteric of Death," *Indian Economic and Social History Review* 26, no. 4 (1989): 387–403; Klein, "Population Growth and Mortality in British India: The Demographic Revolution," *Indian Economic and Social History Review* 27, no. 1 (1990): 33–63; Klein, "Ímperialism, Ecology, and Disease: Cholera in India, 1850–1950," *Indian Economic and Social History Review* 31, no. 4 (1994): 491–518; Klein, "Development and Death: Reinterpreting Malaria, Economics and Ecology in British India," *Indian Economic and Social History Review* 38, no. 2 (2001): 147–79; Sumit Guha, "Mortality Decline in Early Twentieth-Century India: A Preliminary Enquiry," *Indian Economic and Social History Review* 28, no. 4 (1991): 371–91; Tim Dyson and Arup Maharatna, "Excess Mortality during the Bengal Famine: A Re-evaluation," *Indian Economic and Social History Review* 28, no. 3 (1991): 281–97; Bidyut Mohanty, "Migration, Famines and Sex Ratio in Orissa Division between 1881 and 1921," *Indian Economic and Social History Review* 29, no. 4 (1992): 507–28. See the appendices in P. B. Desai, *Size and Sex Composition of Population in India, 1901–1961* (Bombay, India: Asia Publishing House, 1969).

52. Population practices in Africa and India differed in this period in that Indians practiced some female infanticide and selective nonnurturing and had British health services in parts of the subcontinent. Other reasons why Indian fertility rates may have been lower than African rates include Indian prohibitions against widow remarriage, in contrast to African practices of encouraging such remarriage. However, mortality rates may have been higher in Africa, compensating in part for this difference. Indian populations were undercounted—but not as seriously as in Africa. Indian data suggest a common decline in fertility rates in the early twentieth century, and African data suggest a parallel decline, at least for some regions. These comparisons should be explored in more detail.

53. The overall pattern of "demographic transition," in which populations worldwide have changed over the past two centuries from high rates of mortality and fertility to low rates of mortality and fertility (with mortality declining first), is now known to have been far more variable than was earlier thought. Nonetheless, though the exact pace of historical change in African societies is not yet known, I argue that it is appropriate to retain the general assumption of demographic transition for Africa.

54. The tolerances are cumulative: that is, the tolerance is plus or minus 0.1 percent for the 1940s, 0.2 percent for the 1930s, and 1.0 percent for the 1850s. In the statistical test of this estimate, we assumed a uniform distribution of error in growth rates of +/- 1 percent and replicated the calculation of growth rates 100,000 times, obtaining the equivalent of a Monte Carlo distribution of the continental population under our assumptions. At 95 percent confidence, we found the resulting error tolerances to be half as large as those shown in figure 10.3. See "Appendix A: Review of Error Margins," by Patrick Manning and Scott Nickleach, in the online appendix to this chapter. In a larger study of African population, from 1650 to 1950, Scott Nickleach and I are employing stochastic techniques to establish error margins for estimating rates of birth, death, and migration in Africa and for overseas migration. See Patrick Manning and Scott Nickleach, *African Population, 1650–1950: The Eras of Enslavement and Colonial Rule* (forthcoming).

55. Willcox, "Increase in the Population"; Carr-Saunders, *World Population;* Biraben, "L'évolution."

56. Manning, *Slavery and African Life,* 60–85, 179–81.

57. Categories "a" through "c" refer to the effects of slave trade within the indicated decade; category "d" refers to population growth resulting from the end to enslavement one to two decades earlier. Details of these estimates are available from the author; they are still subject to significant revision. The rubric for these estimates appears to be satisfactory in its present form.

58. Inikori, "Introduction"; Manning, "Enslavement of Africans"; Paul E. Lovejoy, "The Impact of the Slave Trade in Africa in the Eighteenth and Nineteenth Centuries," *Journal of African History* 30, no. 3 (1989): 365–94.

59. For the years before 1800, I have assumed that the number of captives retained in sub-Saharan Africa, for each region, was a constant proportion of those exported. After 1850 (and arguably earlier), the proportion of captives retained in Africa rose substantially, and there is no obvious basis for estimating their numbers. See Manning, *Slavery and African Life,* 50–53.

60. Ibid., 79–82.

61. These matrixes are available on request from the author.

62. "Seasoning mortality" refers to the mortality accompanying the captive's settlement and socialization into slave status. This phenomenon, well documented for the Caribbean, must be included in the accounting of the mortality of enslavement in Africa as well.

63. Additional factors could be added to this estimation, such as the possibility that high proportions of females in slavery might have caused their age-specific birthrates to decline, though the same factor might have increased crude birthrates.

64. Interpolation is necessary at various points—for instance, to allocate slave exports from a slave trade region among its constituent colonies and subterritories. In addition, care is required to avoid double counting, since captives exported from sub-Saharan Africa as a whole have already been exported from one of its constituent regions.

Repeated runs of the slave trade simulation led me to summarize their results in two linear equations. Where *E* is the export ratio (current slave exports as a fraction of African regional population), *G1* is the estimated growth rate of the African regional population from Step 4, and *G2* is the growth rate of the African regional population after accounting for slave exports. For the western coast of Africa, where slave exports were predominantly male:

$G2 = G1 - 2.5\ E$

For the slave trade across the Sahara, the Red Sea, and the Indian Ocean, where exports were predominantly female:

$G2 = G1 - 3.1\ E$

For the earlier version of this procedure, see Manning, *Slavery and African Life,* 179–81.

65. Examples included the influenza pandemic of 1918, cholera epidemics of the late nineteenth century in eastern Africa, and sleeping sickness in Central and eastern Africa in the early twentieth century.

66. Note that the variance in these growth rates reflects the difference in territorial growth rates under specific influences; the assumed margin of error for overall estimates (discussed in appendix A) is in addition to these variations.

67. See appendices B15–B17 for estimates by geographic region.

68. A further measure of the discrepancy between the estimates of the present study and previous estimates is my own 1990 estimate for the western coast of Africa, that region from Senegal to Angola that nourished the Atlantic slave trade. In *Slavery and African Life,* for the period from 1700 to 1850, I estimated populations in the range from 17 to 24 million; the present study shows a mid-level estimated population of 32 million for the same region in 1850. This revision suggests that the negative demographic impact of slave exports on Africa was smaller than I suggested in earlier work, and I am pursuing this question in further revisions of this study. See Manning, *Slavery and African Life,* 73–74; Manning and Nickleach (forthcoming).

69. John C. Caldwell, "The Social Repercussions of Colonial Rule: Demographic Aspects," in *General History of Africa,* vol. 7, *Africa under Colonial Domination, 1880–1935,* ed. A. Adu Boahen (Berkeley: University of California Press, 1985), 458–86; Tabutin and Schoumaker, "La démographie de l'Afrique," 521–621; and United Nations, "World Population Prospects." For studies of demographic history in Africa in precolonial settings, see Philip D. Curtin, *Death by Migration: Europe's Encounter with the Tropical World in the Nineteenth Century* (Cambridge: Cambridge University Press, 1989), and Louise Marie Diop-Maës, *Afrique noire: Démographie, sol et histoire* (Paris: Présence Africaine, 1996).

70. The term *scanty evidence* comes from Bruce Fetter, *Demography from Scanty Evidence.* As an example of proceeding from guesswork to specific procedures, the simulation of slave exports showed how it could be that exports of a relatively small number of persons could result in decline of the home population; see Manning, *Slavery and African Life,* 41–44, 49, 66–69.

71. For discussion of census data on Angola, see John Thornton, "The Slave Trade in Eighteenth-Century Angola: Effects of Demographic Structures," *Canadian Journal of African Studies* 14 (1981): 417–27, and José Curto and Raymond Gervais, "The Population History of Luanda during the Late Atlantic Slave Trade, 1781–1844," *African Economic History* 29 (2001): 1–59. See also McDaniel, *Swing Low, Sweet Chariot*.

72. Gregory H. Maddox, personal communication.