Continental Complexities
A Multidisciplinary Introduction to Africa

By Dr. Ibigbolade Simon Aderibigbe
and Dr. Akinloye Ojo

Included in this preview:
• Table of Contents
• Chapter 1 & 2

For additional information on adopting this book for your class, please contact us at 800.200.3908 x501 or via e-mail at info@cognella.com
# Contents

The Study of Africa: An Introduction  
Ibigbolade Aderibigbe and Akinloye Ojo  

Geology and Geomorphology of Africa  
Sandra Whitney  

A Historical Survey of Africa from Earliest Times to Independence  
Akin Alao and Benjamin Akobi  

Introduction to Language in Africa  
Akinloye Ojo and Willie Udo Willie  

Religions in Africa  
Ibigbolade Aderibigbe  

Social Institutions in Africa  
Akinloye Ojo  

Gender Issues in Africa  
Felisters Jepchirchir Krippono and Janet Musimbi M’mbaha  

The Millennium Development Goals and Agriculture in Rural Africa  
Maria Navarro  

The Quest for Development: Regional Integration in Africa  
Mwita Chacha  

Africa, Health Care Systems, and the HIV/AIDS Pandemic  
Ibigbolade S. Aderibigbe and Simon Mutembo  

Introduction to African Literature  
Tayo Ogunlewe  

Notes on African Drama and Theatre  
Freda Scott Giles  

Introduction to Music in Africa  
AdéOlúwa Okúnadé  

Indigenous, Colonial, and Postcolonial Perspectives on African Sports and Games  
Jepkorir Rose Chepyator-Thomson and Kipchumba Byron  

Index  
List of Contributors
Chapter One

The Study of Africa: An Introduction

Ibigbolade S. Aderibigbe and Akinloye Ojo

The expansiveness and diversity of the African continent are vividly captured by the maxim, “Almost everything said about Africa is true and almost everything said about Africa is false.” In tandem with this paradox, Africa has always been a fascinating “dilemma” for the rest of the world. Its progressive and compelling history of a “journey” through facets of ancient kingdoms and civilizations, trans-Saharan trade, transpacific trade, transatlantic trade, colonialism, independent states, and neocolonialism, has made the African continent constantly a “fertile land” for exploration in all areas of natural and human concerns. Unfortunately, in spite of the prominence guaranteed by these landmark experiences, the misconceptions about Africa and Africans are most stunning. Gordon and Gordon (2007) express this so well in the following observation concerning some Americans’ perspectives of Africa and its peoples:

It is not uncommon to hear a college student refer to “country of Africa” or for people to think about Africa as inhabited only by “tribes” of “savage” people living in “jungles.” (p. 1)

While it cannot be denied that Africa has had its shares of civil wars, famine and drought, economic and political challenges, it is most uncharitable to construct the African story solely on these negative conceptualities. Consequently, the interest of the West, particularly the American population, in the various sociopolitical and economic issues unfolding in Africa, should avail itself of the accurate and authentic situations and happenings on the continent. In providing meaningful and objective “resources” to achieve this goal, it becomes imperative that engaging in the study of Africa must involve dynamics of telling the African story credibly and authentically. These dynamics are invariably set firmly in place from the outset, providing credible information pertaining to the African story. Such information should entail intelligible generalizations capturing the diversity of the continent and its peoples, especially in areas of cultures, languages, histories, societies, religions, and politics.
Second, the story should be contextualized. This primarily entails finding appropriate descriptions of the African condition. With such a disposition, the balancing of extreme negative and positive positions on the African story, for example, celebration versus prejudice, romanticism versus narrow-mindedness and good-news Africa versus bad-news Africa, can be achieved.

Third, there should be the “right” education about the African story. Such an engagement would definitely provide the opportunity to examine in detail issues associated with Africa and compare them to those in other parts of the world. Potential issues of interest necessarily include social, political, educational, economic, religious, and cultural sensibilities. Fourth, a combination of the three dynamics above would certainly enhance vivid and effective clarification and illustration of the African story. Through clarification, a deeper understanding of the African past, as well as the implication of this understanding for the present and the future, is secured. The “worlds” of traditional and contemporary Africa are sustainably linked. Illustratively, the accurate African story is objectively narrated, and the common and convenient misconceptions, misinformation, and half-truths about Africa are significantly eliminated. Such misconceptions include, but are not limited to assertions such as Africa is mostly jungle with wild animals; Africa is nothing but poor rural dwellings; life is perpetually dangerous in Africa; cannibalism is practiced in parts of the continent; Africa is a country; Africans are tribalistic and primitive; Africans are not capable of religion; Africans eat strange things, such as bugs and pets; Africans are under the control of witch doctors and sorcerers.

When the “clouds” of misconceptions, misinformation, and half-truths about Africa are cleared, there are some notable facts and figures that are instructive of the physical and human prominence and influence of the continent in world history. For example, Africa is generally designated as the “mother” continent. Many scholars have noted that Africa was the central part of a single continent, until about 100 million years ago, when there occurred the drifting away of other continents, through continental drifts or plate tectonics. The theory of Africa as the “cradle of humanity” has also been evidenced by different human fields of study such as anthropology, geology, archaeology, history, and linguistics. Indeed, it has been argued that the geographical shape of Africa attests to this claim. This is demonstrated when the following three features are considered:

1. the Great Escarpments (steep edges) in the eastern part of the continent
2. deep rift valleys in East Africa, which are proof of continuous drifting
3. remapping of all plates by geologists showing the seven major plates merging well.

The African continent is very sizable. Indeed, it is the second largest of Earth's seven continents, Asia being the largest. Africa covers about 23 percent of the world's total land area, which translates to nearly 11.7 million square miles. The distance from north to south (Cairo to Cape Town) is 4,500 miles; from east to west (Dakar to Mogadishu) is 4,400 miles. Often divided in popular discourse into North Africa and sub-Saharan Africa, the continent has fifty-five different countries (with the creation of South Sudan in July 2011) including forty-nine mainland
nations and six surrounding island nations. Actually, in terms of landmass, the United States, Argentina, India, Europe, New Zealand, and China all will fit well into the landmass that makes up the African continent.

In addition, Africa has a population of over 900 million. This means that about 13 percent of the world's people reside in Africa. Some scholars predict that, based on the current rate of growth, the population of the African continent might soon hit one billion. The four most populous countries and their estimated populations (in millions) are Nigeria (≥140m), Ethiopia (≥84m), Egypt (≥83m), and the Democratic Republic of the Congo (≥68m). Meanwhile, the four least populated countries and their estimated populations (in thousands) are Equatorial Guinea (≥600K), Sahrawi Arab DR (≥200K), Sao Tome and Principe (≥160K), and Seychelles (≥81K).

Africa is indisputably a wealthy continent. Its wealth lies in its abundance of natural resources. Despite the perception of Africa as being poverty-stricken, the links between global economics and African natural resources are quite interesting, both historically and currently. Historically, the continent's wealth in human and natural resources was the reason for the “immoralities” of the transatlantic slave trade and colonialism. The transatlantic slave trade was part of an international economic system in which Africans were taken as slaves to the Americas for the production of sugar, cotton, and rum. Slaves were transported to Europe and exchanged for manufactured goods and guns that were then transported back to Africa. This vicious circle is what came to be known as the “triangle trade.” In the colonial era, too, Africa's natural resources and raw materials (ivory, rubber, gold, cocoa, palm oil, and so on) were used

Table 1: Regions and countries of Africa

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of Countries</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Africa</td>
<td>Six</td>
<td>Algeria, Egypt, Libya, Morocco, Tunisia and Western Sahara (SADR).</td>
</tr>
<tr>
<td>East Africa</td>
<td>Fifteen</td>
<td>Kenya, Tanzania, Somalia, Djibouti, Eritrea, Ethiopia, Uganda, Rwanda, Burundi, Sudan, South Sudan, Madagascar (island nation), Comoros (island nation), Mauritius (island nation), Seychelles (island nation).</td>
</tr>
<tr>
<td>Central Africa</td>
<td>Eight</td>
<td>Cameroon, Central African Republic, Chad, Congo, Democratic Republic of Congo (formerly Zaire), Equatorial Guinea, Gabon, São Tomé and Principe (island nation).</td>
</tr>
<tr>
<td>West Africa</td>
<td>Sixteen</td>
<td>Senegal, the Gambia, Guinea-Bissau, Mauritania, Mali, Niger, Burkina Faso, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin, Nigeria, Cape Verde (island nation).</td>
</tr>
</tbody>
</table>
to fuel the Industrial Revolution in Europe and build several Western economies. Currently, Africa continues to produce and export crude oil (major exporters: Angola, Libya, Nigeria), precious gems and metals (diamonds, gold, copper, and coltan from such countries as South Africa, Sierra Leone, Congo, and Angola), and labor to all parts of the world.

Africa is a continent with variations of vegetation and landforms found in different areas. North Africa is dominated by the Sahara Desert, the world's largest desert. The Sahel (a mixture of semiarid grasslands to thorny Savannah) cuts across the continent right below the Sahara from west to east, through the countries of Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, and Eritrea. Below this are the savanna and the savanna woodland, spreading across West Africa and inland into southern Africa as well as across the water to Madagascar. Interestingly, the rainforest for which Africa is renowned is mostly limited to parts of West and Central Africa (in countries such as Nigeria, Cameroon, and the two Congo Republics) and some of the African islands. The geographic landmass that is Africa with its fifty-five countries can be divided into five regions as shown in Table 1.

Apart from its diversity in variations of vegetation and landforms, Africa is also clearly diverse in languages and peoples. More than two thousand languages are spoken on the continent, some with multiple distinct dialects. In addition, many non-native languages, such as English, Arabic, French, Portuguese, German, Italian, Dutch, and Spanish, are commonly spoken. This variation has led to the evolution of many pidgins and creoles. In terms of ethnicity, Africa's many different peoples can be found all over the five regions of the continent. A representation of some of the different peoples in the different regions is presented in Table 2.

About two-thirds or 63 percent of Africa's population reside in rural areas. Thus, Africa is the least urbanized continent. However, it must be noted that though an estimated 37 percent of the population is currently in urban areas, Africa is rapidly becoming an urbanized continent. This is because urban growth is resulting from rapid movement into cities and abandonment of agriculture. For instance, the Cairo metropolitan area has about 12 million inhabitants, and Lagos and its surrounding suburbs are home to close to 17 million people. By 2015, the population of the Lagos metropolitan area is expected to be more than 23 million, and it probably will be one of the most populated metro areas in the world.

<table>
<thead>
<tr>
<th>Region</th>
<th>Examples of peoples in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Africa</td>
<td>Egyptian Copts, Arabs, Berbers or Amazigh, and Nubians</td>
</tr>
<tr>
<td>East Africa</td>
<td>Amhara, Swahili, Hutu, Kikuyu, and Somali</td>
</tr>
<tr>
<td>Southern Africa</td>
<td>Shona, Ndebele, Zulu, Chewa, and Xhosa</td>
</tr>
<tr>
<td>Central Africa</td>
<td>Bakongo, Lunda, Bamileke, Fang, and Gbaya</td>
</tr>
<tr>
<td>West Africa</td>
<td>Akan, Wolof, Fulani, Yoruba, and Mende</td>
</tr>
</tbody>
</table>
In recognition and response to issues highlighted and discussed above, this volume, *Continental Complexities: A Multidisciplinary Introduction to Africa*, is written with the intention of providing deep insight and understanding of the selected topics on Africa and its people as well as complementing existing literature in the field of African studies. The book is unique because all the contributors are either professors who have years of personal, physical contact with Africa and have actually taught these topics in the Introduction to Africa classes at the University of Georgia or scholars currently teaching their respective topics in universities in Africa. The topics examined in the book are deliberately selected with the intention of giving priority to issues currently relevant to the African discourse and which should constitute popular items of presentations in Introduction to Africa classes.

In realization of this objective and focus, this chapter is essentially introductory, providing the basic background of the required dynamics essential for studying the “African story” free of the usual and rampant misconceptions, misinformation, and half-truths. We also briefly highlight and discuss the physical and human factors about Africa, which project the authentic and current status of the African continent. In the rest of the chapter, we present summaries of the contents of the other chapters in the book. In chapter 2, Sandra Whitney examines the importance of geology and geomorphology in the study of the African continent. She premises this submission on the argument that both geology and geomorphology of an area have fundamental significance and influence on its physical, economic, and human sectors. In the specific case of Africa, she identifies and discusses some of these as the influences on travel and habitation and colonization zones; the influences on the development and composition of soils, which are critical determinants of soil fertility; potentiality of warning people about possible risks of flooding and earthquakes and volcanic hazards; the location and accessibility of minerals, petroleum, and water resources; and the economic benefits of identifying and providing potential sources of income both for local populations that supply food, lodging, and guides as well as for governments through fees paid by tourists.

Akin Alao and Benjamin Akobi in chapter 3 provide a historical survey of the significant developments on the African continent from the earliest times to the present century. In their survey, they focus on the several historical changes that have altered the fortunes of Africa and have added to the complexities of the multiethnic and multicultural continent. Some of their focused changes include the incursion of aliens such as Arabs and Europeans as well as the colonization and decolonization of Africa. Following up on the historical contextualization done in chapter 3, Akinloye Ojo and Willie Udo Willie present some important insights into language and language-related issues on the African continent in chapter 4. Their generalized introduction to language in Africa includes the impact and classification of the multitude of languages and their variants existing on the continent. They also examine the roles of language and the influence of the continent’s linguistic diversity in the cultural, social, and ethnic identities of the many people on the continent. Finally, with special focus on the work of African linguist Ayo Bamgbose, they consider the critical sociolinguistic and politically significant issue of language.
planning in the multilingual African environment, with emphasis on the two elements of status planning and corpus planning.

Religion has always been a dominant part of the African continent, beginning from its traditional settings. Today, in spite of diverse influences and outside contact, Africa and its peoples remain still largely religious. However, religious affiliations and practices have assumed dramatic changes and influences over the decades. Ibigbolade Aderibigbe, in chapter 5, examines the African religious space, focusing on three major religions—African Traditional Religion, Christianity, and Islam—being practiced on the continent today. African Traditional Religion, which was the only and dominant religion of Africa in the past, has suffered significant setbacks from the onslaught of converting strategies of Christianity and Islam. On the other hand, both Christianity and Islam, once considered “foreign” religions in Africa, are today the two main religions, nearly splitting the continent into two equal halves in membership. Both religions now exert significant social, economic, and political influences in Africa.

In chapter 6, Akinloye Ojo focuses on some of the social institutions found across the continent. Based on most African societies being oral or oral dominated, the chapter first provides a discussion of six of the many practical sources of information needed to comprehend African oral societies and then a succinct reflection on the indigenous systems of instruction. The chapter also provides a detailed discussion of the rites of passage across Africa with illustrations from across the continent. Finally, Ojo endeavors to outline some of the possible generalities about kinship systems and marriage across the continent.

Gender issues, particularly the status of women in Africa, have always been interesting and controversial. Felisters Kripono and Janet Musimbi M’mbaha join the debate in chapter 7. They examine the social, economic, and political implications associated with the issues, in precolonial, colonial, and postcolonial Africa. While identifying colonialism and capitalism as the “game changers” in introducing inequality and subjugation of African women, they recognize the potential power and the importance of the African women through change and development. This status, they claim, can be attained if the society changes its attitude toward women and views them as partners in development rather than as competitors in the society.

In chapter 8, Maria Navarro examines the implications of Millennium Development Goals on agriculture in rural Africa. She highlights the multidimensional and global commitments located in the development goals in the endeavor to eradicate poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases; and develop a global partnership for development, among others. She argues that a path to achieving these goals is being created through focus on improving agriculture as a means to better the lives of the small and poor farmers of Africa, particularly in sub-Saharan Africa. She concludes that the success of the programs depends largely on program personnel’s constant engagement in comprehensive needs assessment and strategic planning together with the stakeholders and intended beneficiaries of the program, the farmers themselves. This, she believes, can be achieved by engaging in in-depth analysis of three very important components of the needs assessments:
the characteristics of small-scale agriculture in the target area; the factors that affect the lives of project stakeholders; and the role of agricultural development in achieving the Millennium Development Goals.

Mwita Chacha focuses on the quest for development in relation to integration in Africa in chapter 9. He examines Africa’s attempts at promoting economic development through the use of regional integration arrangements. He begins by noting the puzzle that although many African states had similar economic development profiles with Asian states such as South Korea in the 1960s, they have not yet attained growth levels comparable to the Asian tigers fifty years later. To address this puzzle, the chapter explains that the mismanagement of regional integration has contributed to Africa’s underdevelopment. Specifically, overlapping memberships, institutional weaknesses, and lack of regional leadership have adversely affected the management and performance of regional integration arrangements as conduits toward sustainable economic development.

Perhaps the greatest challenge to the African continent today, particularly its health sector, is the dreadful disease HIV/AIDS. Its pandemic nature has practically defied all efforts thrown at it by governments of various African countries, their agents, nongovernmental agencies, and many international organizations. In examining the unfolding ravaging impact of HIV/AIDS on Africa, Ibigbolade Aderibigbe and Simon Mutembo, in chapter 10, revisit the status of the health care system in Africa. They explore the characteristics of the African traditional health care system and its holistic physiological-cum-spiritual nature. Also, the history of transition to the Western health system with its attendant challenges is discussed. The chapter then discusses the prevalence and the socioeconomic impact of HIV/AIDS on Africa and its population, arguing for complementary efforts of both the traditional and Western health care system as the panacea in combating the disease in Africa.

In chapter 11, Tayo Ogunlewe provides an introduction to African literature. He focuses on what African literature is. He submits that it cannot be explained in a monolithic term. Rather, it should be seen as referring to works of imaginative literature written by Africans, depicting an African worldview. He further argues that no serious introduction to African literature can afford to ignore Africa’s oral literary traditions because, as a “body,” it constitutes one of the forces that influenced the growth and development of modern African literature. To him, the ignoring of this fundamental and important part of African literature is the direct consequence of the damage done to the African psyche by the influence of colonization and Western hegemony. Ogunlewe thereafter explores modern-day African literature of both the Anglophone and Francophone schools with citations of prominent Africans in the field of African literature from both schools. The totality of their works, in his opinion, succinctly captures African literature’s unique “unity in diversity.”

In chapter 12, Freda Scott-Giles presents some useful notes on African drama and theatre. As she notes, the culture of community is the basis for most, if not all, African performing traditions. This means that the expectation in any African performance is that everyone, including the audience, will be part of the performance. And, in her consideration of the African performing traditions, she discusses the disparate notions of mimesis and methexis. The discussion
allows her to define some of the technical notions in African performance traditions. Finally, in response to the understandable limitation of any effort to provide, in one chapter, an in-depth discussion of drama and theatre in the expansive and diverse African continent, the chapter focuses primarily on sub-Saharan Africa and representative African writers from Anglophone countries. And, as Scott-Giles noted, these focused writers have their plays more readily available in texts in the United States.

Adeluwa Okunade’s chapter 13 introduces readers to the basics of African music from its concept, through characteristics, foreign legacies, instruments, recruitment and training in its holistic feature. He argues that in traditional African society, the performance arts discipline of music is a combination of other arts that culminate in creative thinking and performance practice that exhibit the societal ethos, values, and norms. Even today, with his highlighting and discussion of various types of music and musical instruments with complementary influence from outside cultures, Okunade submits that music in Africa is a community art, and not a “separatist” style of stage presentation.

In the final chapter of the book, Jepkorir Rose Chepyator-Thomson and Kipchumba Chelimo Byron discuss sport in the context of indigenous, colonial, and postindependent Africa. They argue that prior to the arrival of the Europeans in Africa, indigenous Africa was rich in sporting culture. The culture of sports was interwoven into the fabric of life and was complexly influenced by geography, history, religion and economics, as well as by social-class dynamics and variations in ethnicity. Sports inculcated cultural and social skills that allowed children and youth to adequately prepare for adulthood. The colonial period promoted de-indigenization of African sports and games, revealed a marriage between indigenous and European sports and games, and eradication or devaluation of physical activities that were wholly African. The postcolonial period has seen sports players and sports themselves attain a new identity, including political as well as social identity spanning local, national, and international levels. The period saw sport serving as a vehicle for social change at many levels: individual, social, and political. African people have tried to revive indigenous sports and games, a trend under way at present in some countries.

Review Questions

1. Identify two of the various African peoples found in each of the five regions of Africa.

2. Despite the various challenges facing the African continent, the chapter warns against constructing the African story solely on these negatives. What are the ways outlined in the chapter that are best to tell the African story?

3. What are some of the most common erroneous opinions or stereotypes about Africa and Africans? What do you think are some of the reasons for these common misconceptions?
4. What are some of the reasons why it is important to study Africa?

5. What is the estimated population of Africa? How soon is this population expected to reach about one billion?

Bibliography

Introduction: Why Study the Geology and Geomorphology of Africa?

Why are the geology and geomorphology of Africa important? The geology of an area influences travel, habitation, and colonization zones through its influence on the geomorphology and topography of an area. The geology and geologic history of an area influence the development and composition of soils, which are critical determinants of soil fertility. Geological awareness can provide necessary information to those knowledgeable of its significance to recognize potential risks of flooding and earthquakes and volcanic hazards. Warnings of dangers can then be issued and preparedness measures taken. The study of geology explains the location and accessibility of minerals, petroleum, and water resources. Geologic prospecting can find mineral and fossil fuel resources to provide employment and to fund governments and development. Geotourism is a potential source of income both for local populations that supply food, lodging, and guides as well as for governments through fees paid by tourists (e.g., Mt. Kilimanjaro, Lake Victoria).

Africa makes up approximately 20 percent of the land surface of the earth. Containing some of the oldest rocks in the world, it formed the core of several “super continents” during the first four billion years of Earth’s history. It also contains some of the youngest rocks on Earth at volcanoes such as Ol Doinyo Lengai in Tanzania and Nyiragongo in the Democratic Republic of the Congo, which have been active in the twenty-first century. Africa contains several major mountain ranges, from the Atlas Mountains (with peaks over 13,000 feet high) in the northwest to the Drakensberg Range (rising to over 11,000 feet) in the south. The Ethiopian Highlands (over 15,000 feet high in some areas) and the snow-capped Ruwenzori Mountains (more than 16,000 feet high) between Uganda and the Democratic Republic of the Congo are the result of the uplift of old Precambrian (>550 million years) basement rocks by the mantle forces lifting up the East African Rift. These mountains are often capped by volcanic rocks related to the opening of the rift. The Atlas Mountains are the result of folding and faulting caused by the collision of Africa with Europe and North America 300 million years ago. There are numerous
smaller mountain ranges across Africa, which are remnants of ancient uplifts of the granites and
gneisses that formed the ancient core of the continent. Some of the tallest mountains in Africa
are volcanoes related to the East African Rift.

Background: Plate Tectonics and the Development of the Foundation of the Continent

Plate tectonics is the geological theory that explains the physical development of the continent
through time. It explains the type of rocks and mineral resources and their locations across the
continent. This scientific theory can predict both the location of valuable resources and potential
natural hazards. The continent of Africa has some of the oldest rocks on Earth in three areas
known as “cratons.” These areas are made up mostly of granites and metamorphic rocks (such
as gneiss and greenstones, which were originally older sedimentary and volcanic rocks). These
three cratons—the West African, the Congo, and the Kalahari/Kaapvaal—crashed together to
form “Africa” over a billion years ago. The major features of the African continent have been
in place since that time. However, eons of erosion and geologically recent tectonic uplift have
shaped the landscape that we see today.

Some of the oldest evidence of life on Earth, bacterial mats preserved in fine-grained chert
that dates to 3.6 billion years ago, is found in the rocks of the Kaapvaal craton. Approximately 2
billion years ago photosynthesizing organisms began to produce free oxygen molecules, chang-
ing the earth’s atmosphere drastically. In Africa there are extensive deposits of iron oxide that
resulted when the iron in solution in the oceans was oxidized and settled to the bottom of the
ocean in what is known as the “Banded Iron Formations.” These formations are an excellent
potential source of iron ore. Around the same time as early plants were filling the air and the
ocean with oxygen, a huge volume of lava was intruded into the Kaapvaal craton. This two-
billion-year old group of igneous rocks, known as the Bushveld Igneous Complex, is one of
the world’s major sources of platinum-group ores, gold, chrome, and many other economically
significant minerals.

Africa has been the center of the movement of the continents as they have coalesced and
split up repeatedly over the eons. Africa formed the core of the great southern continent,
Gondwanaland, during the late Precambrian time (over 550 million years ago) when what is
now South America crashed into the west side of Africa, what is now Antarctica (together with
what is now Australia) attached itself to the southeast, and what is now Madagascar and India
were wedged against the east.

As the continental crust drifted across the globe, pushed by convection currents in the un-
derlying mantle, Africa has shifted latitude significantly. The megacontinent of Gondwanaland
was located over the southern polar region of the earth during most of the Paleozoic (from 540
to 250 million years ago). Starting approximately 375 million years ago, the northern continen-
tal blocks (including parts of what are now North America, Europe, and Asia) collided with
Gondwanaland to form the Pangea Supercontinent. This placed Africa in an even more interior
location, in which position it remained until about 200 million years ago, when Pangaea began to break apart. This breakup left small parts of the old West African craton attached to what is now the coastal plain of Georgia and Florida, where rocks identical to those in northwestern Africa can be found under more recent coastal plain sediments.

Evidence for the theory of continental drift/plate tectonics also comes from many other observations of the geological and biological history of Africa. Some of the earliest scientific support for this theory came from the correlation of rock units between continents, specifically between rocks in Brazil and Gabon, Brazil and West Africa (Ivory Coast to Nigeria), and Argentina and South Africa. Geophysical research has discovered magnetic signatures in rocks on land and on the seafloor that line up with the locations of the magnetic poles of the earth, shifting as the continent moved through geologic time.

Fossil evidence is found in the rocks of Africa, South America, and Antarctica, suggesting that they were once part of a single landmass. Examples are fossils of the land reptile Lystrosaurus from locations on those same three continents, while fossils of Mesosaurus (a freshwater reptile rather like a small crocodile) are found both in Brazil and South Africa. There are even similarities among unusual living species descended from common Gondwanaland ancestors, including large flightless birds (ratites) such as the African ostrich, the South American rhea, and the Australian emu. During the Late Paleozoic (from approximately 300 to 250 million years ago) Gondwanaland suffered extensive glaciation. The evidence for this glaciation is found in deep grooves (striations) in bedrock and the accumulation of sediments characteristic of glacial deposits from this time period. The Karoo Supergroup of rocks in southern Africa is the most well-known of these deposits. Similar rock units are known from Argentina and parts of Australia and India.

Long after the breakup of the supercontinent of Pangaea, Gondwanaland also began to break apart as India, Antarctica, and Australia started to split off about 180 million years ago. South America was finally separated from Africa about 120 million years ago, as rifting opened up the South Atlantic Ocean like a zipper. Madagascar was separated from Africa about 65 million years ago (which allowed prosimians like lemurs to evolve without the competition of the higher primates). What we now know as the continent of Africa then attained most of its current size and shape.

The most recent evidence of plate tectonic movements affecting the African continent is found in the East African Rift (starting approximately 31 million years ago). There are actually three parts to the rifting currently occurring in Africa. The rifting forms a “triple junction” in the region of the Afar Triangle. Two of the branches of this triple junction form what are now the Red Sea and Gulf of Aden. These rifts are pushing Arabia toward the northeast. The third branch of the rift continues south across Africa, bifurcating around Lake Victoria. The continental crust in this area is stretched and thinned over material rising in the mantle between the earth’s crust and its core. Huge blocks of bedrock are thrust up, while other blocks drop down between the uplifted sections forming valleys. These rift valleys are often filled with lakes (e.g., Turkana, Manyara, Albert, Tanganyika, Nyasa). This tectonic activity is often accompanied by volcanism.
as lava rises along fractures created by the rifting. The African continent and the East African Rift are caught between other major oceanic rifts (in the Atlantic and Indian Oceans) with no subduction zones on the east or west side (subduction is occurring only on the north, where the African plate is being forced under the European plate). This may restrict or prevent spreading, which may result in increased uplift relative to the rate of spreading. Consequently, these rift valleys fill with lakes and continental sediments rather than with ocean and marine sediments. So far, only along the northern and eastern branches of this rift system have the valleys been opened up to the ocean.

Evidence for the active rifting apart of the continent came in dramatic fashion in the Afar region in September 2005 when a 60-kilometer-long crack opened up in just three weeks. Basaltic lava was injected into a crack that was dozens of yards wide in some places. At the same time, satellite and GPS measurements show that the entire African continent is moving about 5 cm/year toward the northwest, toward Europe, closing the Mediterranean. This movement is responsible for many of the earthquakes occurring in southern Europe. Fortunately for Africa, the earthquakes that are generated along rift zones tend to be relatively small (<magnitude 6 on the Richter scale). In contrast, the most destructive quakes occur along subduction zones (e.g., off the coast of Japan) and along major transform faults (e.g., the San Andreas fault in California).

Formation of the Modern Geologic Surface of Africa

The formation of many of the rocks we see on the surface across Africa took place within the last 300 million years. After eons of cratons crashing together and mountain ranges being thrust up, erosion carved down the high mountains and deposited the sediment across the surface of the continent. The old basement rocks have been warped into a wavy surface, with erosion of the higher points and deposition in the low areas. Among the largest group of sediments deposited during this process is the Karoo Supergroup, a sequence of sediments laid down from South Africa and Botswana northeastward to Tanzania between 300 million and 150 million years ago. The first sediments laid down in this group are vast thicknesses of glacial till, the result of that great Ice Age (300–250 million years ago) that covered so much of Gondwanaland. This Ice Age was followed by a warm period of extensive swamps that resulted in the formation of thick layers of coal across most of this area. Today these coal beds are a significant potential source of power for industry and transportation in Africa. Above the coal layers are sediments laid down as deltas in rivers and lakes. Some of these sediments contain alluvial (placer) deposits of economic minerals such as gold or uranium. As the climate changed yet again, windblown sand dunes covered the land. By this time, the megacontinent of Gondwanaland was beginning to break up, and extensive lava flows covered the older sediments.

In northern Africa, the remaining high points in the basement rocks stand out as isolated mountain ranges (e.g., Tibesti and Ahaggar) across the Sahara Desert. Between these ranges, thick sequences of both terrestrial and shallow marine sediments were deposited. Some of the
oldest of these sediments (225–135 million years old) have yielded fantastic dinosaur fossils as exploration has been able to penetrate the harsh desert environment. Within the younger sediments (6–7 million years old) hominid fossils have been found. These sediments are also important as aquifers and as oil reservoirs from Morocco and Algeria to Egypt. The freshwater springs that originate in these aquifers have supported human settlements for millennia, and now provide a source of water for irrigation in some areas. The oil reserves are currently providing energy resources for North Africa and Europe.

Over enormous periods of time the erosion of Precambrian basement rocks reduced the old mountain ranges to a rolling peneplain over much of the surface of the African continent. However, remnants of these older rocks can still be seen sticking up above the plains as “inselbergs” or “kopjes.” Excellent examples of these remnants can be seen in areas such as the Serengeti, where erosion and later deposition of volcanic ash has created a large, relatively level plain surrounding the old granites and gneisses of the kopjes (e.g., Naabi Gate, the entrance to the Serengeti National Park).

Soils across Africa reflect the underlying geology and influence the agricultural production in each region of the continent. The soils that have developed over millions of years have been leached of many nutrients necessary for plant growth. Tropical soils over these old terrains can only maintain their fertility if the vegetative matter remains intact and nutrients can cycle quickly from the plant to leaf litter and decaying plant material in the shallow soil and back to the roots of the living plants. Clearing land interrupts this cycle and can reduce the fertility and productivity of the soil. The result of overclearing and farming in these areas is often a creeping desertification. On the other hand, younger, usually volcanic, soils still have many of the nutrients needed for agriculture. This is why so many people live and farm in areas of recent volcanism such as the highlands along the East African Rift, and even on the slopes of dangerous volcanoes like Nyiragongo in the Democratic Republic of the Congo. Indirectly, it also explains the fertility of old river valleys such as the Nile, as the annual river flood brought down nutrient-rich sediment from the Ethiopian highlands.

**Geomorphology: Landforms and Their Influence on People**

Highland areas that have been uplifted (during the last 30 million years) in southern and eastern Africa include the East African Rift valleys with associated faulting followed by volcanism and sedimentation into valleys (e.g., the area now occupied by Oldupai Gorge). The highland areas within the tropical zone were prime locations for European colonization because the elevation moderated the tropical climate. Rainfall was adequate for farming and ranching, and the cooler weather meant fewer malarial mosquito problems. The edges of this highland region often form escarpments, relatively steep slopes down to the coastal plains.

These narrow coastal plains, backed by steep escarpments, result in relatively few rivers that are navigable into the interior of the southern portion of the continent. The limitations on travel
due to rapids and waterfalls delayed European exploration and colonization in many parts of southern Africa. Many of the colonies existed primarily along the coast for this reason. In contrast, major river valleys that drain tectonic basins, such as the Congo and the Nile (as well as the Niger, Zambezi, Orange, Senegal, and Limpopo), supported the explorations of early travelers and settlement by Europeans in the late nineteenth century. In this way, the Europeans were just following in the footsteps of earlier African civilizations, taking advantage of the relative ease of water travel.

The “Great Lakes” district of east Africa also supports large populations around Lake Victoria (in a basin between the rift valleys) and along the shores of the Great Rift Valley lakes (Turkana, Albert, Tanganyika, Malawi/Nyasa). Soils in this area are young and fertile, allowing productive agriculture to support significant populations. Although Lake Victoria is in the middle of the East African Rift, it is different than its neighboring lakes. It occupies a basin between two branches of the rift. Whereas the lakes that fill rift valleys are long and narrow and can be very deep (Lake Tanganyika is the second deepest in the world at nearly 5000 feet at its deepest section), Lake Victoria is broad and shallow (maximum depth less than 300 feet). At times in the geologic past, Lake Victoria has completely dried up.

Africa also has several major internal drainage basins. The Okavanga Delta in southern Africa supports a unique ecosystem and wildlife preserves. The Niger basin, with its narrow outlet to the Atlantic Ocean, has been the center of major African civilizations for centuries (e.g., the city of Timbuktu). The Chad basin (Lake Chad) has, during wetter centuries, supported large fishing-based populations. These basins tend to have old soils and low fertility. They also are at latitudes with minimal rainfall.

The two major areas of African deserts are the Sahara and the Namib. These deserts are largely latitude dependent because the prevailing winds keep moisture from the oceans away from the land. There is evidence that as the climate has changed, these areas, and others across the continent, have fluctuated between wet and dry conditions. Radar images that “see” below the sands of the Sahara indicate large river systems below the modern sand-covered surface. In contrast, there are sand beds below the Congo Rainforest that suggest times of desertification in the geologic past of this area.

The semiarid areas of East Africa have resulted from the formation of a rain shadow, as the East African Rift rose up high enough to block rain from the Atlantic, which now falls on the west side of the rift and flows down the Congo River drainage to the Atlantic Ocean. East Africa is dependent on the monsoonal rains from the Indian Ocean, and suffers from extended dry seasons each year. This change in local climate over the last 6 to 7 million years is seen in the fossil record of changing species. Forest-dwelling monkey and pig species changed to open-grassland dwelling grazers like baboons and hominids as well as gazelles and wildebeest and zebras.
Geohazards

Geologic hazards in Africa can be grouped into floods, earthquakes, and volcanoes. Flooding is possible along major rivers and in flat lying basins and coastal plains. Flash floods occur in semiarid regions with minimal vegetation cover to absorb sudden rains. These floods often are due to weather conditions far upstream, so that those in the flood zone may have little or no warning. The classic annual flood of the Nile is now controlled by the Aswan High Dam which created Lake Nasser. This prevents disastrous floods, but has stopped the recharge of nutrient rich sediments onto the farm fields of the river valley. The construction of hydroelectric dams now controls flooding along many African rivers. Along rivers that do not have dams, citizens who live down on the flood plain are at risk of inundation. Earthquakes present a relatively minor

Table 1: List of African countries in which some major mineral resources can be found

<table>
<thead>
<tr>
<th>Mineral Resource</th>
<th>African countries with deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td>Angola (alluvial); Benin; Botswana; Burkina Faso; Burundi; Cameroon; Central African Republic; DRC; Ethiopia; Gabon (alluvial); Ghana; Ivory Coast; Kenya; Liberia; Mali; Namibia; Niger; Nigeria; Rwanda; Sierra Leone; South Africa; Sudan; Swaziland; Tanzania; Uganda; and Zimbabwe.</td>
</tr>
<tr>
<td>Diamonds</td>
<td>Angola (Cretaceous kimberlites and placer deposits); Botswana (kimberlites); Burkina Faso (alluvial); Cameroon; Central African Republic (alluvial); DRC; Gabon; Ghana; Ivory Coast; Lesotho (kimberlites and alluvial); Namibia (alluvial offshore); Sierra Leone; South Africa; Swaziland; Tanzania; and Togo.</td>
</tr>
<tr>
<td>Petroleum</td>
<td>Algeria (Paleozoic marine sediments); Angola (offshore); Benin (?); Cameroon; Chad; Republic of Congo (offshore); Egypt; Equatorial Guinea; Gabon (offshore); Libya; Nigeria; and Sudan.</td>
</tr>
<tr>
<td>Iron</td>
<td>Algeria; Angola (Banded Iron Formation); Cameroon (BIF); Egypt; Gabon; Ivory Coast; Liberia (BIF); Mauritania (BIF); Senegal; South Africa; Swaziland; and Uganda.</td>
</tr>
<tr>
<td>Limestone</td>
<td>Benin; Kenya; Rwanda; Sudan; Tanzania; and Togo</td>
</tr>
</tbody>
</table>

Note #1: Many other precious metals and industrial stone resources are exploited in Africa. See the Geological Atlas of Africa for detailed country-by-country descriptions of these natural resources.
hazard along the East African Rift. There are no subduction zones or active transform faults to create major earthquake hazards. However, since there are few construction standards that take possible earthquake hazards into consideration, many structures are vulnerable to collapse even in minor earthquakes.

Nyiragongo and Nyamuragira in the Democratic Republic of the Congo are two very dangerous volcanoes. They lie along a failed rift left over from the opening of the Atlantic Ocean when Gondwanaland split apart. Nyiragongo has an active lava lake and has had lava flows extend down into the city of Goma. Its lava is very fluid, and its slopes are very steep, resulting in very fast flowing lava (up to 60 mph), which makes it highly dangerous when the lava lake overflows. There are three water-filled lakes in this area that present unique geohazards. Because there are still reserves of lava below this area, large quantities of carbon dioxide are still escaping from deep underground. Lake Kivu, on the border of the Democratic Republic of the Congo and Rwanda, has large quantities of methane and carbon dioxide dissolved in its water and trapped in the sediment on the bottom of the lake. If a lava flow from the neighboring Nyiragongo volcano entered the lake, large quantities of these toxic gases could be released. Several times in recorded history (and an unknown number of times in prehistory), Lake Nyos in Cameroon (a volcanic crater lake) released large quantities of carbon dioxide, including the terrible tragedy in 1986, killing over 1,700 people. Carbon dioxide, heavier than air, displaces the oxygen as it rolls downhill, resulting in the asphyxiation of all animal life. As the carbon dioxide naturally dissipates, it leaves little trace of the cause of death for the people and animals caught in its path. There is now a monitoring system in place to try to warn residents if another eruption of carbon dioxide gas occurs so that they may have time to move out of the way of the dangerous gas. The third lake in this group is Lake Monoun, which erupted carbon dioxide gas in 1984, killing thirty-seven people.

**Mineral Resources—types and distribution**

Africa has major reserves of bauxite (aluminum ore), chromite, cobalt, coltan (columbite-tantalite, used in modern electronics such as cell phones and computers), diamonds, gold, manganese, phosphate, platinum-group metals, titanium minerals (rutile and ilmenite), vanadium, vermiculite, zirconium (Geological Atlas of Africa). Mineral resources can provide economic benefits, but also fueled colonialism and still are the source of conflict. Most recently the sale of diamonds has been used to fund wars in countries such as Sierra Leone and the Democratic Republic of the Congo.

Petroleum production has the potential to fund major development in African countries. However, even when oil companies pay significant royalties to governments, very little of that money has been spent on improving infrastructure or encouraging other business ventures in the nations involved. This has led to conflict in countries such as Nigeria, and may fuel popular
uprisings in other countries if the resources are not applied to the public good rather than to just the enrichment of select officials.

Major mineral resources, although widespread, are not evenly distributed. Their distribution is controlled by the underlying geology and by the tectonic and erosional processes that created and redistributed them across the continent. Some minerals are found in the original rocks in which they formed, such as diamonds in volcanic deposits known as “kimberlites” or gold in veins in metamorphic rocks such as gneisses and greenstones. Others have been concentrated by alluvial action (erosion and deposition in river beds, lake sediments, or along beaches creating “placer deposits”). Geologic prospecting uses the knowledge gained by mapping the various rock types to determine where to look for these mineral resources. Table 1 above presents a brief listing of the countries in which some of these major mineral resources can be found:

In spite of the potential wealth that could be gained by tapping into the natural mineral resources of Africa, not all countries are able to take advantage of that potential. Relatively mineral-poor countries and countries with limited exploration include: Guinea Bissau; the Gambia; Eritrea; Equatorial Guinea; Djibouti; Malawi; Morocco; Mozambique; Somalia; Tunisia; Western Sahara. Some of these countries simply may not have the geologic foundation to provide them with mineral assets. Others may have potential mineral riches within their borders, but political problems and internal conflicts prevent exploration and/or development of those resources (e.g., Somalia).

Geotourism

Many nations in the world take advantage of unique geologic features to generate income from tourism. In the United States, the world’s first National Park, Yellowstone, is a geologic wonder that brings jobs and income to a remote part of the country. Similarly, the Grand Canyon and Yosemite are economic engines for their regions. Unfortunately, relatively few places in Africa have tapped into this potential. One area that is taking advantage of potential geotourism is northern Tanzania. Each year this country hosts thousands of tourists who come to climb Mt. Kilimanjaro. Zambia and Zimbabwe have tapped into the potential for geotourism to Victoria Falls, but political instability has hurt their ability to attract tourists to that area. North African countries like Tunisia and Morocco have traditionally capitalized on both their proximity to Europe and their beautiful beaches to attract tourists, and Egypt adds the Nile and its Red Sea beaches to its cultural heritage as attractions for tourists. Countries like Kenya, Tanzania, and South Africa have marketed their wildlife viewing more than their geologic sites in attracting tourists. However, many tourists include geologic sites like Mt. Kenya, Mt. Kilimanjaro, Ngorongoro Crater, and Table Mountain among their destinations. The countries of Egypt, Morocco, Algeria, Tunisia, Tanzania, Kenya, and Botswana each earn more than half a billion dollars each year from tourism.
Geology and Hominid Evolution

The evolution of human beings had its beginnings in Africa. This is where the earliest fossils of hominids (a.k.a. hominines) have been found. Hominids are bipedal apes, including modern humans, our evolutionary ancestors, and similar species that went extinct, leaving no descendants. The preservation of fossils, and their subsequent discovery, depends in large part on the tectonic and geologic conditions. It is also dependent on political stability allowing researchers to safely operate in an area.

East Africa provides ideal conditions for the preservation and discovery of fossils because the rifting produces depressions that relatively rapidly accumulate sediments that can bury bones before they can be destroyed. The continuing uplift of this area later causes rapid erosion that now exposes those fossiliferous sediments, allowing paleontologists and paleoanthropologists to find the fossils on or near the surface. East Africa has the added advantage that frequent volcanism has deposited widespread ash layers between the sediment layers. These ash layers can be dated using radiometric techniques so that we can organize the fossils according to their geologic age. Southern Africa also has many excellent sites for fossil preservation and discovery. However, many of these sites are in cave deposits, and the lack of volcanic ash layers makes determining the age of the fossils more difficult.

Paleoanthropologists work with geologists to determine the location of sediments of the right composition and age in order to decide where to look for fossil hominids. Most of the fossil hominids have been found along the East African Rift from the Afar Triangle in Ethiopia (including the Australopithecus afarensis fossil known as “Lucy” and the Ardipithecus ramidus fossil known as “Ardi”) south through Kenya into Tanzania (where the Oldupai Gorge has yielded numerous fossils and stone tools, and the Laetoli site with its hominid tracks that look very much like modern human footprints). Ar. ramidus fossils have been dated to approximately 4.4 million years ago, and Au. afarensis fossils have been dated to between 2.9 and 3.8 million years ago. However, many hominids have also been located in South Africa, including the first hominid described from Africa—the “Taung” child (Australopithecus africanus, dating to approximately 2.5 million years ago) described in 1924. Interestingly, recent excavations in Chad have turned up what are (so far) the oldest hominid fossils, dating to between 6 and 7 million years ago. There have not been any hominid fossils dating to earlier than 2 million years old found outside of the African continent. Therefore, Africa is seen as the birthplace of humankind. (See From Lucy to Language for more detailed information and many life-sized photographs of the fossils.)
Review Questions

1. Why are the geology and geomorphology of Africa important?

2. What are the major mountain ranges of Africa, and how were they formed?

3. What are the major “cratons” of Africa, and why are they important?

4. What “supercontinents” was Africa part of in the geologic past?

   What is the evidence for the existence of these landmasses?

5. What is the “East African Rift” and why is it important?

6. What is the evidence that the East African Rift is splitting apart?

7. How is Lake Victoria different from the other rift valley lakes (e.g., Turkana or Tanganyika)?

8. When did southern Africa undergo a period of glaciations? What is the evidence?

9. What is the Karoo Supergroup? Why is it important?

10. What are the ages of the sediments covering the Sahara? Why are they important?

11. How does the underlying geology affect the soils of Africa?

12. How does the development of the East African Rift affect the climate of East Africa?

   What is the evidence?

13. Why are the Nyiragongo volcano and Lake Nyos dangerous?

14. What economic minerals are found in significant quantities in Africa?

15. What areas of Africa are known for hominid fossils?

   What geologic conditions influence the occurrence and discovery of these fossils?