

Unit V:

Europe Physical:

Europe is sometimes described as a peninsula of peninsulas. A peninsula is a piece of land surrounded by water on three sides. Europe is a peninsula of the Eurasian supercontinent and is bordered by the Arctic Ocean to the north, the Atlantic Ocean to the west, and the Mediterranean, Black, and Caspian Seas to the south. Europe's main peninsulas are the Iberian, Italian, and Balkan, located in southern Europe, and the Scandinavian and Jutland, located in northern Europe. The link between these peninsulas has made Europe a dominant economic, social, and cultural force throughout recorded history. Europe can be divided into four major physical regions, running from north to south: Western Uplands, North European Plain, Central Uplands, and Alpine Mountains.

Western Uplands

The Western Uplands, also known as the Northern Highlands, curve up the western edge of Europe and define the physical landscape of Scandinavia (Norway, Sweden, and Denmark), Finland, Iceland, Scotland, Ireland, the Brittany region of France, Spain, and Portugal.

The Western Uplands is defined by hard, ancient rock that was shaped by glaciation. Glaciation is the process of land being transformed by glaciers or ice sheets. As glaciers receded from the area, they left a number of distinct physical features, including abundant marshlands, lakes, and fjords. A fjord is a long and narrow inlet of the sea that is surrounded by high, rugged cliffs. Many of Europe's fjords are located in Iceland and Scandinavia.

North European Plain

The North European Plain extends from the southern United Kingdom east to Russia. It includes parts of France, Belgium, the Netherlands, Germany, Denmark, Poland, the Baltic states (Estonia, Latvia, and Lithuania), and Belarus.

Most of the Great European Plain lies below 152 meters (500 feet) in elevation. It is home to many navigable rivers, including the Rhine, Weser, Elbe, Oder, and Vistula. The climate supports a wide variety of seasonal crops. These physical features allowed for early

communication, travel, and agricultural development. The North European Plain remains the most densely populated region of Europe.

Central Uplands

The Central Uplands extend east-west across central Europe and include western France and Belgium, southern Germany, the Czech Republic, and parts of northern Switzerland and Austria.

The Central Uplands are lower in altitude and less rugged than the Alpine region and are heavily wooded. Important highlands in this region include the Massif Central and the Vosges in France, the Ardennes of Belgium, the Black Forest and the Taunus in Germany, and the Oreand Sudeten in the Czech Republic. This region is sparsely populated except in the Rhine, Rhne, Elbe, and Danube river valleys.

Alpine Mountains

The Alpine Mountains include ranges in the Italian and Balkan peninsulas, northern Spain, and southern France. The region includes the mountains of the Alps, Pyrenees, Apennines, Dinaric Alps, Balkans, and Carpathians. High elevations, rugged plateaus, and steeply sloping land define the region. Europes highest peak, Mount Elbrus (5,642 meters/18,510 feet), is in the Caucasus mountains of Russia. The Alpine region also includes active volcanoes, such as Mount Etna and Mount Vesuvius in Italy.

Flora & Fauna

Much like its physical regions, Europes plant and animal communities follow a general north- south orientation. The tundra, found in Iceland and the northern reaches of Scandinavia and Russia, is a treeless region where small mosses, lichens, and ferns grow. Huge herds of reindeer feed on these tiny plants. The taiga, which stretches across northern Europe just south of the tundra, is composed of coniferous forests, with trees such as pine, spruce, and fir. Moose, bear, and elk are native to the European taiga.

Just south of the taiga is a mixture of coniferous and deciduous trees, including beech, ash, poplar, and willow. Although this area remains heavily forested, the continents forests were

drastically reduced as a result of intense urbanization throughout human history. Intense trade introduced many species, which often overtook native plants. The forests and grasslands of western and central Europe have been almost completely domesticated, with crops and livestock dominant.

Finally, small, drought-resistant plants border the Mediterranean Sea, Europe's southern edge. Trees also grow in that southernmost region, including the Aleppo pine, cypress, and cork oak. The only primate native to Europe, the Barbary macaque, inhabits this Mediterranean basin. A small troop of Barbary macaques lives on the tiny island of Gibraltar, between Spain and the African country of Morocco.

The waters surrounding Europe are home to a number of organisms, including fish, seaweeds, marine mammals, and crustaceans. The cold water surrounding northern Britain and Scandinavia is home to unique species of cold-water corals. All of the major bodies of water in Europe have been fished for centuries. In many places, including the Mediterranean and North seas, waters have been overfished. About a quarter of marine mammals are threatened.

Today, around 15 percent of Europe's animal species are threatened or endangered, mainly by habitat loss, pollution, overexploitation, and competition from invasive species. The European bison, the heaviest land animal on the continent, is one of the most threatened species.

Beginning in the 20th century, many governments and non-governmental organizations (NGOs) have worked to restore some of Europe's rich biodiversity. Establishing fishing limits, protecting threatened habitats, and encouraging sustainable consumption habits are some efforts supported by European conservationists.

Plant life

Major vegetation zones

The terms "natural," "original," and "primitive," as epithets applied to the vegetation of Europe, have no precise meaning unless they are related to a specific time in geologic history. It is nevertheless possible to envisage continental vegetation zones as they formed and acquired

some stability during postglacial times, although such zones are only rarely recalled by present-day remnants.

Tundra vegetation, made up of lichens and mosses, occupies a relatively narrow zone in Iceland and the extreme northern portions of Russia and Scandinavia, although that zone is continued southward in the mountains of Norway. Vegetation of a similar kind occurs at elevations of 5,000 to 6,000 feet (1,500 to 1,800 metres) in the Alps and the northern Urals.

Southward, the virtually treeless tundra merges into the boreal forest, or taiga. The more northerly zone is “open,” with stands of conifers and with willows and birch thickets rising above a lichen carpet. It is most extensive in northern Russia but continues, narrowing westward, across Sweden. South of that zone, and without an abrupt transition, the “closed” boreal forest occupies a large fraction—mainly north of the upper Volga River—of Russia and Scandinavia. Thin-leaved and cold-resistant conifers, together with birch, predominate.

In southern Europe, Mediterranean vegetation has a distinctive character, containing broad-leaved evergreen trees and shrubs as well as areas of scrub. Around the sea that vegetation is called maquis; it includes aromatic plants and small trees such as olives and figs. Scrub is scattered because of summer drought, particularly in areas where the soil is underlain by limestone or where there is little, if any, soil.

The wooded-steppe and grass-steppe vegetation zones are confined primarily to southwestern Russia and Ukraine, although they also extend into the Danubian lowlands (*see* the Steppe). Semidesert vegetation characterizes the dry lowland around the northern and northwestern shores of the Caspian Sea.



Drainage

Topographic influences

The drainage basins of most European rivers lie in areas originally uplifted by the Caledonian, Hercynian, and Alpine mountain-building periods that receive heavy precipitation, including snow. Some streams, notably in Finland and from southern Poland to west-central Russia, have their sources in hills of Cenozoic rocks, while others, including the Thames and Seine rivers, derive from hill country composed of Mesozoic rocks (i.e., those about 66 to 252 million years

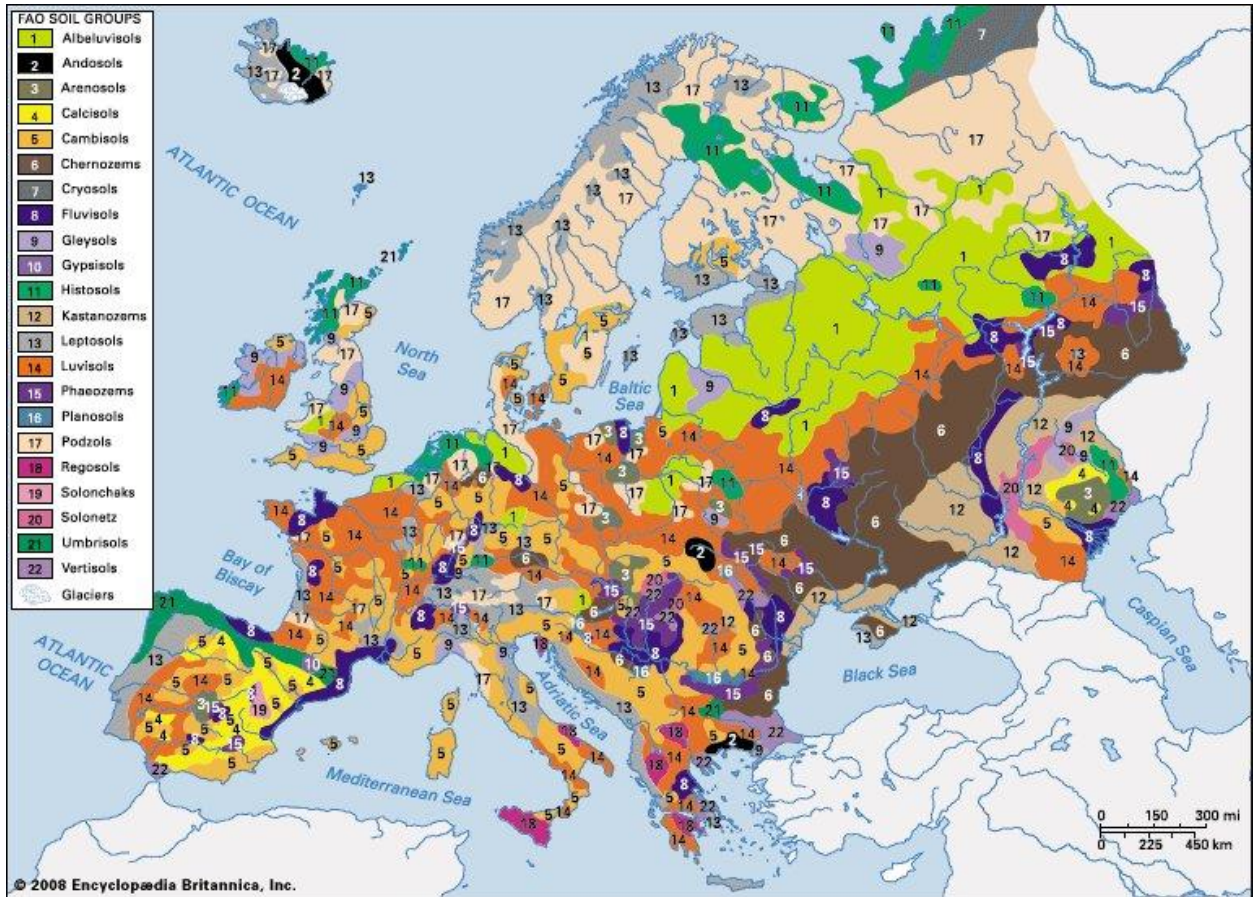
old). Drainage is directly, or via the Baltic and the Mediterranean seas, to the Atlantic and Arctic oceans and to the enclosed Caspian Sea.

The present courses and valley forms of the major rivers result from an intricate history involving such processes as erosion by the headstream, downcutting, capture of other rivers, faulting, and isostatic changes of land and sea levels. The Rhine, for example, once drained to the Mediterranean before being diverted to its present northerly course. The courses of many rivers—notably those of Scandinavia and the North European Plain—have been shaped since the Pleistocene Epoch (about 2,600,000 to 11,700 years ago). While the Alps, Apennines, and Carpathians provide watersheds, other mountain ranges have been cut through by rivers, as by the Danube at Vienna in Austria, Budapest in Hungary, and the Iron Gate and by the Olt in Romania. In the East European Plain the rivers are long and flow sluggishly to five seas. In western, central, and eastern Europe, rivers are largely “mature”; i.e., their valleys are graded, and their streams are navigable. Northern and southern Europe, in contrast, present still “youthful” rivers, as yet ill-graded and thus more useful for hydroelectricity than for waterways. The Atlantic rivers have scoured estuaries widening seaward, while, in the Baltic, Mediterranean, and Black seas, with minimal tidal influences, deltas and spits have been created. Since the end of the Pleistocene the upper Dnieper has failed to drain the low area of the Pripet Marshes effectively.

Soils

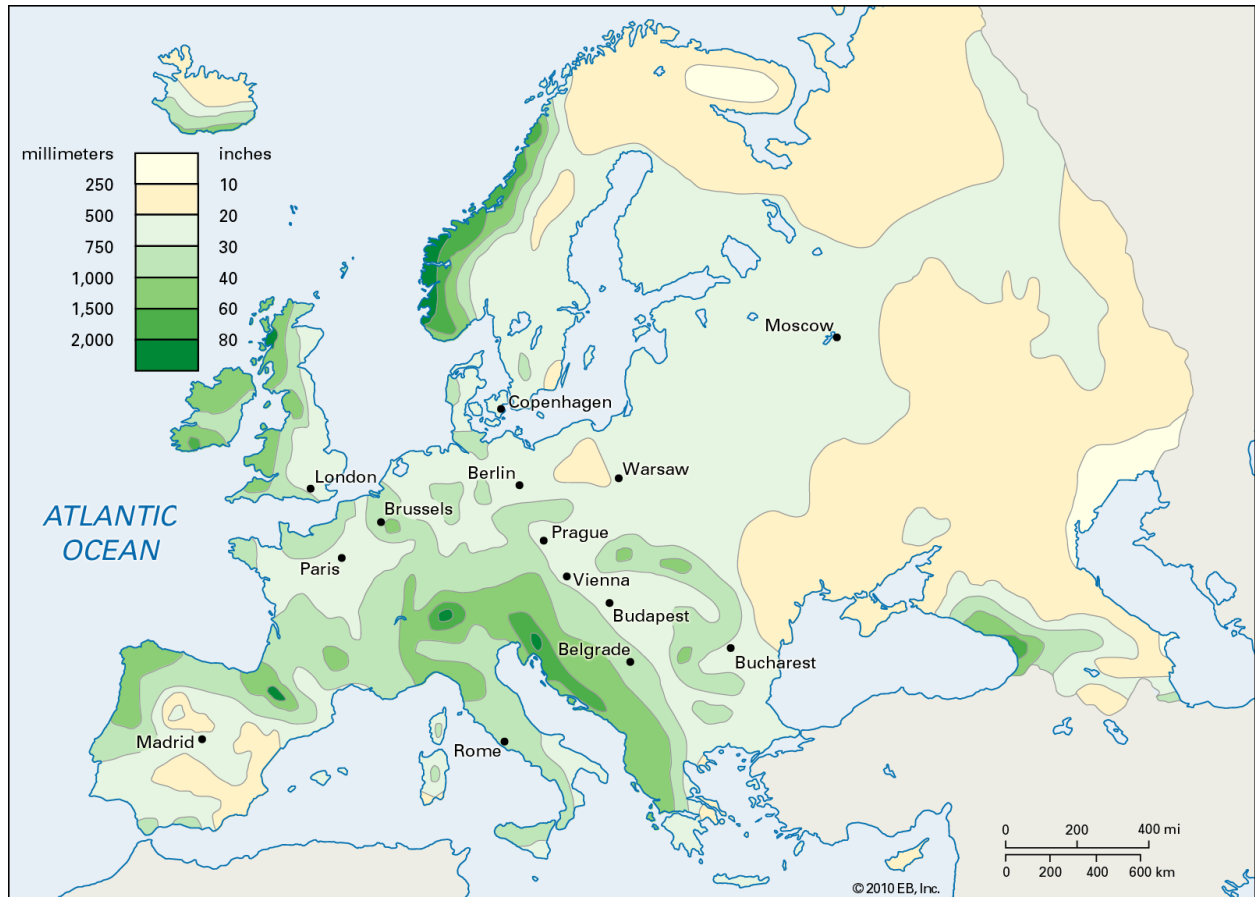
The soil patterns of Europe are clearly and zonally arranged in the East European Plain but are much more complicated in the rest of the continent, which exhibits a more varied geology and relief. Tundra soils occur only in Iceland, in the most northerly parts of Russia and Finland, and in high areas of Sweden and Norway; they tend to be acidic, waterlogged, and poor in plant nutrients. South of that zone and extending around the Gulf of Bothnia and across Finland and Russia north of the upper Volga, cool-climate podzols are characteristic. Those soils, formed in a coniferous woodland setting, suffer from acidity, the leaching of minerals, hardpan formation and permafrost beneath the topsoil, and excess moisture; given the climate, they are virtually useless for crops.

The larger zone to the south stretches from central Russia westward to Great Britain and Ireland and southward from central Sweden, southern Norway, and Finland to the Pyrenees, Alps, and Balkan Mountains. In that region temperate-climate podzols and brown forest soils have developed in a mixed-forest environment, and those soils, which are highly varied, usually have a good humus content. Locally, the farmer recognizes soils of heavy to light texture, their different water-holding capacities, depth, alkalinity or acidity, and their suitability for specific crops. The soils within that zone that cover loess are excellent loams; lowland clays, when broken down, also exhibit high quality, as do alluvial soils; in contrast, areas covered with dry, sandy, or gravelly soils are more useful for residential and amenity purposes than for farming. In southwestern Russia, in portions of the Transcaucasus region, and especially in Ukraine, some soils that have been formed in areas of grass steppe are chernozems (black earths)—deep, friable, humus-rich, and renowned for their fertility. In the formerly wooded steppe lying to the north of the grass steppe in both south-central Russia and the lower Danubian lowlands, soils of somewhat less value are known as degraded chernozems and gray forest soils. At best, chestnut soils—some needing only water to be productive—and, at worst, solonetzic (highly saline) soils cover areas of increasing aridity eastward of Ukraine to the Ural River. Lastly, in southern Europe, where the countryside is fragmented by mountains, plateaus, and hills, much soil has been lost from sloping ground through forest destruction and erosion, and a bright red soil (terra rossa), heavy and clay-rich, is found in many valleys and depressions.



Climate

As Francis Bacon, the great English Renaissance man of letters, aptly observed, “Every wind has its weather.” It is air mass circulation that provides the main key to Europe’s climate, the more so since masses of Atlantic Ocean origin can pass freely through the lowlands, except in the case of the Caledonian mountains of Norway. Polar air masses derived from areas close to Iceland and tropical masses from the Azores bring, respectively, very different conditions of temperature and humidity and produce different climatic effects as they move eastward. Continental air masses from eastern Europe have equally easy access westward. The almost continuous belt of mountains trending west-east across Europe also impedes the interchange of tropical and polar air masses.



Maritime climate

Characterizing western areas heavily exposed to Atlantic air masses, the maritime type of climate—given the latitudinal stretch of those lands—exhibits sharp temperature ranges. Thus, the January and July annual averages of Reykjavík, Iceland, are about 32 °F (0 °C) and 53 °F (12 °C) respectively, and those of Coruña, Spain, are about 50 °F (10 °C) and 64 °F (18 °C). Precipitation is always adequate—indeed, abundant on high ground—and falls year-round. The greatest amount of precipitation occurs in autumn or early winter. Summers range from warm to hot depending on latitude and elevation, and the weather is changeable everywhere. The maritime climate extends across Svalbard, Iceland, the Faroes, Great Britain and Ireland, Norway, southern Sweden, western France, the Low Countries, northern Germany, and northwestern Spain.

Central European climate

The central European, or transitional, type of climate results from the interaction of both maritime and continental air masses and is found at the core of Europe, south and east of the maritime type, west of the much larger continental type, and north of the Mediterranean type. That rugged region has colder winters, with substantial mountain snowfalls, and warmer summers, especially in the lowlands. Precipitation is adequate to abundant, with a summer maximum. The region embraces central Sweden, southern Finland, the Oslo Basin of Norway, eastern France, southwestern Germany, and much of central and southeastern Europe. The range between winter and summer temperatures increases eastward, while the precipitation can exceed 80 inches (2,000 mm) in the mountains, with snow often lying permanently around high peaks. The Danubian region has only modest rainfall (about 24 inches [600 mm] per year at Budapest), but the Dinaric Alps experience heavy cyclonic winter, as well as summer, rain.

Continental climate

The continental type of climate dominates a giant share of Europe, covering northern Ukraine, eastern Belarus, Russia, most of Finland, and northern Sweden. Winters—much colder and longer, with greater snow cover, than in western Europe—are coldest in the northeast, and summers are hottest in the southeast; the January to July mean temperatures range approximately from 50 to 70 °F (10 to 21 °C). Summer is the period of maximum rain, which is less abundant than in the west; in both the north and southeast of the East European Plain, precipitation reaches only between 10 and 20 inches (250 and 500 mm) annually. In parts of the south, the unreliability of rainfall combines with its relative scarcity to raise a serious aridity problem.

Mediterranean climate

The subtropical Mediterranean climate characterizes the coastlands of southern Europe, being modified inland (for example, in the Meseta Central, the Apennines, and the North Italian Plain) in response to elevation and aspect. The main features of that climatic region are mild and wet winters, hot and dry summers, and clear skies for much of the year, but marked regional variations occur between the lands of the western and the more southerly eastern basins of the Mediterranean; the former are affected more strongly by maritime air mass intrusions. Rainfall in southern Europe is significantly reduced in areas lying in the lee of rain-bearing westerlies;

Rome has an annual mean of roughly 26 inches (660 mm), but Athens has only about 16 inches (400 mm).

Oceania:

Oceania, collective name for the islands scattered throughout most of the Pacific Ocean. The term, in its widest sense, embraces the entire insular region between Asia and the Americas. Oceania has traditionally been divided into four parts: Australasia (Australia and New Zealand), Melanesia, Micronesia, and Polynesia.

Australasia, geographical term that has never had a precise definition and that was originally employed to denote land believed to exist south of Asia. In its widest sense it has been taken to include, besides Australia (with Tasmania) and New Zealand, the Malay Archipelago, the Philippines, Melanesia (New Guinea and the island groups lying east and southeast of it as far as and including New Caledonia and Fiji), Micronesia, and Polynesia (the scattered groups of islands extending eastward from the above groups to about longitude 130°). The Hawaiian Islands and even Antarctica have been included under the heading “Australasia,” but more often the region is treated as coterminous with Oceania.

Vegetation

The word *vegetation*, as opposed to *plant life*, implies the structure and communal relations of the landscape's plant cover, whether it be forest, grassland, or marsh. There is no standard, or worldwide, classification system (such as exists for describing flora) for that aspect of the environment. Initial attempts to apply European and American classification concepts to Australia were not particularly satisfactory, because of the peculiarities of the continent's vegetation and environment. For example, climatic control of local vegetation zones was often found insufficient to explain vegetation changes; on the contrary, soil patterns and geologic history quite override climatic control in many localities. Similarly, structural descriptive schemes useful for Northern Hemisphere coniferous and deciduous vegetation proved inappropriate when confronted by the great variety of evergreen vegetation—notably mallees and shrubs—found in Australia. The mapping of Australian vegetation is based largely on factual

descriptive features, and by that means comprehensive and detailed accounts and maps have been produced.

Australian plant life is distributed in three main zones—the Tropical, Temperate, and Eremian—a pattern that reflects overall climatic conditions. The Tropical Zone, which arcs east and west across the northern margin of the continent and extends halfway down the eastern seaboard, has a mainly dry monsoonal climate, with some wet regions. The Temperate Zone, with a cool-to-warm (temperate-to-subtropical) climate and precipitation mostly in winter, is arced across the southern margin, embracing Tasmania and extending up the eastern seaboard to overlap slightly with the Tropical Zone. The Eremian Zone covers the whole of central Australia through to the west-central coast; its climate is arid.

The major structural units constituting the geographic distribution are rainforest, sclerophyll forest (dominated by hard-leaved plants such as eucalypts), and woodland, scrub, savanna, and grassland forms, each with a range of subforms. The bulk of the Tropical Zone comprises mixed deciduous woodland and sclerophyllous low-tree savanna, with areas of tussock grassland, coastal mangrove complexes, and tropical rainforest containing much exotic vegetation—particularly in the northeastern parts of Cape York Peninsula and in Queensland. A strong Malesian influence occurs throughout the entire zone. The rainforests—characterized by large trees with stem buttresses and by multiple vegetation layers with interlaced canopies of lianas and epiphytes growing in the trees—fit the popular concept of “jungle.”

The Temperate Zone is characterized by dry and wet sclerophyllous forests, temperate mixed woodlands, savanna woodlands, mallees, and scrubs, with areas of alpine vegetational complexes, temperate rainforest, and sclerophyllous heath. A much higher proportion of the vegetation cover is typically and recognizably “Australian.” Within that zone the southwestern corner of Western Australia is outstanding, both for the high proportion of Australian plants and for the richness of the plant life, while the vegetation of Tasmania is notable for its forests of southern beech and for its botanical links with New Zealand and South America. In marked contrast to the tropical rainforests, the predominant trees throughout most of the Temperate Zone communities are either *Eucalyptus* or *Acacia*. Much of the Temperate Zone vegetation has been

cleared for agricultural purposes, leaving only the vegetation communities of infertile or inaccessible localities.

The vegetation of the Eremian Zone ranges from barely vegetated desert and hills through a variety of semiarid shrub savannas, shrub steppes, semiarid tussock grasslands, and sclerophyllous hummock grasslands. Many shrubs have adapted themselves similarly to the arid conditions, so that in their vegetative state many representatives of different families look alike. *Acacia*, *Eremophila*, and *Casuarina* are examples of genera that tend to displace *Eucalyptus* as the dominant tree or shrub. Much of that vegetation is badly degraded.



