Chapter 19 The Warm Temperate Western Margin (Mediterranean) Climate

Distribution

The Warm Temperate Western Margin Climate is found in relatively few areas in the world. They are entirely confined to the western portion of continental masses, between 30° and 45° north and south of the equator (Fig. 133). The basic cause of this type of climate is the shifting of the wind belts, explained in Chapter 13. Though the area around the Mediterranean Sea has the greatest extent of this type of 'winter rain climate', and gives rise to the more popular name Mediterranean Climate, the best developed form of this peculiar climatic type is, in fact, found in central Chile (Fig. 134). Other Mediterranean regions include California (around San Francisco), the south-western tip of Africa (around Cape Town), southern Australia (in southern Victoria and around Adelaide, bordering the St. Vincent and Spencer Gulfs), and south-west Australia (Swanland).

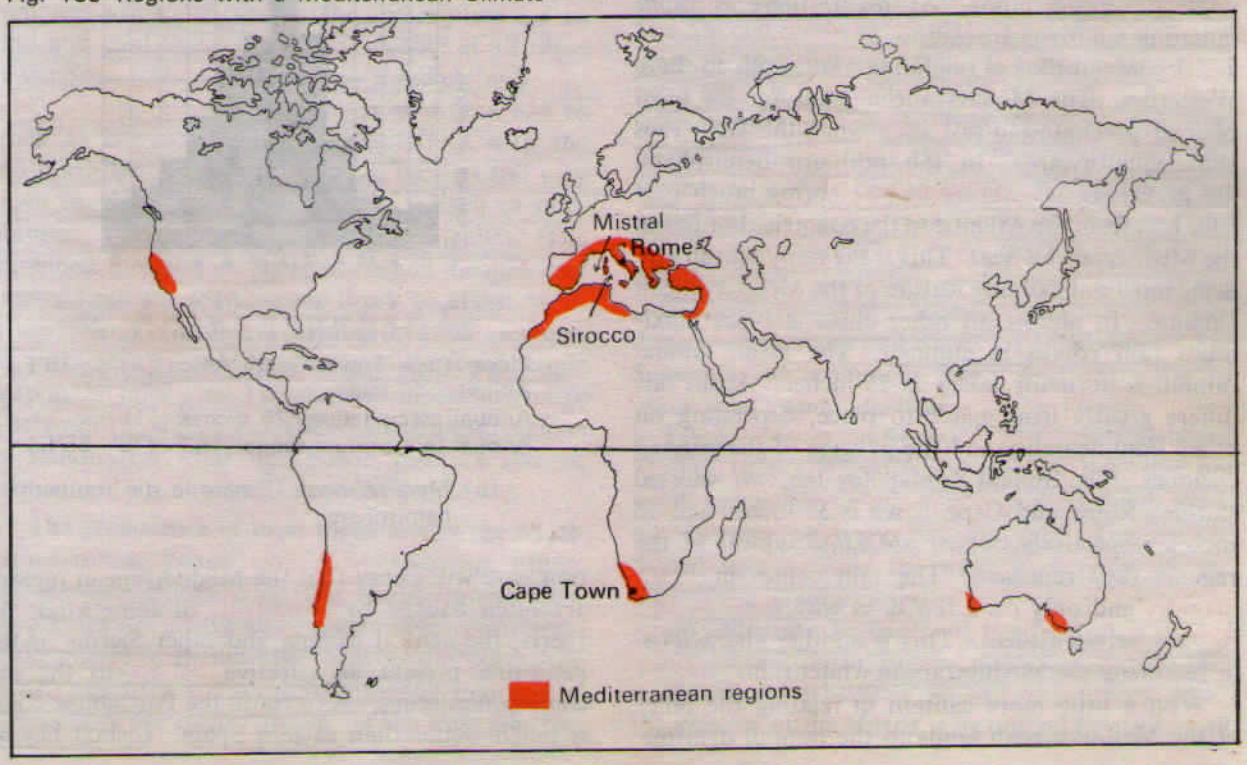
Climate

The Mediterranean type of climate is characterized by very distinctive climatic features.

1. A dry, warm summer with off-shore trades. As illustrated in Fig. 135 (a) and (b), the summer months have a relatively high temperature (76°F. in July in Rome and 70°F. in January in Cape Town.) The highest temperatures are however experienced further away from the coast in the more continental eastern Mediterranean, in the interiors of the Balkan peninsula, the Anatolian Plateau and Mediterranean Middle East. For example, the July mean for Athens is 80°F. Larrissa (Greece) 81°F. and Beirut (Lebanon) 83°F. Elsewhere in central Chile, South Africa and Mediterranean Australia, due to their coastal position, the influence of the sea has modified the temperature and the January means (Southern Summer) are normally around 70°F.

In summer when the sun is overhead at the Tropic of Cancer, the belt of influence of the Westerlies is shifted a little polewards. Rain bearing winds are therefore not likely to reach the Mediterranean lands. The prevailing Trade Winds are off-shore and there is practically no rain. The air is dry, the heat is intense and the relative humidity is low. Days

Fig. 133 Regions with a Mediterranean Climate



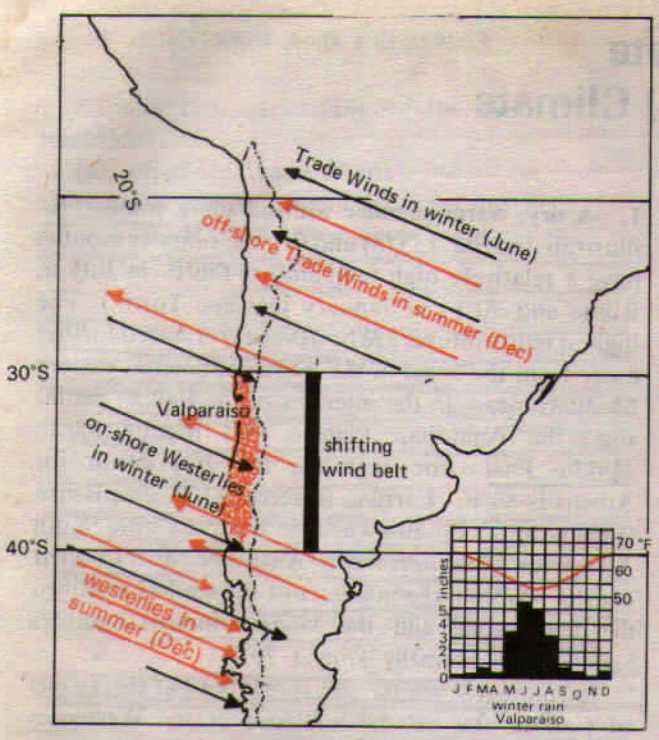
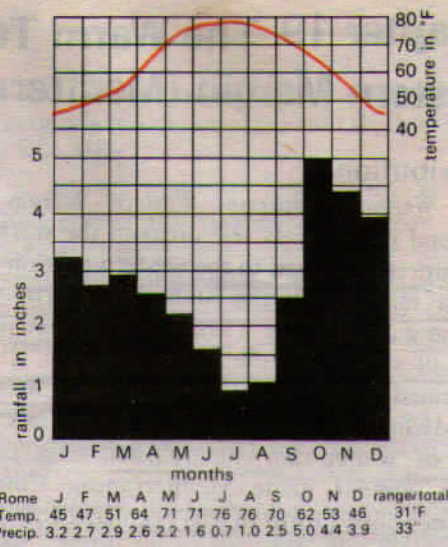


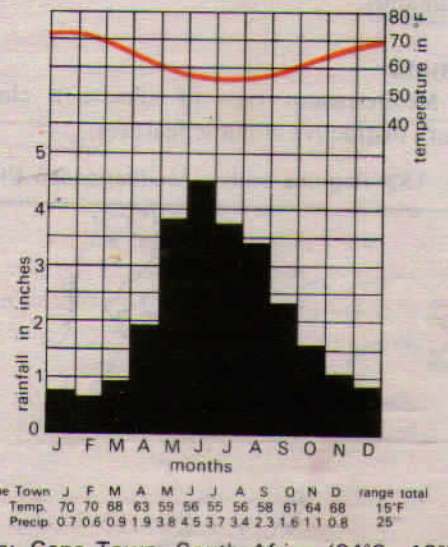
Fig. 134 Central Chile—a region with a typical Mediterranean Climate—showing the shifting of the wind belt with most rain falling in winter



	J	F	M	A	M	J	J	A	S	O	N	D	range/total
Rome Temp.	45	47	51	64	71	71	76	76	70	62	53	46	31°F
Precip.	3.2	2.7	2.9	2.6	2.2	1.6	0.7	1.0	2.5	5.0	4.4	3.9	33"

Place: Rome, Italy (42°N., 12°E.)
Altitude: 207 feet
Annual precipitation: 33 inches
Annual temperature range: 31°F. (76°–45°F.)

Fig. 135 (a) Mediterranean Climate in the northern hemisphere



	J	F	M	A	M	J	J	A	S	O	N	D	range total
Cape Town Temp.	70	70	68	63	59	56	55	56	58	61	64	68	15°F
Precip.	0.7	0.6	0.9	1.9	3.8	4.5	3.7	3.4	2.3	1.6	1.1	0.8	25"

Place: Cape Town, South Africa (34°S., 18°E.)
Altitude: 40 feet
Annual precipitation: 25 inches
Annual temperature range: 15°F. (70°–55°F.)

(b) Mediterranean Climate in the southern hemisphere

are excessively warm and in the interiors, prolonged droughts are common. At night, there is rapid radiation but frosts are rare.

2. A concentration of rainfall in winter with on-shore Westerlies. The Mediterranean lands receive most of their precipitation in winter when the Westerlies shift equatorwards. In the northern hemisphere, the prevailing on-shore Westerlies bring much *cyclonic rain* from the Atlantic to the countries bordering the Mediterranean Sea. This is the rainy season and is the most outstanding feature of the Mediterranean Climate. In almost all other climatic types maximum rain comes in summer. The mean annual rainfall is normally taken as 25 inches. Again this differs greatly from place to place, depending on relief, continentality and the passage of the passing cyclones. The annual rainfall for the two selected stations Rome and Cape Town is 33 inches and 25 inches respectively, which are quite typical of the regions they represent. The rain comes in heavy showers and only on a few days with bright sunny periods between them. This is another characteristic feature of the Mediterranean winter rain.

With a little more caution in relating the relief of the Mediterranean lands to the rainfall distribution, you will notice that the Mediterranean regions are often backed by mountains of some kind. In Iberia, the central Meseta and other Sierras of the peninsula present an effective barrier to the oncoming Westerlies. As a result the Portuguese coast is much wetter than eastern Spain. Lisbon has an

annual rainfall of nearly 30 inches while Cartagena, along the eastern coast of Spain does not receive even half as much. Much heavier precipitation has been recorded in the highlands on windward slopes facing the Westerlies. The steep hills of the eastern Adriatic are the rainest part of Europe with 182 inches recorded at Crkvice, about 3,600 feet above sea level.

Rain in Mediterranean Europe normally begins in September, reaching its peak somewhere in October (5 inches in Rome). Though the downpours are infrequent they are often very torrential and in mountainous districts, destructive floods occur. The floods come so suddenly that there is practically no time to do anything about it. The disastrous flood of Lisbon in 1967 came in the middle of the night and caused great damage and loss of life in a few hours!

Snow rarely occurs on lowlands and coastal districts and even if it does fall on the highlands, it is moderate and is a source of water supply for hydro-electric power generation and for irrigation.

3. Bright, sunny weather with hot dry summers and wet, mild winters. Considering its mid-latitude position, the Mediterranean regions have a very favourable climate, unrivalled by any other climatic regions. The climatic features are transitional between those of the Trade Wind Hot Desert in the south and the Cool Temperate Maritime Climate in the north. Summers are warm and bright and winters are so mild and cool that many tourists come at all times of the year. The sky is almost cloudless and sunshine is always abundant. In July, Rome has as much as eleven hours of sunlight, and with the Mediterranean palm trees around, tourists feel very much as if they are in the tropics! Even in mid-summer, the intense heat is never sultry. The combined effects of on-shore winds and the maritime breezes keep the temperature down to about 50°F. in winter and not often exceeding 75°F. in summer. The climate is so mild that many of the local people sleep in the open air. The annual temperature range is between 15° and 25°F. The Mediterranean regions are famous for their health and pleasure resorts, frequented by millions all round the year.

4. The prominence of local winds around the Mediterranean Sea. Many local winds, some hot, others cold are common around the Mediterranean Sea. The causes are many and varied. The topography of the region with the high Alps in the north, the Sahara desert in the south, continental interiors in the east and the open Atlantic on the west give rise

Fig. 136 Local Winds of the Mediterranean Sea

to great differences in temperature, pressure and precipitation. The passing cyclones from the Atlantic, the anticyclones from the north, and the cold air masses from the continental interiors are often interrupted or channelled by relief features, resulting in the birth of local winds around the Mediterranean. These winds varying in *strength, direction and duration* affect the lives, crops and activities of the people there. Fig. 136 indicates the location and direction of some of these local winds and the more important ones are described below.

(a) Sirocco. This is a hot, dry dusty wind which originates in the Sahara Desert. Though it may occur at any time of the year, it is most frequent in spring and normally lasts for only a few days. The Sirocco blows outwards in a southerly direction from the desert interiors into the cooler Mediterranean Sea. It is usually associated with depressions from the Atlantic passing from the coast eastwards inland. After crossing the Mediterranean Sea, the Sirocco is slightly cooled by the absorption of the water vapour. Even then, it is still hot and dry with a temperature of over 105°F. Its sorching breath withers vegetation and crops. The damage is particularly serious when it comes at the times during which vines and olives are in blossom. The Sirocco is so prominent that it is called by many other local names, such as Chili in Tunisia, Ghibli in Libya, Leveche in Spain, Khamsin in Egypt and Malta. In the Adriatic and Aegean Sea, this hot wind, better known as Gharbi gathers much moisture causing fog, heavy dew and rain. This may be 'blood rain' because the wind is carrying the red dust of the Sahara Desert.

(b) Mistral. In contrast, the Mistral is a cold wind from the north, rushing down the Rhone valley in violent gusts between 40 and 80 miles per hour. The velocity of the Mistral is intensified by the funnell-

ing effect in the valley between the Alps and the Central Massif, and in extreme cases trains may be derailed and trees uprooted. In winter when the Mistral is most frequent the temperature of the wind may be below freezing-point, though the sky may be clear and cloudless. As a protective measure, many of the houses and orchards of the Rhone valley and the Riviera have thick rows of trees and hedges planted to shield them from the Mistral.

A similar type of cold north-easterly wind experienced along the Adriatic coast is called the Bora. Like the Mistral, it is caused by a difference in pressure between continental Europe and the Mediterranean. This usually occurs in winter, when the atmospheric pressure over continental Europe is higher than that of the Mediterranean Sea. The Bora thus blows outwards into the Mediterranean. This dry, icy wind is even more violent than the Mistral and speeds of over 100 m.p.h. have been recorded. During strong Boras, ships may be blown aground and agricultural lands devastated. Tramontana and Gregale are similar cold winds of the Mediterranean Sea.

Natural Vegetation

In a land where half the year is dry, one cannot expect the natural vegetation to be luxuriant. Trees with small broad leaves are widely spaced and never very tall. Though there are many branches they are short and carry few leaves. The absence of shade is a distinct feature of Mediterranean lands. Growth is slow in the cooler and wetter season, even though more rain comes in winter. Growth is thus almost restricted to autumn and spring when the temperature is higher and moisture is just sufficient. The long summer drought checks the growth. One fact is clear, plants whether trees or shrubs, evergreen or deciduous, have to devise ways of adapting themselves to a climatic environment with such a marked rhythmic recurrence of rain and drought. In many ways, the vegetational responses to climatic demands in the Mediterranean are similar to those of the adjacent deserts and the savanna further south. Plants are in a continuous struggle against heat, dry air, excessive evaporation and prolonged droughts. They are, in short xerophytic, a word used to describe the drought-resistant plants in an environment deficient in moisture.

Types of Mediterranean vegetation. Various kinds of vegetation are found in the Mediterranean regions.

1. Mediterranean evergreen forests. These are open woodlands with evergreen oaks, of which the cork oaks of Spain and Portugal are the best known. They are found only in the climatically most favoured regions with a rainfall of well over 25 inches. The trees are normally low, even stunted, with massive trunks, deeply fissured barks, small leathery leaves and a wide-spreading root system in search of water. The cork oaks are specially valued for their thick barks, used for making wine-bottle corks and for export around the world. In Australia, the eucalyptus forests replace the evergreen oak. The jarrah and karri trees are commercially the most important. The giant sequoia or redwood is typical of the Californian trees.

2. Evergreen coniferous trees. These include the various kinds of pines, firs, cedars and cypresses which have evergreen, needle-shaped leaves and tall, straight trunks. They appear more on the cooler highlands and where droughts are less severe. Deforestation has reduced their numbers considerably.

3. Mediterranean bushes and shrubs. This is perhaps the most predominant type of Mediterranean vegetation. Summers are so dry and hot that in places forests give place to short, evergreen shrubs and bushes. The low bushes grow in scattered clumps and are often thorny. The more common species are laurel, myrtle, lavender, arbutus and rosemary, of which a number are strongly scented or perfumed.

In many areas, due to man's interference in *forest depletion*, or to *overgrazing*, the original woodlands degenerate into a scrub vegetation with scattered, stunted trees and tall bushes. They are so different from the ordinary woodland or the true desert scrubland that special names have been given to them to distinguish their location in different parts of the Mediterranean lands. This type of vegetation is called maquis in southern France, and macchia in Italy. In California, the term chaparral is used and in Australia mallee scrub. In limestone uplands, where the soil is extremely thin and the scrub deteriorates into highly xerophytic ground creepers, a more exact term, garrigue, is used.

4. Grass. Conditions in the Mediterranean do not suit grass, because most of the rain comes in the cool season when growth is slow. Slow-growing vegetation, which cannot replenish its foilage readily, and which is without deep-penetrating roots, is least suited here. Even if grasses do survive, they are so wiry and bunchy that they are not suitable for animal farming. Cattle rearing is thus unimportant in the Mediterranean. The grass, which is replaced by certain drought-resistant varieties of shrubs and flowering herbs, can however support sheep or goats.

Olive cultivation in Andalusia, Spain. The small, gnarled trees are typical of the Mediterranean region *S.E.F. Torino*

Even this form of grazing has done more harm than good for it has promoted soil erosion and impoverished the hill-slopes of the Mediterranean. Animal fats are not important here and the chief cooking oil is obtained from olives. Dairy products are net import items.

Economic Development of the Mediterranean Regions

Despite the semi-arid conditions over many parts of the Mediterranean lands, the climate as a whole is favourable. Its warm, bright summers and cool, moist winters enable a wide range of crops to be cultivated. One must not forget that the Mediterranean shore-lands were once the *cradle of world civilization*. Nowadays the area is important for fruit cultivation, cereal growing, wine-making and agricultural industries, as well as engineering and mining. We shall deal with some of them in greater detail below.

1. Orchard farming. The Mediterranean lands are also known as the world's orchard lands. A wide range of citrus fruits such as oranges, lemons, limes, citrons and grapefruit are grown. The fruit trees have long roots to draw water from considerable depths during the long summer drought. In exceptionally dry areas, *irrigation* helps to relieve the lack of moisture. In the Great Valley of California, the Vale of Chile, the Negev Desert of Israel and the northern shores of Mediterranean Europe, an elaborate system of irrigation canals enables both fruits and cereals to be successfully raised. The thick, leathery skin of the citrus fruits prevents excessive transpiration and the long, sunny summer enables the fruits to be ripened and harvested. The various Mediterranean oranges are so distinctive in their shape, size, taste and quality that they are called by different names in their area of production. Of the Mediterranean oranges, perhaps, the best known are the Sunkist oranges from California, exported for table consumption and for making orange squash. The Seville oranges of Spain are small but very sweet and are particularly suitable for making marmalade. Those from Israel, the Jaffa oranges, are equally delicious and are specially grown for export. In Tangiers, the tangerine is of great local importance. In the temperate monsoon lands of China and Japan, which were, in fact, the native home of the orange, commerical cultivation of the fruit is less significant, and only in recent years has there been any serious effort made to popularize their export as 'mandarin oranges. The Mediterranean lands account for

70 per cent of the world's exports of citrus fruits.

The olive tree is probably the most typical of all Mediterranean cultivated vegetation. It is so hardy and long-rooted that it can survive even on very poor limestone soils with less than 10 inches of annual rainfall. Like our coconut palm, the olive tree is very 'versatile' and has many uses. The olive can be eaten fresh or pickled with spices. The fleshy part can be crushed and olive oil extracted, a valuable source of cooking oil in a region deficient in animal fat. Soap and margarine can also be made with the oil. Besides olives, many nut trees like chestnuts, walnuts, hazelnuts and almonds are grown and the nuts picked as fruits or for the chocolate industry. Other important fruits are peaches, apricots, pears, plums, cherries and figs.

2. Crop cultivation. Besides orchard fruits, the Mediterranean climate also supports many field crops. Cereals are by far the most important. Wheat is the leading food crop. Though conditions for extensive wheat cultivation are not as ideal as those of the cool temperate regions, the Mediterranean farmers have utilized the seasonal climatic rhythm to their best advantage. The wheat grown is mainly hard, winter wheat. It is suitable for both bread-making and other food-products such as *macaroni, spaghetti and vermicelli.* The farmers usually sow the seeds in autumn, so that they germinate and grow steadily with the coming winter rain. By spring there is still sufficient moisture for the wheat to mature. The sunny weather of early summer ripens the grains and the wheat is harvested in almost guaranteed rainless weather. Barley is the next most popular cereal.

Summer crops are raised only where irrigation is possible. The water comes mainly from the melting snow that feeds the many rivers whose sources are in the highlands. Lowlands are intensively cultivated and the hill slopes are terraced. In Spain and Italy, the edges of the terraces are firmly piled with stones to prevent any soil from being washed away. Generally speaking, farms are small but there are also large holdings called *haciendas* in Spain which engage large numbers of paid labourers to work the farms. In a few localities, e.g. the Ebro basin in Spain, the Po Valley in Italy and in California, rice has been successfully cultivated and their yields are some of the highest in the world. In the more fertile plains, vegetables, especially beans, and flowers are grown for the local market. A little cotton and tobacco are also grown. The mountain pastures, with their cooler climate, support a few sheep, goats and sometimes cattle. Transhumance is widely practised.

3. Wine production. This is another speciality of the Mediterranean countries, because the best wine is essentially made from grapes. Some 85 per cent of grapes produced, go into wine. The long, sunny summer allows the grapes to ripen and then they are hand-picked. Viticulture is by tradition a Mediterranean occupation and the regions bordering the Mediterranean Sea account for three-quarters of the world's production of wine. In Spain, Portugal, France, and Italy, wine is the national drink. The average wine consumption of the Mediterranean countries is about 15 gallons per head per annum, whereas in U.S.A. it is not even one-tweniteth as much!

Although grapes may be grown in many parts of the temperate lands, commercial viticulture is almost entirely confined to the Mediterranean regions. It has been estimated that 40 million tons of the world's total production of 46 million tons of grapes annually are being processed into wine. The quality of the fermented grape juice is decided by a number of factors including the types of *vines* grown, the quality of the *soil,* the *climate* of the region, the method and extent of *fermentation.* The fragrance, taste and quality of the final product is so varied that the price range is tremendous. Wine may be as cheap as any soft-drink or as expensive as brandy. To differentiate the various kinds of wine, the principal wine areas of the world maintain their exclusive names. The wine from southern Spain

Grapes are grown in many Mediterranean countries. In Turkey some are dried to make sultanas. They are washed and then laid out in the sun *Paul Popper*

is called *sherry*, from Portugal *port wine*. *Chianti*, *asti* and *marsala* come from different parts of Italy. In France the greatest wine regions are located further north, e.g. *Champagne* in the Paris basin, *Bordeaux* in the Garonne basin, *Burgundy* in the Rhone-Saone valley.

The world trade in fresh grapes is comparatively small mainly from Mediterranean South Africa. Most of the inferior grapes are preserved as dried grapes and exported. They are known by several names e.g. *currants* from the Levantine grapes, *raisins* from California, and *sultanas* from Asia Minor.

The other industries associated with Mediterranean agriculture are fruit canning, flour milling and food processing.

QUESTIONS AND EXERCISES

1. What is meant by the 'index plant' of a climatic type? In what ways are the following index plants representative of the type of climate indicated?
   (a) teak—Tropical Monsoon Climate
   (b) olive—Mediterranean Climate
   (c) cactus—Hot Desert Climate
   (d) spruce—Cool Temperate Continental Climate

2. The following statistics of the annual rainfall and annual temperature ranges of four Mediterranean lowland stations are taken from the Mediterranean shorelands. Attempt to explain their differences.

Station	Latitude	Longitude	Annual rainfall	Annual temperature range
(a) Gibraltar	36°N.	5°W.	36"	20°F.
(b) Marseilles	43°N.	5°E.	23"	28°F.
(c) Athens	38°N.	24°E.	16"	32°F.
(d) Alexandria	31°N.	30°E.	8"	23°F.

3. Outline the various types of natural vegetation found in the Mediterranean regions. Relate this to climate, soil and human interference.

4. Give an explanatory account of the following statements about economic activities of the Mediterranean lands.
   (a) Orchard farming is the predominant occupation.
   (b) The chief cereal cultivated is hard, winter wheat.
   (c) Pastoral farming is of little importance.

5. Write geographical notes on any *three* of the following.
   (a) The Mediterranean Climate is typified by dry, sunny summers and wet, mild winters.
   (b) Hot, dusty Sirocco and cold stormy Mistral.
   (c) Mediterranean woodlands, shrubs and scrub.
   (d) Three-quarters of the world's wine comes from the Mediterranean regions of Europe.