Chapter 24 The Cool Temperate Eastern Margin (Laurentian)

Distribution

The Cool Temperate Eastern Margin (Laurentian) Climate is an intermediate type of climate between the British and the Siberian type of climate. It has features of both the maritime and the continental climates. It is apparent from Fig. 153 that the Laurentian type of climate is found only in two regions. One is north-eastern North America, including eastern Canada, north-east U.S.A., (i.e. Maritime Provinces and the New England states), and Newfoundland. This may be referred to as the North American region. The other region is the eastern coastlands of Asia, including eastern Siberia, North China, Manchuria, Korea and northern Japan. It may be referred to as the Asiatic region.

In the southern hemisphere, this climatic type is absent because only a small section of the southern continents extends south of the latitude of 40°S. The only possible location is in eastern Patagonia, south of Bahia Blanca (lat. 39°S.) to Tierra del Fuego (lat. 54°S.). But the climatic barrier of the southern Andes is so complete, that the Westerlies hardly ever reach Patagonia. The region is subjected to aridity rather than continentality. Its annual precipitation is not more than 10 inches, so that it is a rain-shadow desert. Elsewhere in the southern hemisphere, the climate is so equable and the oceanic influence is so profound that neither the continental nor the eastern margin type of climate exists.

Climate

The Laurentian type of climate has cold, dry winters and warm, wet summers. Winter temperatures may be well blow freezing-point and snow falls to quite a depth. Summers are as warm as the tropics (70° – 80°F.) and if it were not for the cooling effects of the off-shore cold currents from the Arctic, the summer might be even hotter. Though rain falls throughout the year, there is a distinct summer maximum from the easterly winds from the oceans. Of the annual precipitation of 30 to 60 inches, two-thirds come in the summer. Winter is dry and cold, because the winds are dry Westerlies that blow out from the continental interiors. We shall now examine in closer detail the variations of the Laurentian type

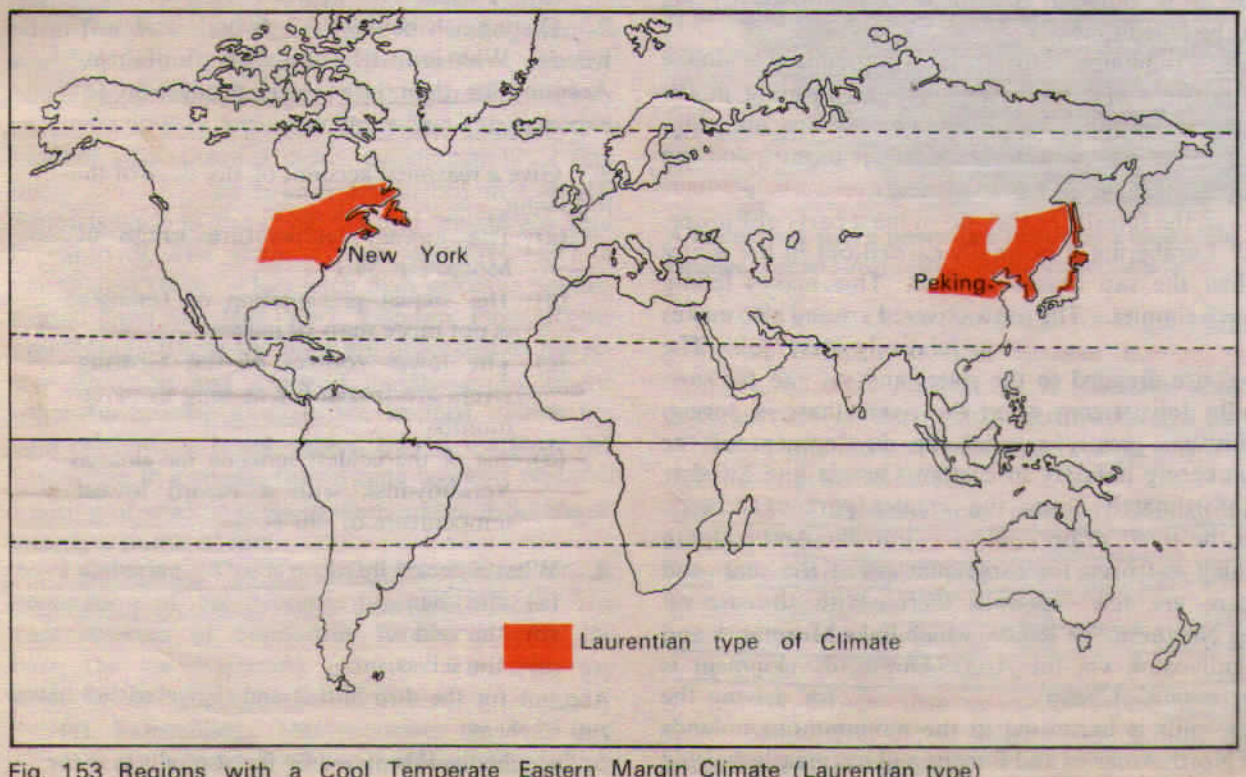
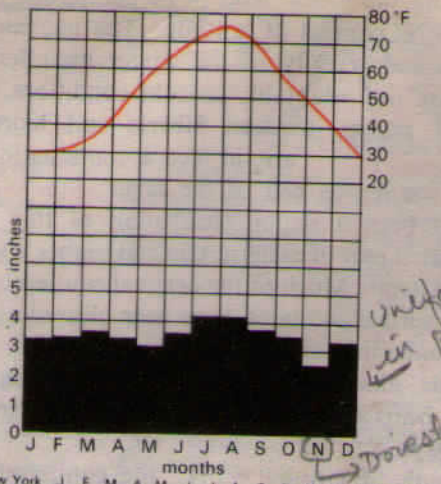


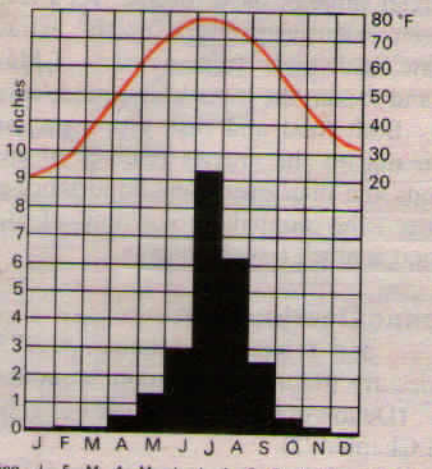
Fig. 153 Regions with a Cool Temperate Eastern Margin Climate (Laurentian type)



New York	J	F	M	A	M	J	J	A	S	O	N	D	range / total
Temp	31	31	39	49	60	69	74	72	67	56	44	34	43°F
Precip	3.3	3.4	3.6	3.4	3.1	3.6	4.2	4.2	3.7	3.5	2.5	3.3	41"

Place: New York, U.S.A (41°N., 74°W.)
Altitude: 314 feet
Annual precipitation: 41 inches
Annual temperature range: 43°F. (74° – 31°F.)

Fig. 154 (a) Laurentian type of Climate in North America



Peking	J	F	M	A	M	J	J	A	S	O	N	D	range / total
Temp	24	29	41	57	68	76	79	77	68	55	39	37	55°F
Precip	0.1	0.2	0.2	0.6	1.4	3.0	9.4	6.3	2.6	0.6	0.3	0.1	25"

Place: Peking, North China (40°N., 116°E.)
Altitude: 131 feet
Annual precipitation: 25 inches
Annual temperature range: 55°F. (79° – 24°F.)

Fig. 154 (b) Laurentian type of climate in Asia

of climate between the North American region and the Asiatic region.

The North American region. The most remarkable characteristic of the Laurentian climate of the North American region is its uniformity in precipitation (about 3 to 4 inches monthly) with a late summer maximum. New York in Fig. 154(a) has an annual precipitation of 41 inches with the wettest months in July and August (4.2 inches each). No month is really dry, and the driest month, November, has 2.5 inches of rain. This uniformity of precipitation is largely due to the Atlantic influence and that of the Great Lakes. The warm Gulf Stream increases the moisture content of easterly winds from the open Atlantic. The prevailing Westerlies which penetrate across the Rockies carry depressions over the Great Lakes to the New England states. These winds thus promote wet conditions especially in winter, which are vital for the agricultural activites of north-eastern North America. The meeting of the warm Gulf Stream and the cold Labrador Current on coastal waters off Newfoundland produces dense mist and fog and gives rise to much precipitation. St. John's, its capital has as much as 54 inches of annual precipitation. It is said that Newfoundland experiences more drizzles than any other part of the world.

In summer the Westerlies bring less depressions and extend their continental influence to the coast. Temperatures are normally high in summer for the latitude. New York has a mean July temperature of 74°F. and sometimes even as high as 90°F. Once, on 7 August 1918, the absolute maximum of 104°F. was reached. Such high temperatures in a cool temperate maritime region, where the relative humidity is high, can be very trying. Prolonged heat waves cause discomfort and frustration in crowded cities. In winter, the temperature drops and snow falls. New York has two months below freezing-point, and an annual temperature range of 43°F. Away from the maritime influence, the cold increases. The mean January temperatures for Quebec, Ottawa and Montreal are 10°F., 12°F. and 14°F. respectively. The temperature ranges widen accordingly.

The Asiatic region. In contrast, the rainfall distribution of the Asiatic region is far less uniform. Winters are cold and very dry while summers are very warm and exceptionally wet. Peking, a typical station of the Laurentian Climate in northern China will bring out these facts very clearly. It has seven dry months from October to April with a total rainfall of less than 2.1 inches which is only one-twelfth of the annual total of 25 inches. The remaining five months receive more than an inch a month, with 9.4 inches in July alone. The rainfall regime, is, in fact, similar to that of the tropical

Japan - Plum rain (June) & Typhoon rain (Sept)

monsoon type in India, where the whole year's rainfall is concentrated in the three summer months. The mountainous interior of China has such pronounced continental effects that the intense heating in summer creates a region of extreme low pressure, and moisture-laden winds from the Pacific Ocean and the Sea of Japan blow in as the South-East Monsoon. The Laurentian type of climate here is often described as the Cool Temperate Monsoon Climate. It has a very long, cold winter, and a big annual range of temperature. The July mean for Peking is 79°F. while that of January is only 24°F. The temperature range is therefore more than 55°F. The dry, cold wind that blows out from the heart of Asia in winter carries fine, yellowish dust and deposits it as a thick mantle of loess in Shansi, Shensi and other neighbouring provinces at the bend of the Hwang Ho. Much of the winter precipitation in northern China, Korea and Hokkaido, Japan, is in the form of snow. In the mountainous districts, the snow piles to a depth of 5 to 10 feet.

The climate of Japan is modified by its insularity, and also by the meeting of warm and cold ocean currents. It receives adequate rainfall from both the South-East Monsoon in summer and the North-West Monsoon in winter. The latter is the dry, cold wind from mainland Asia, but after crossing the Sea of Japan it has gathered sufficient moisture to give heavy relief rain or snow on the western coasts of Japan. The rainfall is more evenly distributed, as in Tokyo, with two maxima, one in June, the Plum Rain (6.5 inches), and the other in September, the Typhoon Rain (9 inches). On the windward slopes of the Japanese Alps on the west, some stations, e.g. Kanazawa, have more than 102 inches of rain, much of it falling as snow. The maritime influence also effectively moderates the temperature range. Tokyo has a range of 40°F. (79°F. in August and 39°F. in January) with none of the months below freezing-point. The warm Kuroshio has played an important part in making the climate of Japan less extreme. In meeting the cold Oyashio from the north, it also produces fog and mist, making north Japan a 'second Newfoundland'. Fishing replaces agriculture as the main occupation in many of the idented coastlands.

Natural Vegetation

The predominant vegetation of the Laurentian type of climate is cool temperate forest. The heavy rainfall, the warm summers and the damp air from fogs, all favour the growth of trees. Generally speaking, the forest tend to be coniferous north of the 50°N. parallel of latitude. The increase in the length and severity of the winter excludes forests that are not adaptable to cold conditions. In the Asiatic region (eastern Siberia and Korea), the coniferous forests are, in fact, a continuation of the great coniferous belt of the taiga. Lumbering has always been a major occupation of this sparsely populated part of eastern Asia and timber is a leading export item. Much of the original coniferous forests of fir, spruce and larch have been cleared as a result of lumbering rather than agriculture. Eastern Canada, along the banks of the St. Lawrence River is the heart of the Canadian timber and wood pulp industry.

South of latitude 50°N., the coniferous forests give way to deciduous forests. Oak, beech, maple and birch are the principal trees. Like their counterparts on the western margins, the deciduous forests are fairly open. A long growing season of over six months and an adequate supply of moisture from maritime sources encourage rapid growth of ferns and other temperate undergrowth. The occurrence of trees in almost pure stands, and the predominance of only a handful of species greatly enhance the commercial value of these forests. As a result, they have been extensively felled for the extraction of temperate hardwood. In many parts of Manchuria, Korea and Japan, the forests have made way for the plough. Both food and cash crops are raised. In Canada, due to the greater reserves of coniferous softwoods and their overriding importance in industrial uses, the annual production of deciduous hardwood is much less significant.

Economic Development

Lumbering and its associated timber, paper and pulp industries are the most important economic undertaking. (Details of lumbering have already been dealt with in Chapter 22).

Agriculture is less important in view of the severity of the winter and its long duration. Fortunately the maritime influence and the heavy rainfall enable some hardy crops to be raised for local needs. Potatoes thrive over large areas of the podzolized soils, while hardy cereals like oats and barley can be sown and successfully harvested before the onset of the cold winter. A number of other interesting crops are produced in the Asiatic region such as soya beans (northern China, Manchuria and Korea are amongst the world's leading producers), groundnuts, sesame, rape seeds, tung oil and mulberry. In the North

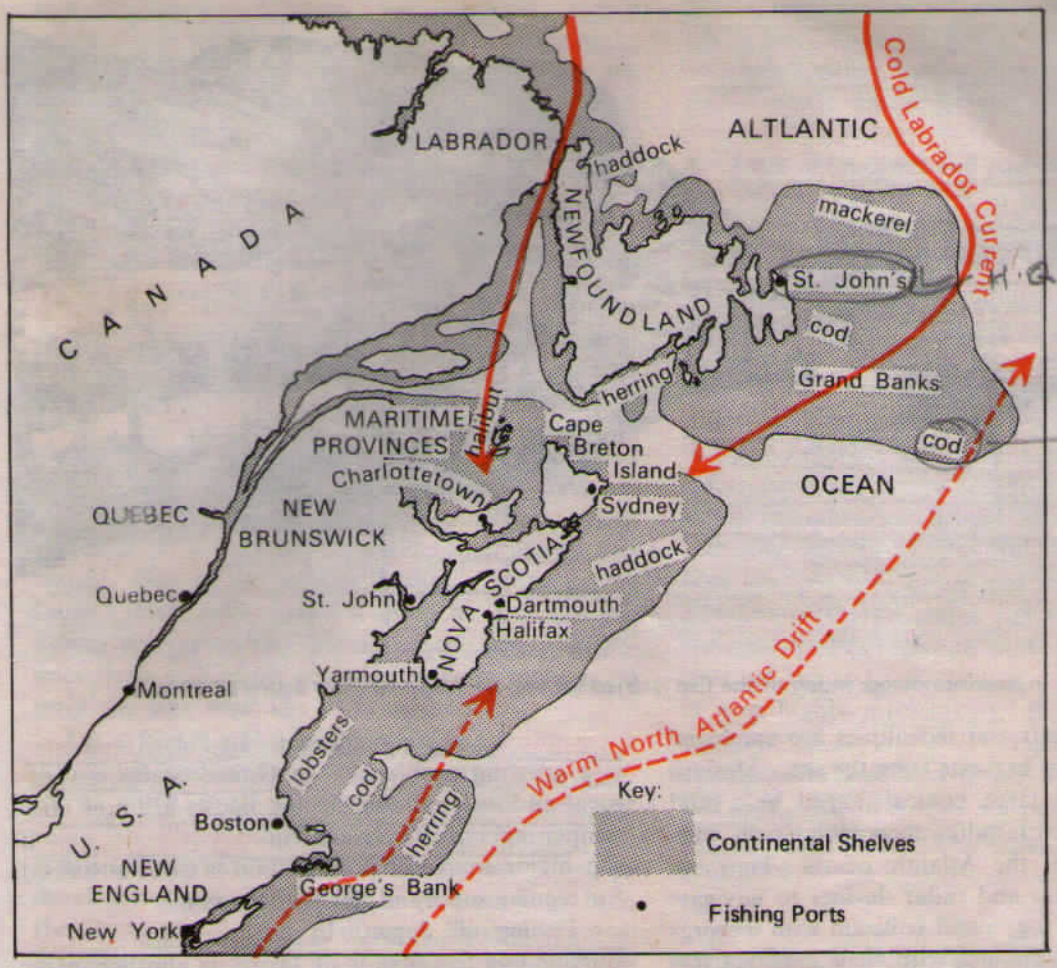


Fig. 155 Fishing: the North American region

American region, arable farming is not carried out on a sizable scale, except in the more favoured localities. Farmers are engaged in *dairy farming, hay cultivation* and, in mild maritime areas, *fruit growing*. The fertile Annapolis valley in Nova Scotia is the world's most renowned region for apples. Fishing is, however, the most outstanding economic activity of the Laurentian climatic regions.

Fishing

Fishing off Newfoundland, the Maritime Provinces and New England

This is one of the world's largest fishing grounds particularly on the Grand Banks of Newfoundland (Fig. 155). The reasons for its importance are geographical. Fish feed on minute marine organisms, collectively called plankton, which is present in abundance only in shallow waters adjacent to land masses, where sunlight can penetrate through. The gently sloping continental shelves (less than 600 feet deep) which stretch for over 200 miles south-east of Newfoundland, and off the coasts of the Maritime Provinces and New England contain a rich collection of microscopic plankton. Fish of all types and sizes feed and breed here and support a thriving fishing industry not only in Canada and U.S.A., but also in countries like Norway, France, Britain, Portugal, Denmark, Russia and Japan, who send fishing fleets to the Grand Banks.

As less than 1 per cent of Newfoundland is cultivated, fishing provides employment for almost the entire population. It is not only the chief source of wealth to Newfoundland, but also a major export item of all the Maritime Provinces. Both pelagic fish which live near the surface and demersal fish which live near the bottom of shallow seas are caught. The chief fish caught is *cod* which is consumed fresh or dried, salted, smoked, canned or packed in ice for export to mainland America, Central and South America and southern Europe. Cod liver oil is exported too. Other fishes caught are haddock, halibut, hake, herring, plaice, and mackerel. Various

A fishing settlement in Newfoundland. Much of the fish is dried for export *National Film Board of Canada*

kinds of fishing craft and techniques are employed to obtain maximum harvests from the sea. Modern trawlers, dragging large conical-shaped nets, and drifters, carrying curtain-like rectangular nets, operate extensively off the Atlantic coasts. They are equipped with radio and radar devices to navigate through the dense fog, avoid collision with icebergs and also maintain contact with their headquarters on land. Off-shore fishermen also use traps, lines and nets to catch crabs, lobsters and shrimps for home consumption and increasingly for export. Further inland, in lakes and rivers, such as the St. Lawrence and the Great Lakes, freshwater fish, e.g. salmon, trout, eels and sturgeons are caught.

In Newfoundland and along the Atlantic coasts are many fishing ports. St. John's, chief port of Newfoundland with a population of nearing 100,000, is the headquarters of the Grand Banks fishing industries. It also had interests in sealing and whaling but these have declined. In the fishing ports of Halifax and Yarmouth in Nova Scotia and in the New England ports are processing plants that cut, clean, salt, pack or preserve fish for disposal by refrigerated boats, trains or trucks to all parts of the continent. They are bases for large fleets of trawlers. A modern trawler may well cost anything around a million dollars and have men stay on board in floating factories far out at sea for days and even weeks. Fishing in this part of the world is highly specialized and very efficient. In fact over-fishing is a growing problem. The United States government and international fishing bodies are now contemplating strict measures in fish conservation if this major source of protein food is to be sustained for regular supply in the years to come.

Fishing off Japan. In the north-west Pacific, surrounding the islands of Japan, is another major fishing area of the world. Nowhere else in the world are there so many people engaged in fishing as in this part of the north-west Pacific. The mountainous nature of Japan and parts of mainland eastern Asia have driven many to seek a livelihood from the sea. The scarcity of meat (there is little pasture in Japan for livestock farming of any kind) and *religious reasons* have popularized fish as the principal item of diet and the chief protein food of the Japanese and the Chinese as well. Large quantities of fish and fish products are either canned or preserved for export to neighbouring countries. The Japanese also make use of fish wastes, fish meal and seaweeds as fertilizers in their farms. Japan is one of the few countries that has taken to seaweed cultivation. Coastal farms that are submerged in water grow weeds for sale as fertilizers, chemical ingredient and even as food.

Another interesting aspect of Japanese fishing is pearl culture. The divers of southern Japan dive down into the coastal waters and bring to the surface

shell-fish called pearl oysters and extract the highly prized *pearls* for sale as ornaments. The lining of the oyster shells, called *mother-of-pearl*, is used for the manufacture of pearl buttons, and other decorative articles. As natural pearls in oysters are difficult to obtain in large numbers, the Japanese have begun to breed the young oysters. By injecting tiny 'seeds' into them, the oysters are made to secrete the pearl material, which accumulates to form 'cultured pearls. These are collected and exported.

The Japanese interest in fishing is not confined to their own territorial waters, they venture far and wide into the Arctic, Antarctic and the Atlantic waters. Large whaling fleets complete with processing plants and experienced crews stay out in the open seas and return only occasionally for refuelling or replenishment of fresh provisions. As a nation, Japan accounts for a sixth of the world's total annual fish caught. She is the world's greatest fishing nation today. Her active participation in international fishing enterprises and her advanced fishing techniques speak well of her relentless drive to make good from the seas what she lacks on land.

Let us find out why this is possible.

1. Japan is not well endowed with natural resources, for as much as 80 per cent of her land is classed 'non-agricultural'. She has to take to the sea if she wants to survive. This has compelled the people to develop the seas, and fishing has for centuries been the traditional occupation of many coastal Japanese.
2. The continental shelves around the islands of Japan are rich in plankton, due to the meeting of the warm Kuroshio and the cold Oyashio currents and provide excellent breeding grounds for all kinds of fish including herring, cod, mackerel, bonito, salmon, sardine and tuna, as well as crabs and lobsters.
3. The indented coastline of Japan, provides sheltered fishing ports, calm waters and safe landing places, ideal for the fishing industry. In Hokkaido, where the Laurentian type of climate is too cold for active agriculture, fishing takes first place. Hakodate and Kushiro are large fishing ports, complete with refrigeration facilities.
4. Lack of lowlands and pastures means that only a few animals can be kept to supply meat and other protein food. *Fish*, in all its varied forms, fresh, canned, dried, frozen, and in the form of fish pastes, fish sauce and spiced condiments takes the place of meat as Japan's primary source of protein food. There is a great demand for it locally, and for export to other east Asiatic neighbours which lack the techniques of large scale commercial fishing.
5. The Japanese fishermen began with small fishing boats, using nets, traps and lines. With the progress made in industries, fishing has also become more scientific, aiming at heavy hauls, high returns and economy of *time, effort and money*. Though three-quarters of the fishermen practise off-shore pelagic fishing either full-time or part-time, in small boats, most of the commercial deep-sea demersal fishing is now highly mechanized. Powered trawlers and modern refrigeration plants backed by sound financial organizations have greatly increased the annual fish yield. Japan is now not only a major producer and exporter of fish and marine products, but also a centre for marine and fishing research.

A cultured pearl farm in Japan

QUESTIONS AND EXERCISES

1. (a) Locate on a world map the extent of the Cool Temperate Eastern Margin (Laurentian) Climate.
   (b) Explain why this type of climate is confined to the northern hemisphere
   (c) Describe its climate.

2. Compare and contrast the climate of any *two* of the following pairs of areas.
   (a) Laurentian Climate in the North American region and the Asiatic region.
   (b) Tropical monsoon Climate of India and the Warm Temperate Eastern Margin (China type) Climate in S. China.
   (c) The Steppe type of climate in Eurasia and the Siberian type of climate in northern Canada.
   (d) The Tundra Climate of Greenland and Trade Wind Desert Climate of central Australia.

3. (a) Name the major fishing areas of the world.

(b) What types of fishing can normally be distinguished in such major fishing grounds?

(c) Name a few methods used to catch the fish.

(d) For any *one* major fishing area you have selected, explain the geographical factors which have contributed to its importance.

4. Write brief notes on any *three* of the following.

(a) The economy of the forests of the Laurentian regions.

(b) Fishing in Japan.

(c) Soya bean cultivation in Manchuria.

(d) Fruit growing in the Maritime Provinces of Canada.

5. The following statistics are a guide to four different types of climate in the northern hemisphere.

(a) Name the type of climate that each of them represents.

(b) Locate a probable station for each.

(c) For any *two* of them describe their climatic characteristics.

Stations	July temp.	January temp.	Annual temp. range	Annual Rainfall	Month of max. rainfall
A	81°F	78°F.	3°F	96"	April and October
B	55°F.	12°F.	43°F.	8"	June, July, August
C	91°F.	56°F.	35°F.	3"	irregular
D	74°F.	30°F.	44°F.	41"	July, August, September