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SECONDARY GEOGRAPHY

For Classes IX-X

Written by

Dr. Shamsul Alam

Kazi Abdur Rouf

Selina Chahjahan

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Translated by

Abjad Hossain Chowdhury

Syed Shakhawat Hossain

Shamim Ahmed

Edited by

Nazrul Islam

On looking from the earth, the stars seem to exist in same plane. The distance of the stars from the earth is measured by the velocity of the light. The unit of measurement from the earth to the stars or from stars to stars is called light years. Since the sun is the near most star, its distance from the earth is about 15 crore kilometres. A ray of light from the sun takes 8 minutes 19 seconds to reach the earth.

The star next to the sun is Proxima Centauri. It is about 38,00,000 crore kilometres from the earth. Scientific discoveries have enhanced our knowledge about the stars. Some of the stars are round, some are spiral or lineal while some others are shapeless. The density of Black Dwarf and Black Hole is very high and their gravitational force is also very strong.

Constellation : Looking at the cloudless sky in a dark night, one can see a number of stars clustered together. These are called constellations. The astronomers in the past, connecting every individual constellation with imaginary lines and imagining different figures, gave them strange names. Of them, the names of Great Bear, Orion, Cassiopeia, Little Bear, Canis Major, Eridanus etc. are worth mentioning.

Galaxies : Billion of stars, dusts and huge pool of vapour have formed clusters of luminaries which are called galaxy or the universe of stars. There are innumerable galaxies in the space. Galaxies are far apart from each other. The milky way is a small part of a galaxy.

The Milky Way : The cluster of stars that look like a brightly illuminated long pathway extending from north to south in the dark sky is called the milky way. A milky way is formed of millions of stars, some scientists take it to be a huge circular region. Some other scientists consider it to be a coiled up hard nebulae. Looking at the clear and cloudless night sky in winter, one would see a long line of translucent and radiant lustre of light with a wide vicinity extended north to south. That is known as the milky way. Our solar system including the sun is included in one of such a milky way. The sun is positioned among billions of stars in this milky way.

Nebulae : The covering of the dimly lit stars in the space is called the nebulae. They are visible with naked eyes or with powerful telescopes. Some of the nebulae are full of gaseous bodies. They have strong forms. These are called gaseous nebulae. The scientists think that many nebulae are far away from our milky way. One nebulae may contain billions of stars. Since the nebulae are billions and billions of light years away from the earth, the stars between them cannot be identified separately. The milky way is in the same plane with the nebulae.

Meteors : Sometimes in the cloudless night sky it looks as if a star is running about or a star has just dropped off. This event is known as drop off of a star. These are not actually stars. They are called meteors. Innumerable physical masses float in the space. The gravitational force causes these physical masses rush towards the earth with a violent speed. When they come in touch with air, the friction with air makes them flare up. Majority of the meteors are small in size.

Uranus : Uranus is the third largest planet. In order of distance from the sun its place is seventh. It is located at a distance of 287 crore kilometres from the sun. The planet takes 84 years to complete a single rotation round the sun but it takes only 10 hours 49 minutes to rotate on its own axis. Its diameter is nearly 49,000 kilometres. It is very light because it is formed of light substances. The atmosphere contains high percentage of methane. Average temperature 170° Celsius. Recently, scientists have discovered some rings round this planet, but these rings are not bright. Uranus has 5 (five) satellites such as Mirinda, Ariel, Ambriel, Titania and Oberon.

Neptune : In order of distance from the sun, Neptune is placed in 8th position. It is about 450 crore kilometres from the sun. This planet has got feeble light and heat. Neptune in area is equivalent to 72 earths and 17 earths in mass. Its Diameter is 48,400 kilometres. The atmosphere which is formed of the mixture of gas mainly methane, ammonia and other gases. This planet was first sighted by the scientists in 1846. It has two satellites such as Triton and Neroid. Moreover, two rings have been recently discovered to exist round this planet.

Luminaries and Solar System

What we learnt from this chapter:

Luminaries : The planets, stars, satellites, comets, meteors, pulsar, Black Dwarf, Black Holes that exist in boundless space are called the Luminaries.

Stars : At night and clear sky, the luminaries that twinkle in the space are called stars.

Nebulae : The covering of the dimly lit stars in the space are called nebulae.

The Milky Way : The brightly, illuminated long pathway running from north to south formed by cluster of stars is called the milky way.

Comets : Sometimes a kind of luminaries appear in the space. They exist for a short period and then disappear. They are known as comets. Halley's comet appear in the sky every 75 years.

Planets : The celestial bodies having no light or heat of their own revolve round the sun. They are called planets. The earth, mercury, saturn etc. are the planets.

Satellite : The celestial bodies that revolve round a planet are satellites. The moon is a satellite.

The Solar System : The family of celestial bodies that include the sun and its planets, satellites, asteroids, comets, and meteors is called the solar system. There are eight planets in the solar system. They are Mercury, Venus, Earth, Mars, Saturn, Jupiter, Uranus and Neptune.

Chapter Two

Latitude and Longitude

Some imaginary lines extending from east to west and from north to south are drawn on a map of the world to determine the location of any place. These lines are known as the parallels of latitude and the meridians of longitude respectively. In geography, latitude and longitude are two important topics. One can determine the location of a place with the help of latitude and longitude. With the location of the longitude, one can determine the time of that place. Moreover, the northern and the southern position of any place can be determined through latitudes. Similarly, the western and the eastern position of any location from the Prime Meridian can be ascertained by longitude. Degree of latitude or a part of it is known as the latitude, while the degree of longitude of a part of it is termed as longitude.

Latitude : Before we learn what is actually meant by the degree of latitude, we will have to have an idea about the axis, the equator and parallels of latitudes. The imaginary line which runs north to south through the centre of the earth is known as axis. The northernmost point of this axis is known as the north pole and the southernmost point is the south pole. Keeping both the poles in equal distance, an imaginary line has been drawn which encircles the globe from west to east is known as the equator or the terrestrial equator. Due to the spherical shape of the earth, this line is also circular. So, this line is also known as the equatorial circle.

The equator has divided the earth into two equal halves. The part lying north to the equator is known as the Northern Hemisphere and that to the south as the Southern Hemisphere. With the help of the equator, one can determine the angular distance of a place situated either in the northern or in the southern hemisphere. So, to find out the angular distance of a place upon the surface, the only thing is to be done is to connect with an imaginary line, any point of that place with the centre of the earth. Again, the meridian which passes over that point ultimately meets the equator on a certain point, and that the meeting point is connected by an imaginary line with the centre of the earth (Fig. 3).

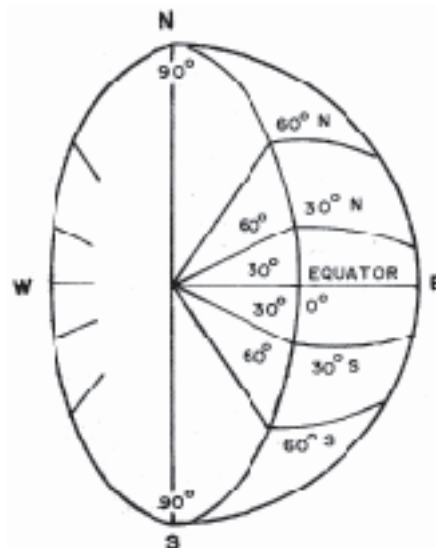


Fig. 3 : Angular distance from equator

International Date Line

Travelling towards east or west from any place will require adjustment of local time which ultimately creates problems even for adjustment of days of the week. This problem stands acute if anybody crosses 180° longitude towards east or west from a particular place. To avoid this problem an imaginary line has been drawn absolutely over the waterbodies from north to south. This imaginary line is known as International Date Line.

Necessity of the International Date Line :

We know that for the difference of 1° of longitude, there is a difference of time of 4 minutes. So, for every 15° of longitude, there will be a difference of an hour. Thus travelling eastward from prime meridian (Greenwich) up to 180° , one would be 12 hours ahead of the schedule and travelling westward 12 hours behind the schedule. If it is 10 A.M. on Monday in Greenwich, then the corresponding time would be 10 P.M. on the same day at 180° East longitude whereas, the time at 180° West longitude would be 10 P.M. on the previous day i.e. Sunday. But 180° East or 180° West longitude is virtually the same longitude. So, it is observed that the local time differs by 24 hours or one day in the same longitude. There is a change of day and date if one crosses this line which is known as the International Date Line (Fig. 8).

Any ship or aeroplane sailing towards east from Greenwich will have to subtract one day and sailing towards west will have to add one day to adjust with the local time.

The International Date Line is virtually 180° east and west longitude. It crosses through the Aleutian on the north-eastern part of Siberia, Fiji and Chatham islands. To avoid the problems of adjusting local time, the International Date Line has been so set that it passes only over the waterbodies turning 12° towards east just near the Bering Strait, 7° towards west near the Aleutian islands and 11° towards east near Fiji and Chatham islands. Had it not been drawn this way, the people would have to count two different local times in two different parts of the same island.



Fig. 8 : International Date Line

The process of changing of season : Normally, we know that there are four seasons in the earth viz., the summer, the autumn, the winter and the spring. Now we will try to understand how the changes of season do occur. The explanations for the change of seasons may be obtained from four situations of the earth during revolution around the sun.

1. Summer in the Northern Hemisphere and Winter in the Southern Hemisphere :

We know that the north pole comes nearer to the sun once in a year. During revolution on her orbit, the north pole of the earth after 21st March, starts showing inclination towards the sun. Consequently, a large portion of the northern hemisphere is being illuminated by the rays of the sun. The area of illumination gradually increases. As a result, the days become longer and the nights shorter in the northern hemisphere. As the days become longer the sun gives its rays for a longer time in the northern hemisphere. The earth gets more time to receive heat and the heated earth in turn makes the surrounding air to be hot. Nights are short and the amount of radiation from the soil is less in comparison to the amount of heat that is stored during day time. Thus hot weather prevails in the northern hemisphere and so it is summer there.

At this time opposite condition prevails in the southern hemisphere. Since the southern hemisphere remains far from the sun and it gets sunshine for a shorter time. So the nights are long and the days are short. The earth radiates the heat which she has stored at day time. As a result, the earth becomes cold. Cold weather prevails in the southern hemisphere and it is winter there.

2. Autumn in the Northern Hemisphere and Spring in the Southern Hemisphere :

After 21st June, the length of the day starts decreasing and the length of night gets increasing in the northern hemisphere. But until 23rd September in comparison to night, the length of the day still remains shorter. The north pole which is inclined towards the sun starts moving away from the sun and from a distant position the southern hemisphere gradually inclined towards the sun i.e. the south polar region comes nearer to the sun. Consequently temperature gradually decreases in the northern hemisphere and it increases in the southern hemisphere. This condition is known as Autumn in the northern hemisphere and Spring in the southern hemisphere. On 23rd September the day and night are equal throughout the world (Fig. 14).

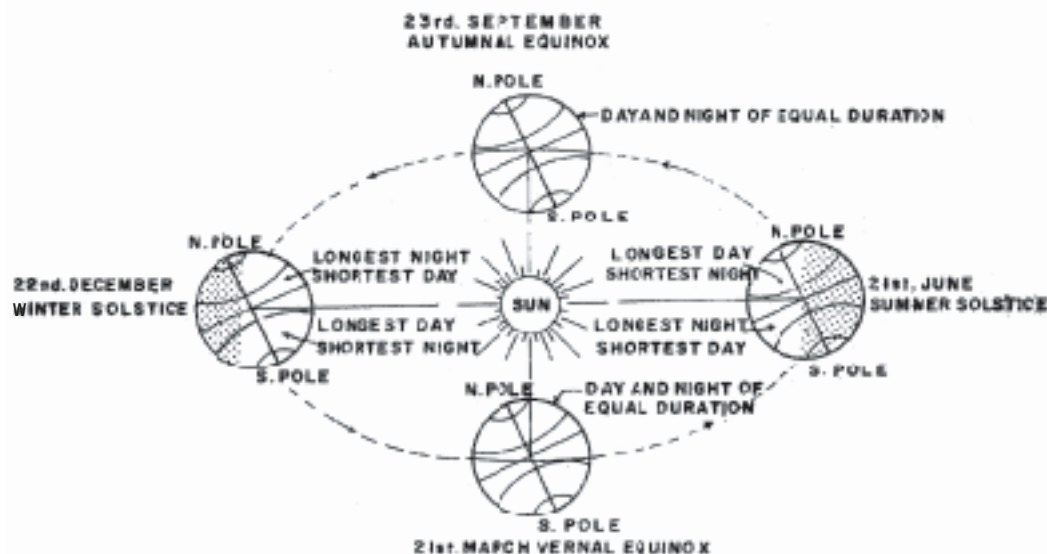


Fig. 14 : Revolution of earth-fluctuation of day and night-change of season

3. Winter in the Northern Hemisphere and Summer in the Southern Hemisphere :

We know that after 23rd September, the southern hemisphere starts showing inclination towards the sun. One can perceive that everyday the sun moves southward. This is known as southwardly movement of the sun. In comparison to night, the days become longer in the southern hemisphere as the south pole shows inclination towards the sun. As the sun's rays fall directly on the Tropic of Capricorn, the southern hemisphere gets sun rays for a longer period of time. Consequently, the temperature increases in the southern hemisphere. On 22nd December, the south pole approaches to the nearest position towards the sun and it is the longest day in the southern hemisphere. So, one and half months preceding 22nd December and the same period following that date the temperature remains high in the southern hemisphere. Naturally, during this period, the temperature remains very low in the northern hemisphere. So, one and half months preceding 22nd December, it is summer in the southern hemisphere and it is winter in the northern hemisphere.

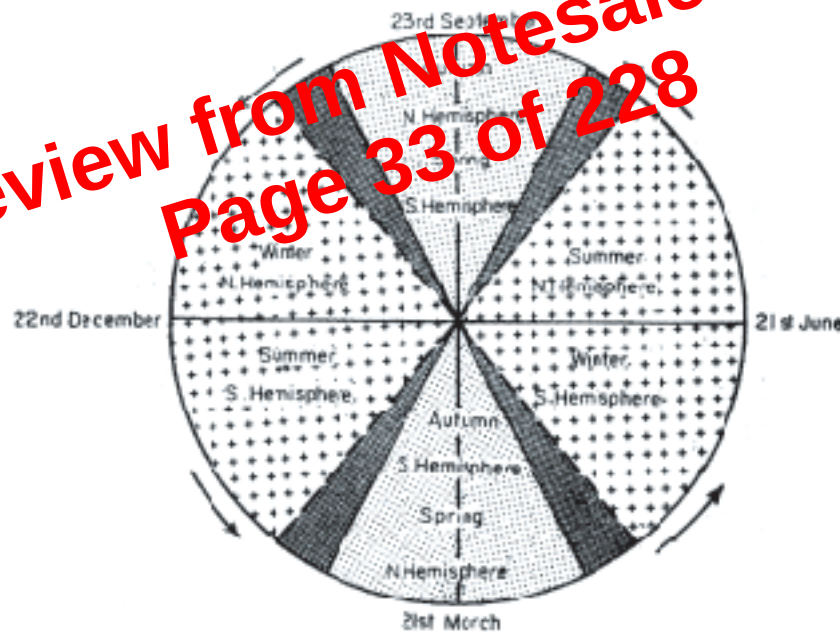


Fig. 15 : Main seasons

4. Spring in the Northern Hemisphere and Autumn in the Southern Hemisphere :

The sun starts moving towards the north after 22nd December. The length of the day starts decreasing in the southern hemisphere and increasing in the northern hemisphere. Consequently, the temperature increases gradually in the northern hemisphere and decreases in the southern hemisphere. Again day and night become equal in duration on 21st March. On this date the sun's position is vertical on the equator. This is known as autumnal equinox. This is spring in the northern hemisphere and autumn in the southern hemisphere (Fig. 15).

2. What does the given figure represent?

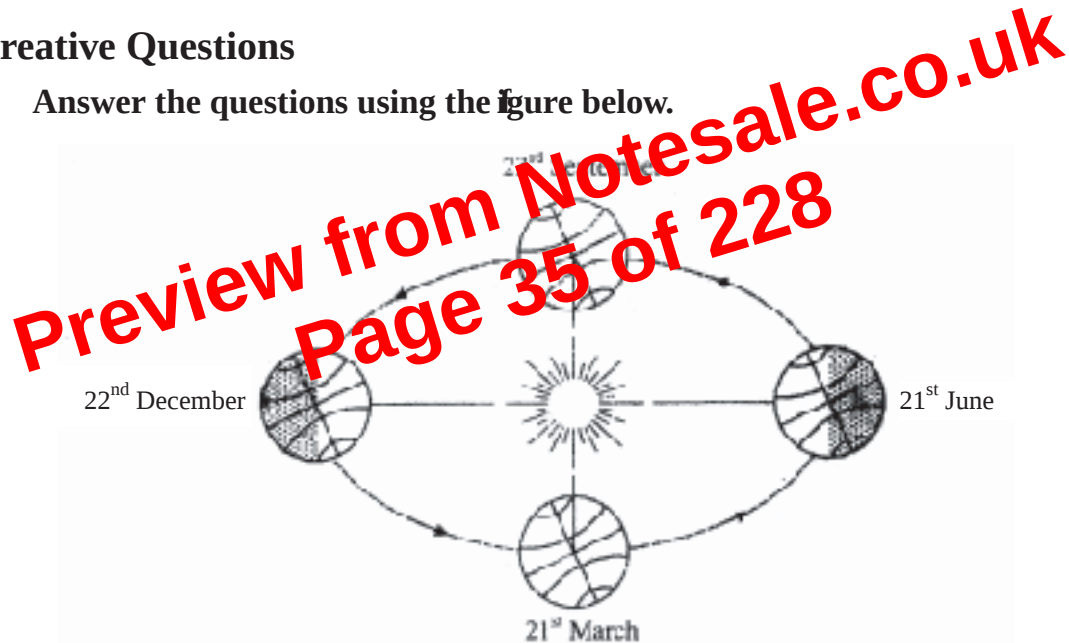
- a. The change of season b. The occurrence of the day and night
c. The fluctuation of the day and night d. The rotation of the earth

3. In the North and South Pole of the earth –

- a. The day and night is equal
b. The fluctuation of the day and night is very little
c. Six months night at a stress
d. The differences of temperature of day and night

4. Which is the date known as autumnal equinox?

- a. 21st March b. 21st June
c. 23rd September d. 21st December

Creative Questions**1. Answer the questions using the figure below.**

- a. What is the figure about above?
b. Why it is the longest day in the Southern Hemisphere on 22nd December?
c. Prove the annual motion of the earth from 4 different points of the given figure.
d. Explain what role does the change of season play in Bangladesh agricultural sector?

Rocks and Minerals

The outer cover of the earth's surface is known as the earth's crust. The earth's crust is basically formed of the rocks composed of different minerals. These earth forming minerals serve out different purposes. As for example, mineral oil and coal are used as fuel. Moreover, the economic use of gold, copper, zinc, aluminium, nickel, iron etc. is also very much important.

Different land forming processes like volcanism, depositional and erosional activities are highly influenced by the structure of the rocks and minerals. It is necessary to acquire some knowledge about minerals and rocks being the elements responsible for forming the earth's crust.

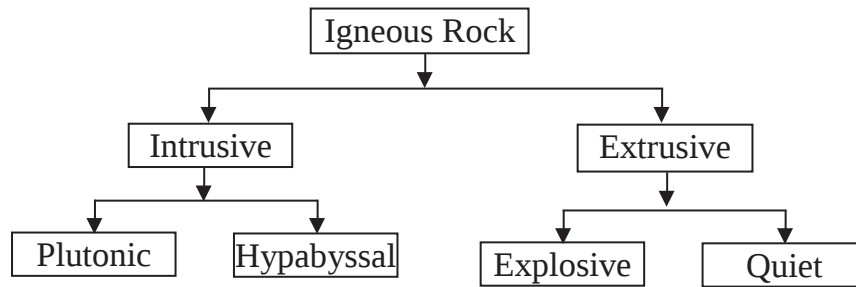
First let us see what is meant by minerals? What is the difference between rocks and minerals?

Minerals are formed by the composition of two or more basic elements. However, some minerals may be formed of one basic element. Diamond, gold, copper, silver, mercury and sulphur may be cited as examples. Of all these, the hardness of diamond is highest and of talc is lowest.

On the other hand, the rocks are formed by the mixture of one or more minerals. Here, we mention the term mixture because in nature the minerals are found in mixed condition. Each of the rock-forming minerals maintains its characteristic. Though much of the rocks are formed of more than one mineral, but in such case, the minerals and rocks are the same. As for example, calcite is a mineral while it is known as limestone as a rock. The characteristics of minerals are controlled by nature of the basic elements forming them. On the other hand, the property of rocks are regulated by the nature of the minerals constituting them.

The rock family : The rocks are of three types according to their mode of origin. These are igneous, sedimentary and metamorphic rocks. Igneous and metamorphic rocks are formed by the processes accomplished in the interior of the earth. On the other hand, the sedimentary rocks are formed by the processes acting on the surface of the earth. Though the mode of formation of these rocks are different, yet they are interrelated.

Igneous rocks : Igneous rocks can be formed under two environmental conditions viz., intrusive and extrusive. In the deep interior of the earth due to cooling, magma may be crystallized to form intrusive rock. If the magma finds its way to the surface of the earth through the vents, then it is termed as lava. This lava after cooling becomes extrusive rock (chart 1).



Intrusive rocks are sub-divided into plutonic and hypabyssal. Extrusive rocks are again sub-divided into explosive and quiet type. In intrusive type of rock, the magma solidifies in the deep interior of the earth. Granite, gabbro, syenite, diorite etc. are the examples of intrusive rocks. In hypabyssal type, the magma solidifies in the shallow interior as Porphyry.

Magma when thrown by violent explosions into the air after being solidified gives birth to the explosive Igneous rocks. Tuff and breccia may be cited as examples. In the quiet type of igneous rock, the molten magma flows out quietly in all directions and solidifies. Rhyolite, basalt, andesite etc. are best examples of this type of rock.

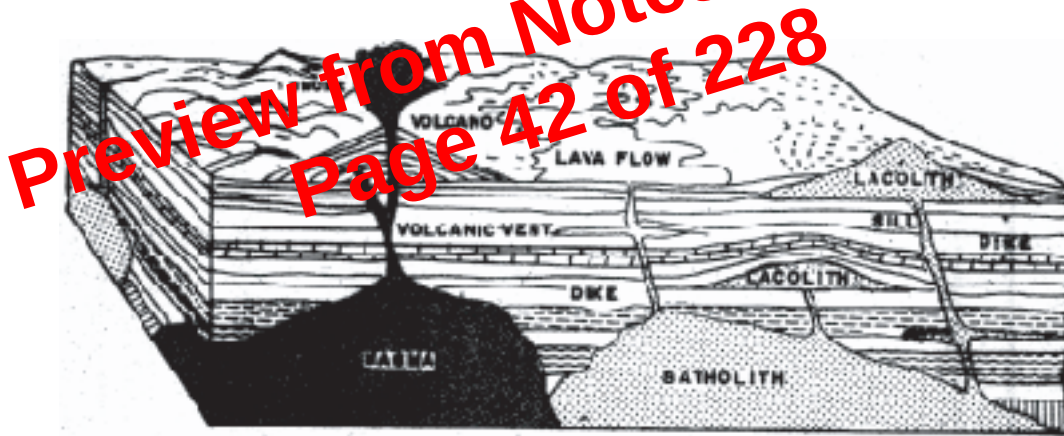


Fig. 19 : Landforms created by igneous rock

Batholiths, Laccoliths, Dikes, and sills are the examples of the igneous rock formed into the interior of the earth (Fig. 19).

Sedimentary rocks : The rocks which are formed by the deposition of sediments are known as sedimentary rocks. In this type of rock, the sediments are deposited in layers or strata. Sedimentary rocks cover an area of 5 per cent of the total area of the earth's crust. However, about 75 per cent of the total exposed part of the continental landmass is formed of sedimentary rocks.

Sources of sediments and their characteristics : Different types of mechanical and chemical weathering processes are acting on the earth's crust. Due to the effect of these processes, the outer crust of the earth gradually erodes out. These eroded

Characteristics of sedimentary rocks : Bedding, ripple marks, clay, cracks etc. are found in the sedimentary rocks (Fig. 20). The presence of fossils is one of the major characteristics of the sedimentary rock.

Metamorphic rocks : The rocks which through temperature, compression and chemical actions have been changed either in form or in composition is known as metamorphic rocks.

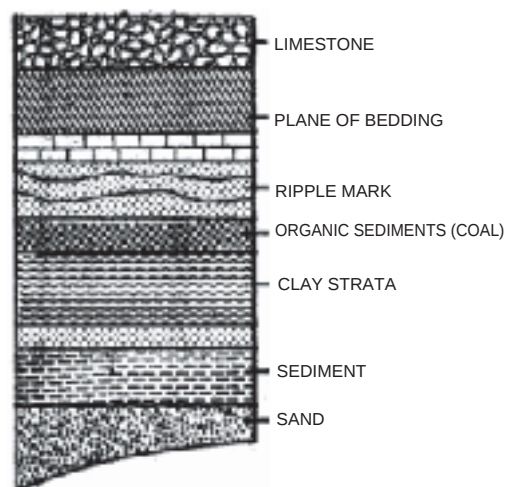


Fig. 20 : Bedding of sedimentary rocks

The agents of metamorphism : Heat, compression and chemically active fluids are the main agents who work singly or collectively to transform rocks. These metamorphic media increase the internal density of the rocks and the dimension of the crystals and create clear foliation. Due to the application of temperature and pressure, the minerals of the rock become compressed like the leaves of trees and are arranged in parallel layers. This characteristic of layered structure of rocks is called foliation (Fig. 21).

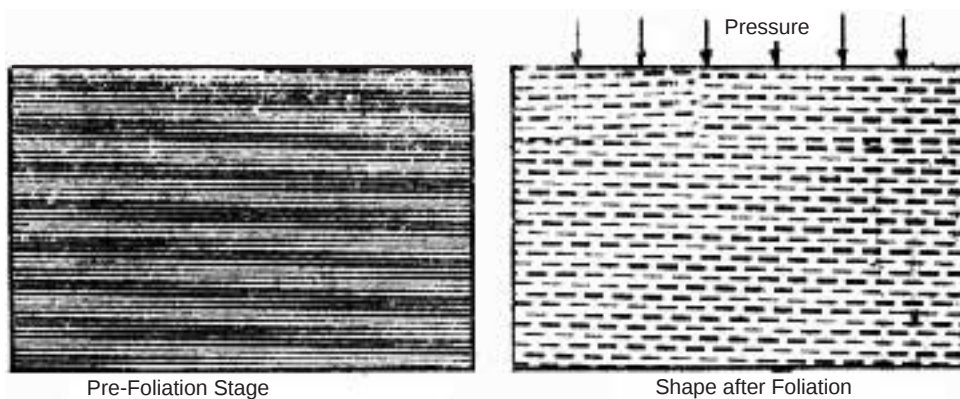


Fig. 21 : Formation of foliation

Examples of the important metamorphic rocks :

Rocks with foliation

Slate : Slate is produced from shale. This type of rock contains very fine crystals which are mainly formed by small plates created from mica. Slate is used to produce writing slates, blackboards etc.

Effects of volcanism : Volcanic eruptions and heavy lava flow are a kind of natural calamity which causes heavy damages to the living creatures and different human activities. In the past, many towns and settlements were destroyed by lava flows and thousands of people died instantaneously due to the release of poisonous gas from the volcanoes. Many of the volcanoes are situated in high mountainous regions and their crests always remain under heavy ice cover. But when eruption starts, the ice coverings melted and creates mud flow and creates heavy damages to the localities situated at the foot of the mountains. Moreover, occasionally the rock fragments and ashes ejected with explosive forces are being thrown into the air.

The landforms that are created from the volcanic eruptions and lava remain unutilised for a longer period and brings noteworthy changes in the landscape. However, the landforms thus formed by volcanoes are very fertile and are also very rich in mineral resources. Moreover, the volcanic landforms are very important for tourism.

Earthquakes

What we learnt from this chapter

Earthquake : An earthquake is a vibration of the surface of the earth caused by sudden release of enormous pressure from the interior of the earth.

Effects of Earthquake

- (a) Folds, cracks and landslides may occur and even the courses of the rivers is may be changed.
- (b) Earthquake, if it occurs in any densely populated areas, will cause enormous damage to houses, roads and streets, water and gas supply system and other resources.
- (c) Earthquake, if occurs beneath the sea creates tremendous waves on the surface of the water.

Volcanoes : The molten rocks of the interior of the earth finds its way to the surface through the cracks or weak points of the lithosphere. These ejected materials are known as lava which gradually accumulates in the surroundings areas of the cracks or openings and forms a high landform which is known as volcano. The volcanoes may be classified into three types viz, Shield volcano, Cinder cone and Mixed cone.

South America, the Mexican Plateau of Central America, the Mongolian and the Tarim Plateau of Asia are examples of this type of plateau (Fig. 34).

(b) The Piedmont Plateau : This type of plateau is formed at the piedmont of high mountains. Due to extensive weathering in the mountainous slope, the eroded materials are deposited in the lower slopes of the mountains creating an extensive plain land which is known as Piedmont Plateau. However, the lower part of this type of plateau joins with the adjacent plain lands. Colorado located in the south western tip of the Rocky Mountain of the United States of America and Patagonia of South America are the Piedmont plateaus.

(c) The Continental Plateau : The vast high plain land enclosed by seas or lowlands are known as Continental Plateau. This kind of plateaus do not have any relation with the mountains. Arabian Peninsula, Spain, Australia, Greenland are the best examples of this type of plateau.

The population is very thin due to rugged relief and dry climate. However, these plateaus are rich in different minerals like tin, copper, etc. Moreover, hydroelectric plants have also been established in the rapid flowing rivers of the plateaus.

Plains

An extensive high land above the sea level with gentle slope is known as Plains. Here, the plain means the land which is less rugged. This type of plains have been formed by the erosional and depositional work of different landforming activities like river, glacier, and wind. Gently undulating land with less rugged relief is most suitable for agriculture, settlement and road construction. So, dense settlements have been developed on the plain lands.

On the basis of the origin of the plain land, the plains have been classified into two as erosional and depositional.

Plains formed by erosion : This type of plains are formed due to continuous erosion accomplished by river, wind and glacier. The upper rocks are eroded gradually and the lands with steep slope are transformed to plains (Fig. 35). The plains at the foot of the Appalachian and the Siberian plains are the glaring examples of this type of plains. Madhupur and Barind region are the two examples of such plains formed by erosion in

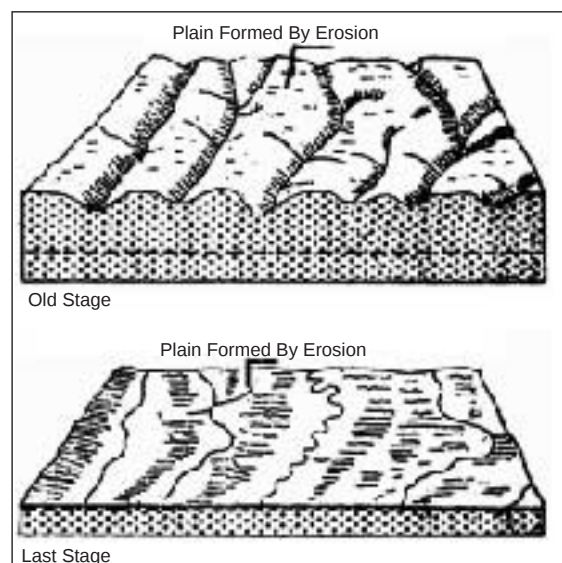


Fig. 35 : Plains formed by erosion

4. The cause of the formation of the Delta –

- i. Through the deposit sediments of both sides of the river
- ii. The layer of the river through deposition at the bank of the river
- iii. Rivers through their mountainous course can form valley

Which one is correct below?

- a. i b. ii
- c. iii d. i, ii and iii

5. Which statement is correct against plateau?

- a. The volcanic lava at the mouth of the river through deposition creates
- b. The sediments are deposited by sluggishness the transportation power of river creates high landforms on the bank of the river
- c. The volcanic lava by the process of weathering and denudation in the old mountainous regions form the plain landforms
- d. This type of plains are formed due to continuous erosion accompanied by river, wind and glacier

Creative Questions

1. The earth is not equal everywhere. There are high mountains and plateaus. In some places there are hills and vast traces of plain lands. The high mountains through denudation formed plateau and plains. Again, a type of plain land is formed at the mouth of the river through deposition. Sometimes, different types of landforms are created by the ascending of the earth crust or by decaying. The delta in plains at the mouth of the river is very fertile. The Delta formed by the deposition of the river Padma, Brahmaputra and Jamuna is world famous.
 - a. What is formed at near to the mouth of the river through deposition?
 - b. State an important difference between fold mountain and laccolith mountain.
 - c. By drawing the map of Bangladesh identify the plain lands formed through river deposition in the south-western part of Bangladesh.
 - d. Analyze the economic importance of this plain lands formed at near to the mouth of the river.

this, loses less amount of energy. On the other hand, the condition is just the opposite in the polar regions, in other words, the polar regions lose more energy than what they receive. The solar energy tries to bring equilibrium of this unequal distribution of insolation through the wind movement and the ocean currents.

The controlling factors of insolation : The amount of insolation that any portion of the earth's surface gets in a day will depend on two factors viz., (a) The intensity of insolation depends on the verticality or the inclination of the sun's rays, (b) Duration of the day in comparison to night and the solar radiation. With the changing positions of the sun, the above two factors act separately from the equatorial region to the poles in different latitudes and in different seasons.

In figure 38, it is observed that the intensity of the vertical rays is greater as it passes through a comparatively thinner layer of atmosphere and it concentrates in a smaller area. The different latitudes lying between the Tropic of Cancer and the Tropic of Capricorn get vertical rays at noon. On the other hand, the oblique solar rays pass through a thicker layer and it covers a larger area. Due to these two reasons, the intensity of solar rays during summer is more than that of the winter. Again the intensity of morning and afternoon rays is less than that of the noon's rays.

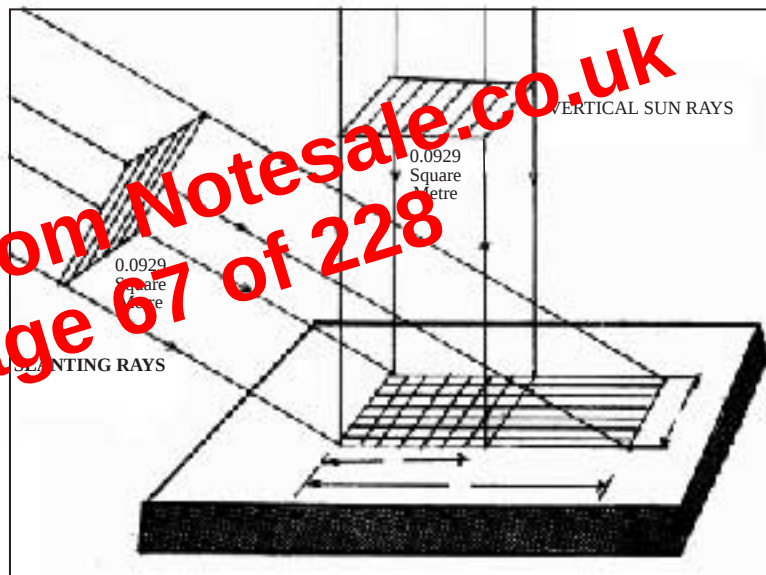


Fig. 38 : Incidence of sun rays

The earth's crust gets sufficient time, if the day is long, to receive more solar energy and consequently both the earth's crust and the atmosphere become warm. On the other hand, if any place, the nights are longer, then that place remains cold as it receives less amount of insolation due to short duration of day time.

Air temperature : The warmth and the coldness situation of the atmosphere is the air temperature. The sun's rays or the solar energy is the major reason for such warmth or coldness of the atmosphere.

The value of pressure is shown as milibar (mb). At the sea level, this pressure of the air is about 6.7 kg. per 6.45 square centimetres. The pressure of the wind decreases with the increase of altitude. Sea level height is internationally accepted as zero (0) height to measure the air pressure. The pressure of the wind is measured by an instrument known as Barometer. The lines joining the places on a map having equal average pressure is known as Isobar. The air moves from high pressure area towards low pressure area.

Due to difference in temperature and pressure the air moves from one part of the earth to another. This movement of the air is known as wind. The wind has certain specific characteristics as follows :

1. The cold and heavy air moves from the areas of high pressure to low pressure area.
2. According to Ferrel's Law, the air moves towards right in the northern hemisphere and to wards left in the southern hemisphere.

The wind system of the earth can be divided into four types. These are Planetary wind, Seasonal wind, Local wind, and Irregular wind.

Planetary wind : These winds being controlled by the pressure belts, blow towards the same direction throughout the whole year. The planetary wind is of three types such as the trade wind, the westerlies and the polar wind. The planetary wind system has been shown in fig. 41.

The trade wind : The sun's rays fall vertically over the equatorial region, so the air becomes hot and goes upwards. Since the pressure is less upward, the rising air gets room for expansion and consequently the air becomes cool and dense. The cool air could not come down directly due to warm air at the bottom. As a result, the air moves towards north and south directions through the upper atmosphere. Moving upto 30° latitudes some part of this air finds its way to come downward and blows towards the equatorial low pressure belt. This part of the air is known as the Trade Wind. According to Ferrel's Law, the trade wind blows from north-east in the northern hemisphere and south-east in the southern hemisphere. The trade wind of northern hemisphere is known as North-East Trade Wind and that of southern hemisphere as South-East Trade Wind. The sky remains clear and the weather is hot and dry as this trade wind originates in the high pressure zones. The big deserts of the world are situated nearer to this area. For example, the Sahara desert, the Lybian desert, the Arabian desert in the northern hemisphere and the Kalahari desert in the southern hemisphere can be mentioned.

a regional air. This mainly prevails in south and south-east Asia. Besides, that the monsoon is also observable in North Australia, part of Africa and in the United States of America. During summer a low pressure is formed due to excessive heat along the mid-latitudes or in the north-west of the Indian sub-continent. Hot and moist air from the adjacent oceans blows towards the continent. According to Ferrel's Law, after crossing the equator this wind is transformed into the south-west monsoon. This wind being obstructed by the high mountains, causes heavy shower on the land.

During winter the interior part of Asia remains very cold and so there creates a high pressure cells. The cold air blows from the north-east high pressure area of the landmass towards the low pressure zone of the ocean. As this air originates in landmass, it is dry and it doesn't contain any water vapour. This is why the Central and South Asian regions remain dry in winter. However, when this blows over the Bay of Bengal it acquires great amount of water moisture and ultimately causes shower to the coast of Sri Lanka and Tamil Nadu. This air, however, when crosses the equator according to Ferrel's Law blows over North Australia as the north-east monsoon and acquires large amount of water moisture from the Indian Ocean causing heavy shower to northern Australia.

Land and Sea Breezes : In the coastal regions, the temperature of local landmass increases with the advancement of the day and a low pressure is established locally and comparatively the cool air from the adjacent sea blows towards the land (Fig. 42).

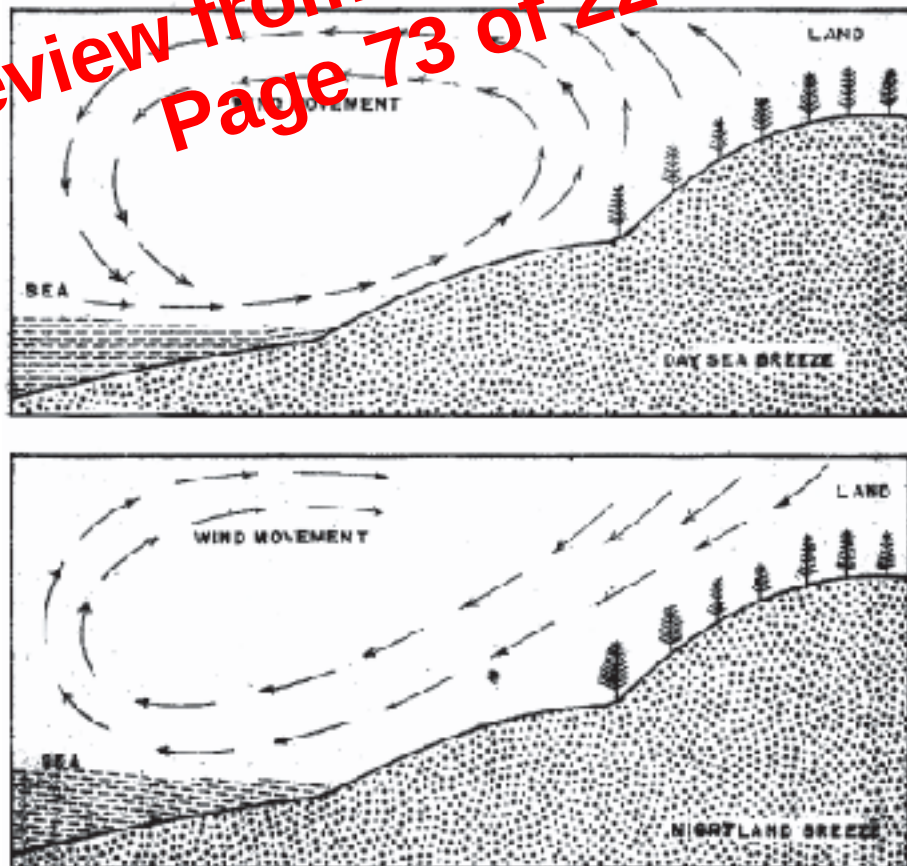


Fig. 42 : Land and sea breezes

This is known as sea breeze. The velocity of this air reaches to its maximum in the afternoon. The air blows from the high pressure zone formed over the ocean towards low pressure area over the landmass as the temperature in the afternoon increases.

After the sun set, the landmass cools quickly in comparison to the ocean. During that time, the high pressure prevails over the landmass. So, the air moves from the high pressure area formed over the landmass towards the ocean (Fig. 42). This is known as the Land Breeze.

Local Wind : The wind which is created due to the difference in diversity of landscapes and in temperature is known as local wind. There are about several hundreds of such local winds such as the valley and the mountain breeze.

Valley and Mountain Breeze : A special type of wind movement is found to occur in the mountainous regions due to the relief of the land. During the day time, the sides of the mountains become more warmer in comparison to the bottom of the valley. As a result, the high pressure prevails at the bottom of the valley and low pressure on the sides of the mountains. The wind which is found to rise upwards along the slopes of the mountains during day time is known as valley wind (Fig. 43).

During night time, the slopes of the mountains cool down due to radiation. At this time, the valley floor remains comparatively hot. So, the cool and heavy air comes down the slopes of the mountain. The wind which during night time moves along the slope of the mountains towards the valley floor is known as the mountain breeze (Fig. 43).

Irregular Wind : In some places, the air pressure decreases and low pressure is formed due to high temperature. Again, high pressure is localised in some places due to much coldness. The wind movements thus formed is known as Irregular Wind such as : cyclones and anti-cyclones.

Atmospheric Humidity and Precipitation

Humidity is the amount of water vapour present in the air. The humidity of the air can be expressed in two ways such as, absolute humidity and relative humidity. Absolute humidity refers to the amount of water vapour per unit volume of air.

On the other hand, relative humidity represents the amount of water vapour actually

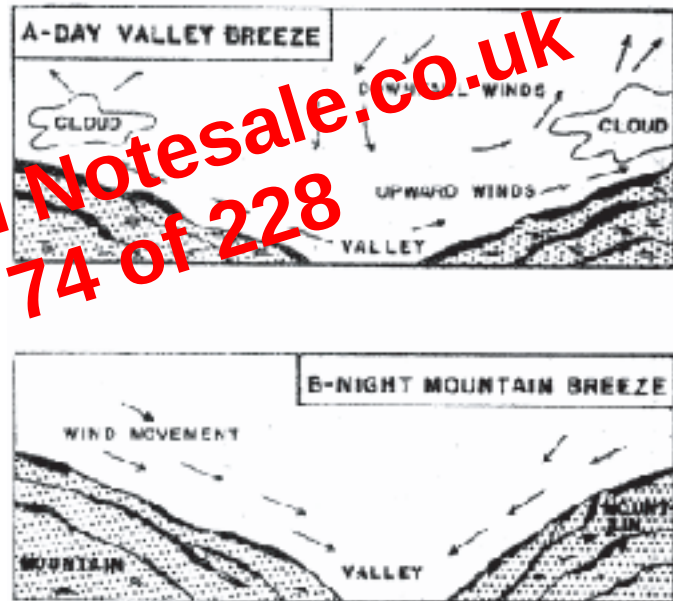


Fig. 43 : Valley and mountain breeze

Chapter Three

The Hydrosphere

Definition : The hydrosphere is the mantle of water which covers the lower parts of the surface of the globe. The hydrosphere covers 71 per cent of the surface of the globe. Its area is about 36.25 lakh square kilometres.

The hydrosphere is formed of oceans, seas, gulfs, lakes etc. The great stretch of open water is known as Ocean, the smaller areas less than ocean are the seas. The open stretch of water surrounded on three sides by land is the bay while the gulf is surrounded by land almost on all sides. The lakes are the stretches of water surrounded by land.

The Oceans

There are five oceans in the world. These are : the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Arctic Ocean and the South Ocean. Of these, the Pacific is the largest ocean having an area of 16 crore and 60 lakh square kilometres. The average depth of the Pacific is the highest being about 4,270 metres. The Atlantic Ocean is the second largest ocean having an area of 8 crore and 24 lakh square kilometres although its place is third in respect of average depth. There are many semi-circles seas in the Atlantic having indented coastline. The Indian Ocean is about 7 crore and 36 lakh square kilometres in area and its average depth is 3,962 metres. The Arctic Ocean or the North Ocean surrounds the north pole. The southern part of this ocean is surrounded nearly all over by North America and Eurasia. The North Ocean is 1 crore and 50 lakh square kilometres in area and the average depth is 824 metres. The South Ocean is 1 crore 47 lakh square kilometres with average depth of 149 metres (Fig. 48).

Table 2 : Area and average depth of the oceans.

Oceans	Area (square kilometres)	Depth (metres)
Pacific Ocean	16 crore 60 lakh	4,270
Atlantic Ocean	8 crore 24 lakh	3,932
Indian Ocean	7 crore 36 lakh	3,962
North Ocean	1 crore 50 lakh	824
South Ocean	1 crore 47 lakh	149



Fig. 52 : The political region of the world

Europe

What we learnt from this chapter :

Location, Area and Coastline : Europe is located in the temperate zone. The area of Europe is about 2,32,27,496 square kilometres. The coastline of Europe is very much broken and long.

Physiography : Europe can be divided into four regions according to its physical structures such as (1) The Mountainous Plateau of North-West Europe, (2) The Great Plain of Central Europe, (3) The Plateau of Central and West Europe, and (4) The Mountainous Plain of South Europe.

Climate : The climate of Europe is divided into four types such as (1) The Tundra Climatic Region, (2) The Temperate Climatic Region of North-West Europe, (3) The Continental Climatic Region of East Europe, and (4) The Mediterranean Climatic Region.

The Political Divisions : The continent of Europe is consisted of 46 small and large states. In the north-west region, there are Norway, Sweden, United Kingdom, Iceland and Ireland, Finland, Estonia, Latvia and Lithuania in the Baltic Region. Belgium, Netherlands, Luxembourg, France, Denmark, Germany and Poland in the plains. In the eastern region, there are European Russia, Belarus, Ukraine and Moldova; in the Trans Caucasian region there are Georgia, Armenia and Azerbaijan; in central European region there are Czech, Slovakia, Romania; Hungary, Austria, and Switzerland, and in the Mediterranean region there are Portugal, Spain, Italy, Vatican City, San Marino, Albania, Greece and Malta.

Exercise

Multiple Choice Questions

- Which one of these below is the Scandinavian Capital?
 - London, Dublin and Edinburgh
 - Stockholm, Oslo and Helsinki
 - Paris, Brussels and Bonn
 - Prague, Bucharest and Vienna
- Which of the European Country below is enjoying the Continental Climate?
 - Denmark
 - Portugal
 - Turkey
 - Georgia
- The varieties of climates of different parts of Europe mainly contributes
 - The latitude of Europe is between 35° North to 71° North
 - The longitude is 25° West to 66° East
 - The differences of the physical structures in different parts of Europe

Which one is correct below?

- i and ii
- ii and iii
- i and iii
- i, ii and iii

Two mountain ranges viz., Hindu Kush extending towards south from Pamir Knot and the other one towards south-west as Sulaiman and Khirthar. The Elburz mountain of north Iran and the Zagros mountain of south Iran have joined the Armenian Knot to the west. The Iranian Plateau is located in between these two mountains. The mountains of Pontic and Taurus originating from the Armenian Knot extend towards west. The plateau of Anatolia is between these two mountains.

3. The low plains of South Asia : The deposits of alluvial soil by the rivers of Tigris (Dazla) and Euphrates (Forat) basin of Iraq, Indus-Ganges-Brahmaputra basin of Pakistan, India and Bangladesh and Hwang Ho-Yangtze-Sikiang basin of China have developed this plain. Tigris and Euphrates plain slope towards south-east, the Indus basin towards south-west, the Ganges basin towards east, the Brahmaputra basin initially towards south-west then towards the south. The alluvial soil has made this plain very fertile.

4. The Plateau of South Asia : The Arab, Deccan and Indo-China plateau of the southern part of Asia is formed of old rocks. Most of the area of the wide Arab Plateau is barren and sandy and this plateau slopes to the east. The West Ghats Mountain is situated to the west of the Deccan plateau, East Ghats Mountain in the east and Vindhya range in the north. This plateau slopes to the east while the Indo-China Plateau slopes to the south.

5. The Volcanic Islands forming festoons down the east coast of Asia, there are rocky islands of Aleutian, Kurile, Japan, Filadieu, the Philippines and Borneo. Most of these islands are adorned with volcanoes.

Rivers : According to the flow, the four great river systems of Asia are as follows :

(a) Rivers flowing to the North Sea : The Obb (with tributary Irtysh 5,569 kilometres) and the Yenisey (with tributary Angara 4,989 kilometres) rising from the Altai Mountains and Lena originating from the lake Baikal (4,264 kilometres) flow to the North Sea. The mouth of the rivers remain frozen most of the time of the year.

(b) Rivers flowing to the Pacific Ocean : The Amur river (4,344 kilometres) originating from Yablonovy Mountain has flowed to the Orkhotosk Sea in the east. This river remains frozen for six months of the year. The Hwang Ho (4,668 kilometres) rises from the Kunlun Mountains and has fallen into the Yellow Sea. The Yangtze (5,525 kilometres) originating in the Tibet Plateau has fallen into the East China Sea. Yangtze is the longest river in Asia. The Sikiang rises from Yuanan Plateau of China and flows to the South China Sea. The Mekong river and the Menam both rise from the Tibet Plateau, have fallen into the South China Sea and to the Bay of Thailand respectively.

(c) Rivers flowing to the Indian Ocean : The Salwin (2,816 kilometres) river of Myanmar originating from the Tibet Plateau has fallen into the Bay of Martaban. The Irrawaddy (2,092 kilometres) rises from the Naga Mountains and flows through Myanmar falls into the Bay of Martaban. The Brahmaputra (2,896 kilometres) rises from lake Manash of Tibet and mingles with the Ganges flows through Tibet, Assam

Table 5 : Area, population, density and the capitals of the Middle East countries, 2010

Name of the Country	Area (sq. kms.)	Population (in crore)	Density of population (per sq. kms.)	Capital
I. Eastern Region				
Afghanistan	6,47,500	2.91	45	Kabul
Iran	16,48,000	7.51	46	Tehran
Total	22,95,500	10.42	45	-----
2. Central Region				
Iraq	4,37,072	3.15	72	Baghdad
Kuwait	17,820	0.31	174	Kuwait
Bahrain	665	0.13	1955	Manama
Qatar	11,437	0.17	149	Doha
United Arab Emirates	83,600	0.54	65	Abu Dhabi
Total	5,50,594	4.30	78	----
3. South Region				
Saudi Arabia	21,49,690	2.92	14	Riyadh
Yemen	5,27,970	2.36	45	Sanaa
Oman	2,12,460	0.31	15	Muscat
Total	28,90,120	5.59	19	----
4. West Region				
Turkey	7,80,580	7.36	94	Ankara
Syria	1,85,180	2.25	122	Damascus
Jordan	92,300	0.65	70	Amman
Lebanon	10,000	0.43	409	Beirut
Israel	20,770	0.76	366	Jerusalem
Palestine	6,220	0.40	643	Ramallah
Egypt	10,01,450	8.04	80	Cairo
Cyprus	9,250	0.11	119	Nicosia
Total	21,06,150	20.00	95	----
Grand Total	78,42,364	40.31	51	----

Source : World Population Data Sheet, 2010

Wheat is the main staple food of the people of this region. Wheat is grown in every country. Barley, maize, rice, millet, beet, cotton, tobacco, dates, silk, and different kinds of citric fruits are other agricultural products depending on places. Stock farming is also found in suitable areas.

Agricultural land in Afghanistan records one-fifth of its total land holding. The northern plains and river valleys in that country are widely used for farming. Sometimes irrigation is needed. Wheat, barley, rice, maize, beet, cotton and tobacco are the leading agricultural products and fruits as grapes, pomegranate, pear and walnut are also grown. Stock farming is also practised for wool and meat.

Iran's agricultural land accounts for only 10 per cent of the total land. Excepting the coast of the Caspian Sea and the Persian Gulf, crops are grown elsewhere by irrigation. Wheat, rice, maize, fruits, cotton, tobacco, opium, grapes and tea are the principal agricultural products. In the dry grassland, sheep and goats are tended. Fishing has developed considerably. Iraq is chiefly an agricultural country but only one, sixth of the land is used for agriculture. In spite of its soil being alluvial, the production is not very high. In the southern part barley, rice and date while in the northern part barley, wheat and juicy fruits are produced. Among the cash crops, cotton is placed next to date. Fine quality Egyptian cotton is grown in the area between the Euphrates and Tigris river. Kurdistan produces lot of tobacco. Mulberry plants are grown for silk worm in the district of Bagdad.

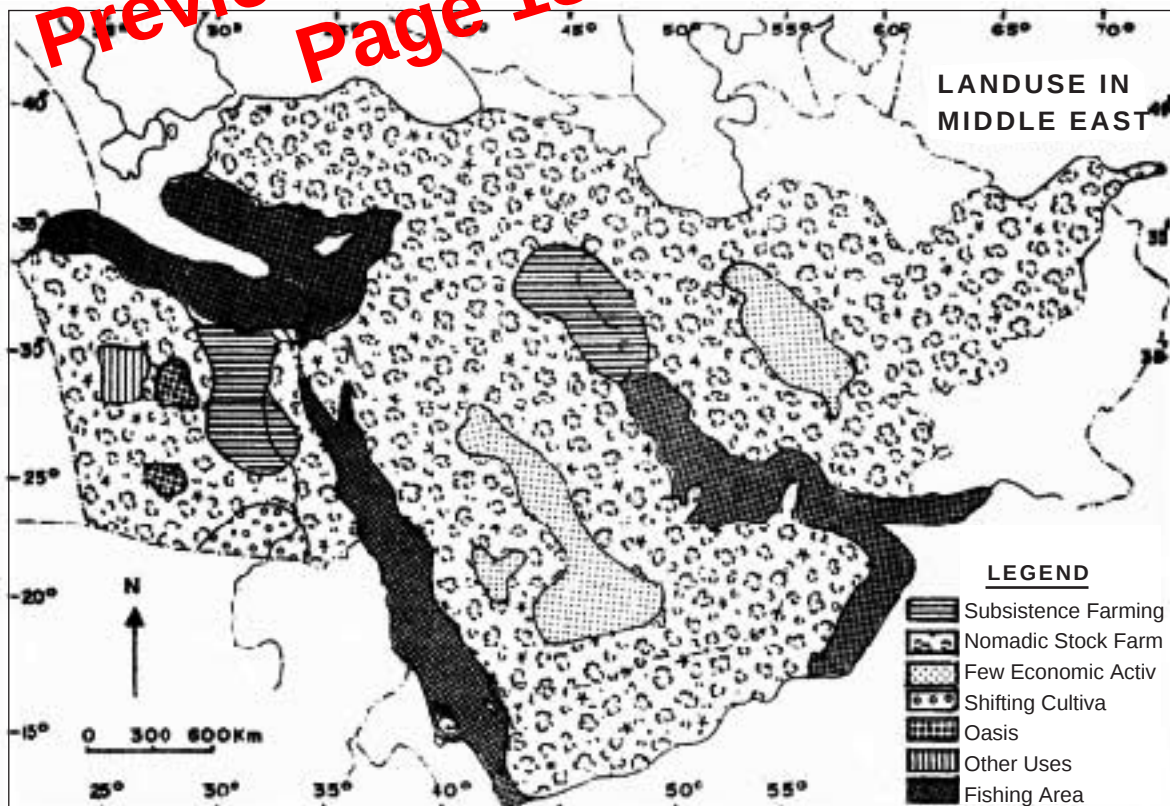


Fig. 75 : Landuse in the Middle East

The two rivers Tigris and Euphrates are lifeline of communication system of Iraq. Tigris is navigable round the year. The riverways have contributed considerably towards the development of trade and commerce in this country. The railways are extended northward from Bosra. Some of the railways are partly metre gauge. The railway stretching from Baghdad to Bosra is of standard gauge.

Turkey depends mainly on railway communication though it has 74,000 kilometres of roads. The trade and industry centres are connected by roads and railways. Airlines maintain communication between Ankara and Istanbul. Roads, railways and airways have developed in Syria considerably. Goods are transported by caravans of camels in the desert areas.

Lebanon has got roads, railways and airways. Roads and railways are developed in both the plains and mountainous regions. Standard gauge of railway lines are used in the plains while the mountainous regions have metre gauge lines. Beirut is the main airport.

Jordan has got roads, railways and airways. Camels are extremely used in the plateaus. Roads have passed through the settlement areas. The western part of the country has a long railway line having a number of branches. Amman is a principal airport.

The roads in the plains of Israel are straight and wide having been 3,500 kilometres long. The railway lines in Israel are of standard gauge.

Palestine: An agreement was signed in 1994 in the United States of America between Isaac Rabin, Prime Minister, Israel and Yasir Arafat, President, PLO on the understanding that self administered Palestine is formed of Samara and Jericho of Israel, the two occupied small cities located on the west coast of Jordan rivers and Gaza strip. The area of Palestine during that time was 2,410 square kilometres and the total population was only 17.31 lakh. At present, the total area is 6,220 square kilometres and the total population is 0.40 crore. Palestine has to depend either on roads or caravan of camels.

The principal cities of Saudi Arabia are linked by improved road communication. One can go from Jeddah to Mecca and Medina by motor car. Motorways have connected Nazaf near Baghdad with Medina while railway has connected Dahrain, a port in Persian Gulf, with Riyadh capital of Saudi Arabia.



Fig. 77 : Palestine

(a) Hills of the South-East : Rangamati, Bandarban, Khagrachhari, Cox's Bazar and the eastern part of Chittagong cover this region. The average height of these hills is 610 metres. The peak of Keokradong (1,230 metres) of Bangladesh is located in the south-eastern part of this region. Recently, another peak named as Tajiodong (Bijoy) of 1,231 metres in height has been discovered in Bandarban. This is now the highest peak of Bangladesh.

(b) Hills of the North and North-East : The heights of the hills in the north of Mymensingh and Netrokona districts, in the north-east of Sylhet district and the hills of the south of Moulavi Bazar and Habiganj are not more than 244 metres. The hills of the north are locally known as Tila. The height of these Tilas varies from 30 to 90 metres.

2. The Terraces of Pleistocene Period : The Pleistocene period is over 25,000 years old. The Barind of the north-west, the Madhupur and Bhawal Garh of the central part and the Lalmai hills or highland of Comilla district cover this region. It is thought that these terraces were formed during the Pleistocene period. The description of these highlands are given below.

(a) Barind : The Barind covers an area of 9,320 square kilometres in the north-western region of the country. The height of this region above the flood plain is about 6 to 12 metres. The colour of the soil is grey and red.

(b) The Madhupur and Bhawal Garh : The Madhupur Garh is situated in Tangail and Mymensingh districts and the Bhawal Garh is in Gazipur district. The area is about 4,103 square kilometres. The height of this region above the plain land is about 30 metres. The colour of the soil is grey and red.

(c) Lalmai Hills : The Lalmai Hills stretch from Lalmai, 8 kilometres to the west of Comilla town to Maynamati. This region covers an area of 34 square kilometres and the average height is 21 metres.

3. The Recent Flood Plains : Excepting the hills of Tertiary Age and the Pleistocene Terraces, the whole of Bangladesh is a plain land drained by rivers. Innumerable small and big rivers are found everywhere in Bangladesh. These rivers flow through the plain land causing floods during rainy seasons. This flood plain has been formed due to the deposition of the sediments brought down by the rivers for years together. The total area of this flood plain is 1,24,266 square kilometres.

1. Karnaphuli Hydro-electric Project : The Karnaphuli river is dammed at Kaptai in Rangamati and the water is harnessed to produce electricity. The project was constructed in 1962. At present, 120 thousand kilowatts of electricity is produced by three generators at Kaptai Hydro-electric Plant.

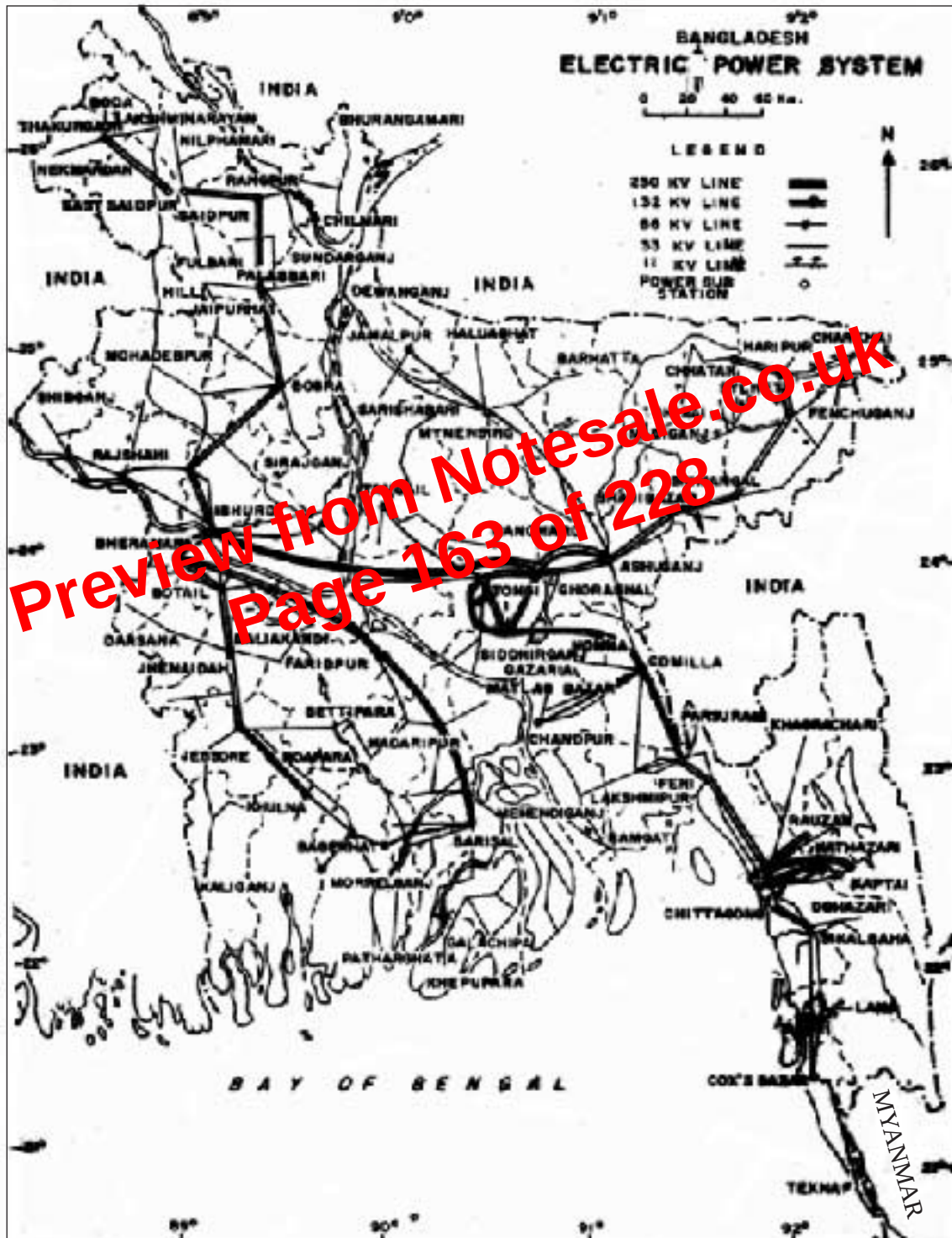


Fig. 85 : Electric power system of Bangladesh

4. Employment : Gas exploitation and discovery have created employment opportunities for many people. They are engaged in extraction of gas, well digging, maintenance and marketing etc.

Natural gas is thus being used in agriculture, in industries, and in domestic purposes. Natural gas is also one of the important sources of revenue. The government earns a remarkable portion of its revenue from natural gas.

Industries

The economy of Bangladesh is mainly agro-based. Though the country is agro-based, yet as a developing country, the importance of industries is no less. Bangladesh still is not rich in industries. The number of industrial units is small. The major industries are :

Jute industries : The geographical factors for the growth of jute industries are : climate, physiography, soil and the abundance of energy resources. The economic factors are the availability of raw materials, skilled and cheap labour force, market, capital, developed transport system and government entrepreneurship.

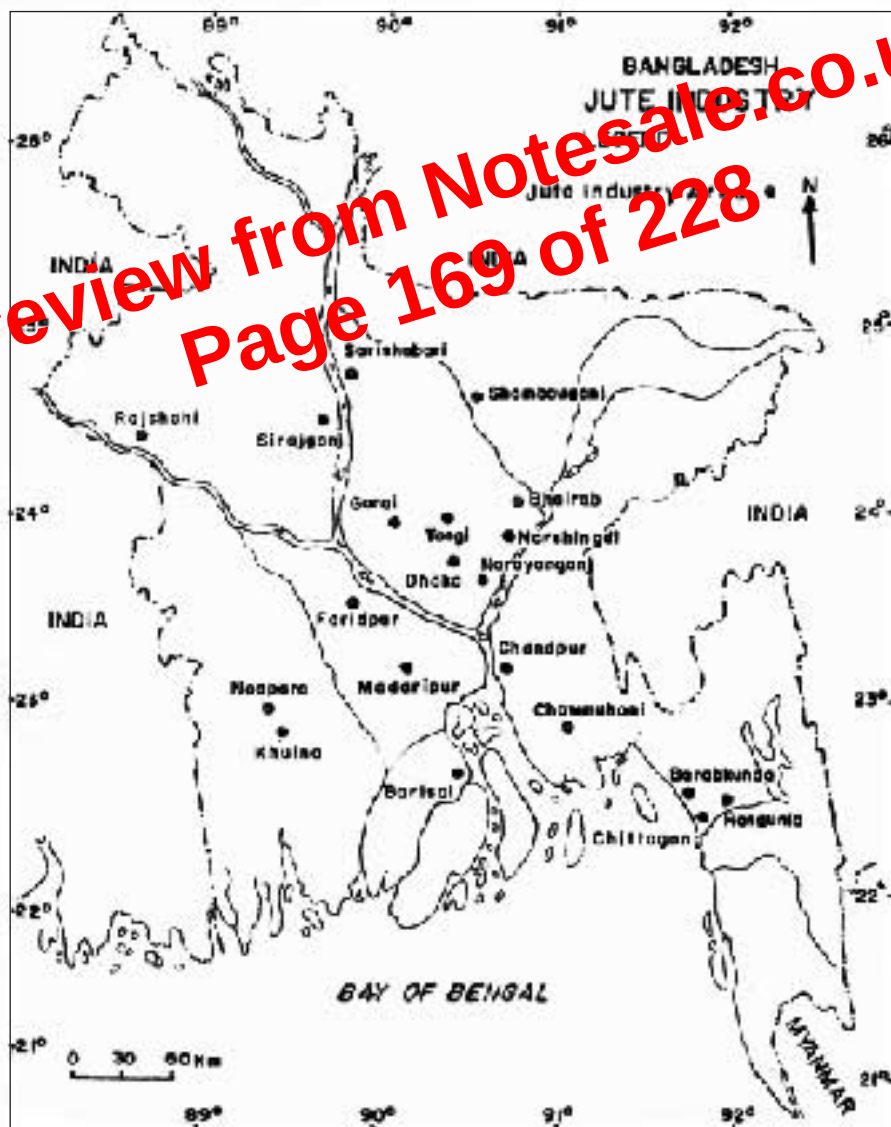


Fig. 88 : Jute industries of Bangladesh

is not available in required number, then the natural resources cannot be utilised properly and as a result the economic development is hampered. On the other hand, if the population is comparatively more than the available resources, then it becomes a burden or a problem for the country. Trained manpower is a resource for any country.

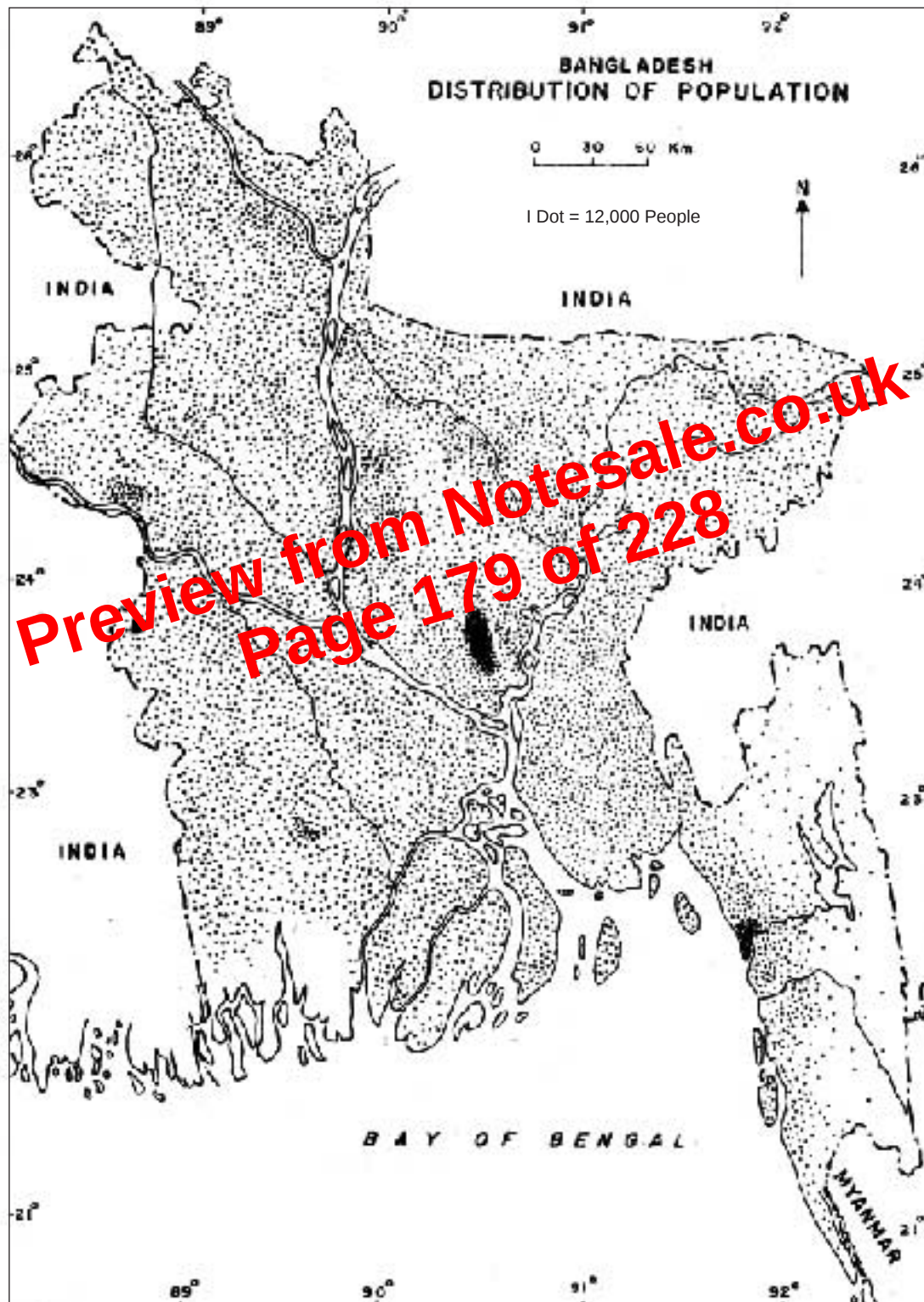


Fig. 92 : Population distribution of Bangladesh

Table 13 : Foreign currency earned through exports, Bangladesh, 2000-2010

(Million US Dollar)

Item	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
1. Ready-made garments	3364	3125	3258	3538	3598	4084	4658	5167	5919	4329
2. Jute and Jute goods	297	305	339	326	403	509	468	483	417	476
3. Frozen food	363	276	322	390	421	459	515	534	455	300
4. Leather	254	207	191	211	221	257	266	284	177	153
5. Chemical	97	67	100	121	197	206	215	216	280	149
6. Tea	22	17	15	16	16	12	7	15	12	5
7. Handicrafts	7	6	6	4	5	4	8	5	6	4
8. Others	2063	1983	2317	2995	3794	4995	6041	7407	8299	6126
Total	6467	5986	6548	7603	8655	10526	12178	14111	15565	11541

Source : Bangladesh Economic Survey, 2010, Table 49

Paper and Newsprint : Bangladesh after meeting the local requirements, exports paper and newsprint every year. At present, paper is imported for our own consumption.

Others : Other exportable items are naptha, furnace, handicrafts and agricultural products.

A comparative statement of the expenses for imports and the earnings from exports is presented in the Table 14.

We have not enough quantity of natural resources. But due to the shortage of capital and technical know how, the natural resources are not properly utilised. For this, there is no balance between imports and exports. During 2003-04, Bangladesh imported goods worth taka 64,262 crore and exported goods worth taka 44,812 crore. In 2009-10, Bangladesh imported goods worth taka 1,20,217 crore and exported goods worth taka 80,706 crore (Source : Bangladesh Economic Survey, 2010). Whole hearted co-operation is necessary to develop the economy of the country by increasing the exports and thereby to overcome the shortage in international trade. For this, increase in production, improvement of the quality of goods, reduction of the cost of production, reduction in internal consumption, reduction of export duties, development of transport system, wide advertisement of the exportable items are indispensable.

Table 14 : Imports and exports, Bangladesh, 1998-2010

(Million US Dollar)

Year	Import	Export
1998-99	8006	5324
1999-00	8374	5752
2000-01	9335	6467
2001-02	8540	5986
2002-03	9658	6548
2003-04	10903	7603
2004-05	13147	8655
2005-06	14746	10526
2006-07	17157	12178
2007-08	21629	14111
2008-09	22507	15565
2009-10	17191	11541

Source : Bangladesh Economic Survey, 2010, Table 49 and 51

Mineral Resources : Mineral resources are not abundant in Bangladesh. Coal, mineral oil, limestone, China clay, bronze, hard rock, silica sand, nuclear minerals, salt, sulphur, natural gas etc, are found in Bangladesh. Of all these, only natural gas is in abundant quantity.

Industries : Jute, textile, paper, fertilizer, sugar, and garments industries are notable industries in Bangladesh.

Population Resources : Bangladesh stands 9th in the world in respect of population. According to 1991 census, Bangladesh has got 11.15 crore of population with a density of 755 persons per square kilometre. The population growth rate is 2.17 per cent per annum. According to 2001 census, Bangladesh has got 12.93 crore, the rate of increase is 1.48 per cent and the density of population is about 876 persons per square kilometre. At present, the total population stands at 14.6 crore and the rate of increase is 1.39 per cent and the density of population is about 993 persons per square kilometre (Source : Bangladesh Statistical Pocketbook - 2009/2010, February 2010, Page 7).

Communication System : The classification of communication system of Bangladesh is as follows :

1. Land transportation : Land transportation includes roads and railways. The roads and railways of Bangladesh is 2,86,507 kilometres and 2,835.04 kilometres respectively.

2. Waterways : Waterways include river and ocean routes. Bangladesh has got 8,400 kilometres of inland navigable waterways. There are two sea ports, viz., Chittagong and Mongla sea ports.

3. Airways : Domestic and international services are available in Bangladesh. The main airport is Hazrat Shahjalal International Airport.

Trade

Major imported goods : The major imported goods are baby food, machineries, food items, industrial raw materials, agricultural implements etc.

Major exportable goods : The major exported goods are ready-made garments, raw jute, jute goods, tea, leather and leather goods, fish and frozen food, paper and newsprint.

5. **In what kind of environmental situation is the Sunderban build-up?**
- In the fertile plains
 - In the coastal region with sandstone
 - In the coastal region of mixed-clay
 - In the plain region of newly formed alluvial
6. **The most important role plays in respect to the strip of sandy land rising out of river bed in Bangladesh –**
- The change of the river direction
 - The change of the origin of the river
 - Frequent flood situation

Which one is correct below?

- | | |
|---------------|------------------|
| a. i and ii | b. i and iii |
| c. ii and iii | d. i, ii and iii |

Rahela's family live beside the river Padma. The sudden water flood has caused river erosion as a result Rahela's family along with other families become homeless. From the information above and your own knowledge about the flood in Bangladesh answer question number 7 to 9.

7. **Which one below is the cause of flood in the river Padma?**
- The water current originated from the Gangatri glacier
 - The ebb and flood tide is created in the Bay of Bengal
 - Heavy rainfall in the Sylhet region
 - Inadequate river dragging
8. **The best way to survive from the river erosion is –**
- Tree plantation beside the bank of the river
 - Dragging the river bed
 - Embankment at the bank of the river
 - To control the flow of the river
9. **The primary need for homeless Rahela's family–**
- | | |
|-----------------|-----------------|
| a. Relief | b. Safe Shelter |
| c. Medical Care | d. Loan |

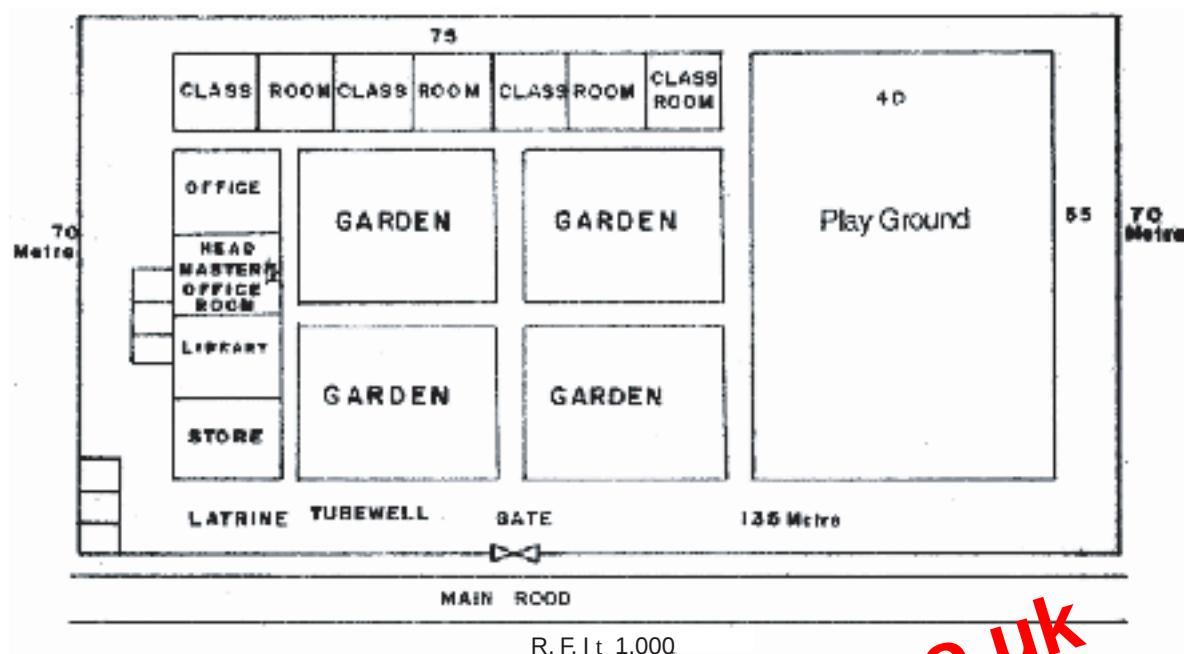


Fig. 101 : Plan of a school

Drawing procedure : Take a line of 13.5 cms. long and draw two perpendiculars of 7 cms. long at each end of this line to get the school premises. Leaving a space of 0.5 cm. to the north, 0.8 cm. to the east, 1.2 cms. to the west and 1 cm. to the south, the plan of the school has been prepared comprising of the school building, play ground and the garden (Fig. 101).

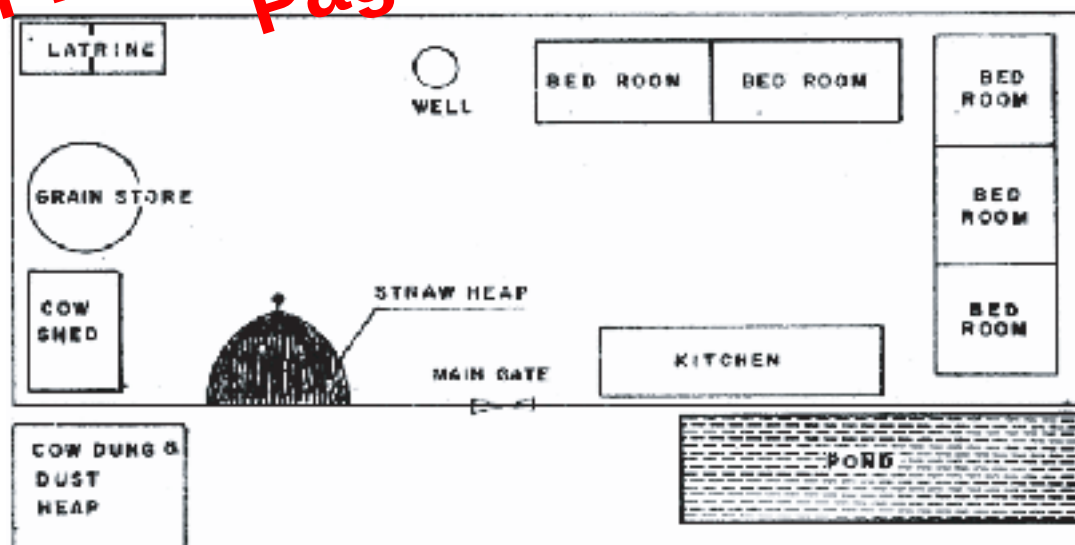


Fig. 102 : A model drawing of a house

Drawing of plans

What we learnt from this chapter :

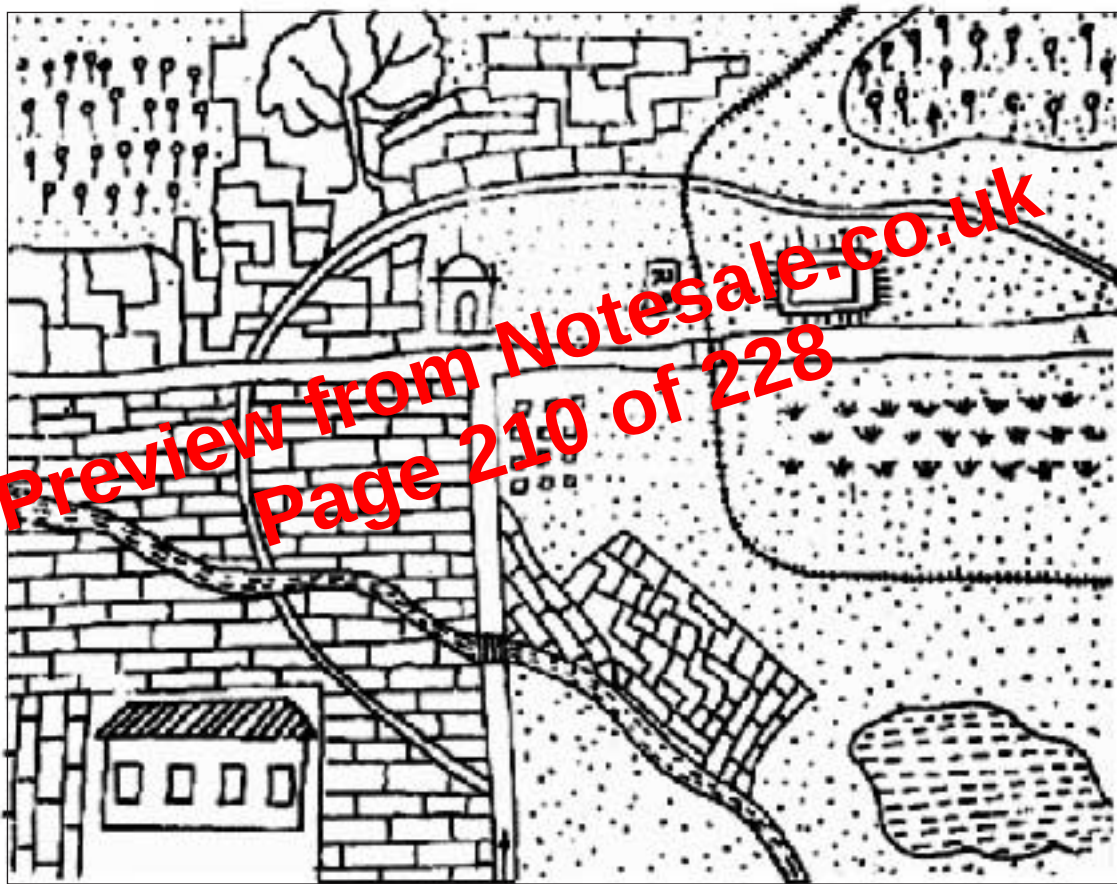
Plan : Representation of house, school, play ground etc. when drawn on some reduced scale is known as plan.

Plan drawing procedure : Measurements with the help of a metallic tape is to be completed first before drawing a plan of any area. A draft sketch of the area is to be prepared. According to a selected scale, the plan is drawn as that of the draft sketch. North line and the scale are to be drawn in the plan.

Exercise

Creative Questions

1. Answer the question from the given figure below.



- What is the figure about above?
- Why is it important for sketches? Explain.
- In the figure if you start from the arrow mark and reached at 'A' sign then in which face you will be off and during the course of your travel what are the things that will come in your notice? Explain.
- The figure above is a sketch give reasons for your answers.

Sample 3 : An outline map of Bangladesh is drawn and the broad gauge and metre gauge railways and their branch routes are shown on it (Fig. 108 c).

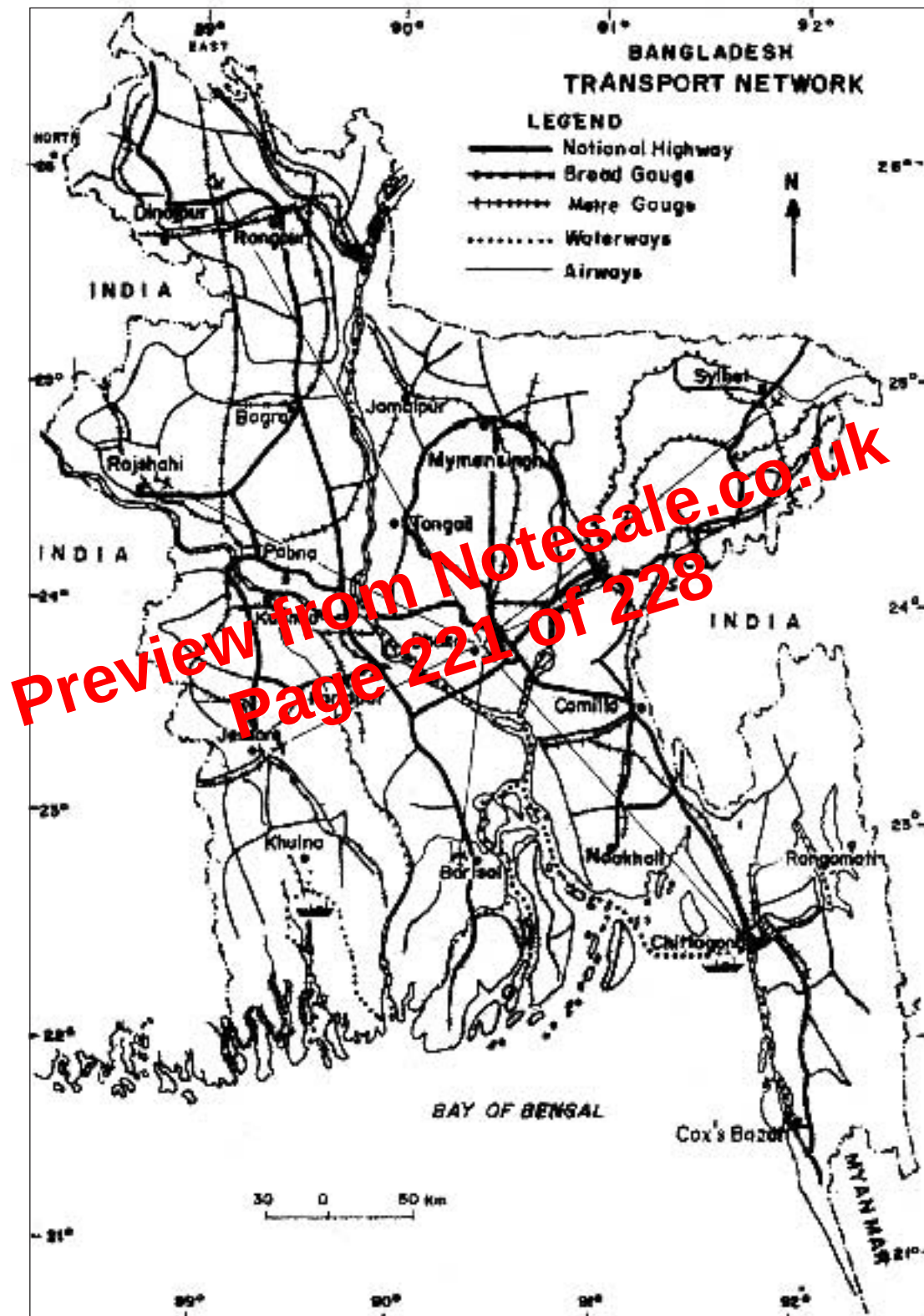


Fig. 108(c) : Drawing technique of Bangladesh