CHAPTER II

THE LAND.

Situation of Kerala:--

Kerala is situated on the south-western corner of India, stretching in a southerly direction from South Kanara along the west coast up to about 55 kms. north of Cape Comorin. It is a narrow strip of land lying between 8° - 18' and 12° - 48' N latitude, 75° - 52' and 180° - 18' E longitude.

Boundaries:--

The land is bound on the north and north-east by the State of Karnataka, east and southern limits by Tamilnad and the west by the Arabian sea. Only at two places Kerala does rise above the crest of the Ghats, in Wynad (a part of the Karnataka plateau) and in the Attapadi and Silent Valleys behind the irregular ridge stretching from Kundahs to the lofty hills north of Palghat.

Area and dimensions:--

The State is formed by the union of the former States of Travancore and Cochin and the district of Malabar of the former Madra's presidency. At present, Kerala has a total area
of 38,855 sq. kms. The State swells to the east in irregular widths ranging from a minimum of 11 kms. to a maximum of 120 kms., the mid width being 74 kms. From the farthest point on the east, the land tapers to the north and south in unequal lengths forming a scalene triangle with its base on the long coast line extending over 580 kms. The perpendicular length of the State comes to about 545.5 kms.

**Topography:**

The ever green area, full of streams and lakes had attracted the attention of travellers who have described it with great pleasure. Lieutenants Ward and Somer in their Memorir of the Survey of the Travancore and Cochin states, has described the country. Buchanan, the renounced English traveller has described the scenery of Malabar area as the most beautiful he has ever seen.

In respect of its physical features, the State may be divided into three distinct parts, each possessing its distinct characters. The divisions are (1) the high land (hills), (2) the middle land (plains) and (3) the sea coast.

**The High Land:**

The high land division comprises the western tracts
of the Western Ghats, which flank it on the eastern side. It forms in excellent natural frontier from Kasaragod in the north to Aramboli in the South, where they abruptly end. It is composed of a succession of ridges and peaks and presents a general irregular outline. The hills are of different elevations. Some of the loftier ones project much above the general line of the hills. They have a precipitous descent towards the west and are connected with a succession of low hills diminishing in attitude towards the coast. This feature is a fairly uniform phenomenon on the western coast of India.

In the northern Kerala, the Ghats maintain an average elevation of 1650 meters but occasionally soar up into peaks upwards to about 2650 meters high. From the extreme north, they run parallel to the coast, at a distance of some 32 kms. as far as Vaval hill abrest of Calicut. From there they turn sharply east wards and after bending northwards round the Nilambur valley, recede inland as far as the Veda hills, north of the Palghat gap. They rise again south of the gap in the Ten Malas or southern hills, some 1300 or 1660 meters high and gradually swell once more into the giant Anamalas. Mukurti (2555 meters) Nilgiri peak (2461 meters), Gulikal hill (2460 meters) and Anginda peak (2404 meters) are the highest
peaks of the Nilgiri boundary.

Towards south, the Ghats reach the highest elevation in the north-east of Anamudi peak, 2707 meters above the sea, the numerous heights clustering this part. This height is responsible for the English term High Range for this part of the western Ghats. South of this group are the Cardamom Hills and Pirmed, where the land spreads out to a plateau of considerable width with hills running up about 1220 meters with isolated peaks of which Agastymalai and Mahendragiri are the most important ones. The Ghats abruptly end near the Aramboly pass in south Kerala. Among the important isolated hills in the south are the Maruthumala and Velimala.

Detached from the main range, there are several outlying hills which break the monotony of the undulating laterite downs of the low country. In north Kerala, the most famous is the Mount Beli (245 meters), a few kms. north of Cannanore. From Quilon southwards, the secondary soften down into undulating slopes intersected by glens and valleys.
The Middle Land:

The middle land lies between the highland and the sea coast. From the Ghats stretching west-ward, in gentler slopes and gradually widening valleys, separated here and there by isolated low hills, the plains succeed the forest clad uplands. Intersected by numerous rivers and streams, dotted everywhere with houses and farmsteads, the plains stretch towards the back-waters in a succession of gentle slopes. Near the coast they merge with coastal plains and lagoons.

The Low Land: (Sea coast)

The coastal low land is more or less a level strip. It is situated along the narrow coast line and is characterised by stretches of sand and numerous lagoons and back-waters, developed by sand bars. To the north of Calicut, along the coast line, as far as Mount Eeli, is fringed with two cliffs alternating with reaches of sand and denuded headlands south of Calicut, the shore is one broken stretch of sand, partly thrown up by the waves, partly formed by the riverine deposits brought down by fast small rivers. The water
of these rivers form lagoons and backwaters between the sea. Some points like Kovalam and Thangassery projects into the sea. At Varkala are cliffs over-hanging the sea. On the southern side of the embouchure of Ashtamudi lake, the highland occurs.

**The Mud Banks:**

The mud banks occur along the sea board from Kotta river to Cape Comorin. The most remarkable of them are of Alleppey, Njarakkal, Calicut and Pantalayani - Kollam. The mud bank near Alleppey is 15 kms. long at a distance of 4.80 kms. from the sea-shore. The mud bank at Njarakkal extends about 5 kms. along the shore from the south to north and 7 kms. out to sea.

**Geology:** (§ 110 2)

The Geological features of Kerala is in consonance with that of South Indian geology. Three main geological formations can be recognised in Kerala with a north - south alignment. They are the Archaens, (2) the Warkalla and (3) the recent deposits. Their chronological sequence is as follows:-
Recent deposits - Quartenary
Warkalla - Tertiary (upper miocene to Pliocene)
Crystallines - Archaean

For stratigraphical classification, the state can be divided into four distinct zones. They are the following-

1) Crystalline rocks, consisting of representatives of Archaen group.

2) Residual laterite formed by the decomposition in situ of the Archaean crystallines.

3) The Warkalla formations - lignite bearing sedimentary beds with a laterite capping.

4) Recent formations - consisting of alluvial, marine and lacustrine deposits.

The oldest and the most prevailing rocks are of the Archaen. Different types of rocks of this group occur in Kerala. The Precambrian is represented by the basic dykes. The succession of the various formation of rocks of Archaean group is as follows -
B. Pre-Cambrian System

<table>
<thead>
<tr>
<th>Basic dykes</th>
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<tbody>
<tr>
<td>(e) Closepet granite</td>
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<tr>
<td>(d) Charnokite</td>
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<tr>
<td>(c) Peninsular gneiss</td>
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A. Archaean System

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<tr>
<th>Basement unknown</th>
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<tr>
<td>(a) Dharwar formation</td>
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<tr>
<td>(d) Champion gneiss</td>
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a. **Dharwar formations:**

The Dharwar formations are seen at south-eastern Wynad, north-west of Gudalur. They are represented by garnetiferous ferruginous quartzites, mica and talc schists. In South Malabar quartz beds and haematite bands are seen with the gneisses.

b. **Champion gneiss:**

Champion gneiss is seen in the south and south-east of Wynad with gold-bearing quartz veins and can be compared to the champion gneiss of Mysore.

c. **Peninsular gneiss:**

This is the most important and the most widespread
rock types found in Kerala. The important minerals that make the gneiss are quartz (clear and granular), feldspars (both monoclinic and trictinic), biotite (bown variety) and garnet. Decomposed garnets give rise to chlorite and iron ores. In Malabar the gneiss surrounding the Dharwar Schists is seen. In south Malabar, the gneiss are more fine grained and well laminated.

In central Kerala, the gneiss are more fine grained and the chief types present are biotite and hornblende. Other gneiss like saïgen, and black micaceous flotiated gneiss, were seen at certain places. In south Kerala, gneisses belonging to the peninsular suite occur which are made up of quartz, orthoclase and mica. Charkonites and leptynites are the most common gneiss in these areas. The exact relationship of the granetiferous gneiss (leptynites) and the peninsular gneisses found in Kerala is not clear.

d. **Charnokite**:

Charnokites are very widely distributed in Kerala. They are seen at South Wynad in north Kerala. In central Kerala they are the chief rock type, of the intermediate type. They have granulitic structure and devoid of garnets.
They are highly garnetiferous in the south. The leptynites overlie the charnockites in general. Although the prevailing rocks are leptynites in valleys and other depressions in south, no leptynites are seen in the north even in the deep valleys.

e. Closepet granite:

These are Archaean intrusives of the post charnockite age are found at two places in Wynad. They are intrusions of biotite and granite, younger in age to gneiss and belongs to either peninsular suite or closepet group.

B. Precambrian System:

I Basic dykes:

The basic dykes assigned to the Cuddapah age is found in Kerala. In north Kerala, basic dykes are seen at south Wynad. In central Kerala basic dykes of fine to medium grain having doleritic characters are seen at many places. Dolerite and gabbros are common in central and South Kerala. The dolerite is seen on either side of the gabbro dyke. Norite dykes are also very common throughout Kerala.
II Residual laterite:

The gneiss of Kerala weather into white, yellow or reddish felspathic clayey rocks which becomes laterites in many areas. But the change is not very sharp. The laterites of Kerala fall into two groups. (1) Residual laterites and (2) Sedimentary laterites.

A narrow zone of laterised rocks, (residual), exists to the west of the crystalline rocks that constitute the eastern boundary of the state. These rocks preserve the structure of its parent rock and is less compact. Below laterite layer lies a layer of Kaolin, which is the product of the complete decomposition in situ of the felspathic parent rocks, viz., granitiferous gneisses and charnockites.

III Warkallay formations:

To the west of laterite formations, the Warkkalay beads occur which is most conspicuous sedimentary bed occurring in Kerala. The features are almost the same to the other parts like bare, grass grown, long flat undulations of laterite. The Warkkalay beds extends to Cannore
and Tellicherry and northwards bordering the back-waters. At Quilon, a highly fossiliferous limestone is seen under lying the Warkkalay beds. The Warkkalay beds are tentatively dated to the upper tertiary age.9

IV Recent deposits:

The recent deposits occur on the west of both laterite formations and the Warkkalay beds, along the coast. It is seen on the sea level, marked by sandy and alluvial flats and along back-water or lagoons. These, widen northwards from Quilon, until at Alleppey, where there is a width of about 17 kms. of such formations, with the back-water which stretches far past Cochin, and is further continued to north through Trichur lake, the Taliparamba and Valarpattanam rivers to those on the Kadalundi river. To the south of Quilon and north of Calicut, this formation occurs as a very narrow strip bordering sea.

These formations, physiographically divide Kerala into three natural units.10 (1) The coastal low lands composed of recent sediments where the general elevation
is less than about 75 meters. (2) The foot hill zone composed of laterites, Warkkalay formations etc., the elevation of which ranges from 75 meters to 300 meters. The highlands of metamorphic rocks where laterization has not taken place and where the elevation is always in excess of 300 meters.

**Soils:** (P16, 10.3)

The soils of the state can be broadly classified into sandy, alluvial, laterite, red, black, peaty, forest and hill soils. The sandy soils occur as a narrow belt all along the coast. They vary in texture from sandy loams to pure sand and are highly porous. The alluvial soils are transported soils and is distributed at the entire tract of Kuttanad and the kole lands of Trichur and Mukundapuram taluks. They are heavy in texture, well supplied with organic matter, nitrogen and potash. They are acidic in reaction.

The laterite soil cover the largest area of the state. They are formed by the weathering mainly of acidic rocks under alternate wet and dry tropical conditions and are
Generally developed in regions of heavy rainfall over 250 cms and high temperature. They have versicular structure and the accumulation of hydrated oxides of iron and aluminium. These soils vary in depth from 1.8 meters to 3 or 4 meters, but vary in quality from rich loam to uncultivable laterite. The soils found at the hills are gritty and shallow, poor in organic content. The soils seen on the plains are deeper and of finer in texture containing fair quantity of organic matter and nitrogen. The reaction of these soils are acidic.

The red soils are found in a small part of Neyyatinkara taluk only. The deep colour of these soils are due mainly to hacunatite or anhydrous ferric oxide. They are loams of some kind and their reaction is acidic. The peaty or kari soils occur in the taluks of Ponnani, Kanyannur, Vaikam, Shertalai, Ambalapuzha and Kutanad. They are characterised by a deep black colour, high content of organic matter and very strong acidity. The forest and hill soils cover about 26% of the area of the state. They are characterised by a surface layer of organic matter derived from forest growths. These soils are rich in nitrogen, but poor in bases and acidic in reaction.
Climate:-

The diversity of the physical features of the state is responsible for the corresponding diversity of climate. The High Ranges have a cool and bracing climate throughout the year, while the plains are hot and humid. In the hottest months, the average maximum temperature is only 91°F. In the monsoon, when the sun is hidden in the clouds and heavy rain occurs, the dinural range of the thermometer is very limited, but the air is damp and chilley rather than cold. The atmosphere of the coast, in the hottest season never becomes heated like the inland due to the regular sea-breeze. The major part of the country is shielded by the Ghats from the desicating winds of the Deccan tableland. The whole state is watered uniformly by the numerous streams that have their source in the Ghats and flow into the back waters and lakes. The annual mean maximum temperature is about 88° and the mean minimum is 75°, the annual mean being 81°. The mean highest and the mean lowest are 95° and 67° respectively. The mean humidity of the atmosphere is 70% of saturation at the lowest and 88% at the highest.
Seasons:

The seasons of Kerala can be divided into six according to the native concept. They are (1) the Sisira kalam. (2) the Vasantha kalam, (3) the Greeshma kalam, (4) the Varshakalam (5) the Sarat kalam and (6) the Hemantha kalam.

The Sisira kalam starts in the end of January and continuous till March. It is distinguished by the excessive heat, especially in the month of March. The Vasantha kalam begins with the new moon in March and continues till May. This period is very hot with rain at intervals. The mean temperature rises to about 81° in March to 83° and in April to nearly 85°. The next season is Greeshma kalam which sets in with the new moon in May and continuous up to July. The south-west monsoon commences and continuous throughout this period. The temperature falls to about 78°. The average rainfall is the highest in the months of June and July. The Varsha kalam which comes next begins with the new moon in July and continuous to September. The rain during this season is moderate compared to the last season. This is succeeded by the Sarat kalam which ends in November. During this season, the north-west
monsoon is active, especially in the month of October.
The last season is the Hemantha kalam which lasts till January. This season is marked by moderate dews in some areas and rather heavy dews in others. Sometimes, few rains also occur during this season.

Rain fall:-

Kerala gets a heavy annual rain fall. The average level of rainfall is about 210 cms. The rainfall in the Malabar area is higher with an average of 290 cms. The central part of Kerala has an annual rainfall of about 270 cms. while in the southern parts of Kerala, it is little less, about 210 cms. As we move from the coast to the Ghats, there is an increase in the amount of rainfall. The main reason for the good rainfall is due to the western Ghats, which arrest the lower strata of rain clouds brought up from the Indian Ocean by the periodical winds of the south-west monsoon and the rain to precipitate in this region. In Kerala, the lowest rainfall noted is at Chittor (140 cms.) in Palghat district and the heaviest is at Athrimalai (525 cms.) in the Anamalais.

The south-west monsoon is strong in Kerala and it generally breaks out in May and lasts till August -September.
But towards the end of March and beginning of April, sporadic rain showers occur. But from June, it begins regularly. By the end of September the south-west monsoon passes away. Then by October the north-east monsoon sets in. It is not as strong as the south-west monsoon.

**Hydrology:**

The heavy monsoon rains in the area are drained by several small fast rivers running in a roughly north-east, south-west directions forming small dendritic patterns. They divide the whole Kerala into numerous ridges and valleys, dissecting the state. Most of them originate from the western Ghats and flows into the Arabian sea or into the back waters. But three of them (the Kabbani, Bhavani and Pambar) originating from the eastern side of the mountain, flows towards the east and form tributaries of Cauvery river. There are forty-one rivers in the state that drain the western part. Out of them, only four rivers exceed hundred and fifty Kms. The average length of the rivers is about 65 Kms. only. A short description of the important rivers from north Kerala to south is given below.
Valapattanam river:

Rises in the Periya mala in the north-west corner of the Wynad. It is 118 kms. long and enters the sea at Valapattanam, from which it takes its name.

Kotta river:

This river starts from the Western Ghats, runs for 74 kms, opens up a long chain of inland water ways.

Beypore river:

This is a 154 kms. long river which originates from the Western Ghats. It is formed by the union of three rivers - the Karimpuzha which drains from Mukutri peak, the Ponpuzha which originates from the Nilgiri - Wynad hills; all the three unite a few kms. above Nilambur and flow into the sea at Beypore, 10 kms. south of Calicut.

The Kadalundi river:

The Kadalundi river, which is connected with the Beypore river by a creek, flows down through the Ernad and Valluvanad taluks, originates from the wilds of silent valley. It empties into the sea at Kadulundi after a course of some 126 kms.
Bharathapuzha:-

This is the largest river running through north Kerala. It flows from the Anamalai hills, runs through Pollachi, traverses the taluks of Palghat and Ponnani and discharges into the Arabian sea at Ponnani. The length of the river is 250 kms.

Some of the less important rivers in north Kerala are (1) the Nilesvaram (76 kms. long) (2) the Ezhi Mala river (48 kms. long), (3) the Taliparambo (66 kms. long), (4) the Anjarakandi (64 kms. long), (5) the Tellicherry (22 kms. long), (6) the Mahe (54 kms. long), (7) the Elatur (51 kms. long), (8) the Agala Puzha (22 kms. long), (9) the Kallai (22 kms. long) and (10) the Chettuwaye.

In central Kerala, there are few important rivers. The chief rivers are the Periyar, the Chalakkudi and the Muvattupuzha.

The Periyar:-

This is the longest and largest of all the rivers in Kerala. It rises in an extensive forest in the Sivagiri
peak, 96 kms. south of Devikulam. It runs for 227 kms. At Alwaye, it divides itself into two branches, one flowing in the north-westerly direction into the back waters near the Oranganore bar and the other taking a southerly direction and joining the back-water near Verapoly. A branch from the latter flows to the south and discharges itself into the back-water to the north of Tripunitura.

The Chalakudi river:-

It rises from the Ghats beyond the Kondasseri forests and flows through wild and mountainous country as far as Kanjrapalli for a distance of 80 kms. It then empties itself into the right branch of Periyar at Blantikara, about 10 kms. to the east of Oranganore.

The Muvattupuzha:-

This river originates in the Peermade region and flowing through the Muvattupuzha taluk of the Ernakulam district, empties into the Vembanad lake. It runs for 120 kms.

The Parambikulam, the Kuriyar and the Sholayar are the tributaries of the Chalakudi river. They take their rise in the Ghats. The Karuvannur river which is formed
the junction of the Manali and Kurumali at Parakadavu, discharges partly into the Manakodi lake and partly into the Chetwa back water.

In south Kerala also, there are a number of rivers, most of them originating in the Ghats. The important ones among them are:

The Minachil:

It rises in the Pirmed plateau, a little above Nallatannipara and runs of 67 Kms. and joins the backwaters.

The Kallada:

Rises in the ranges that extend from Alavarkurichi to Chenchimmi in the Western Ghats and flowing through some of the taluks of Quilon district, empties itself in the Ashtamudi lake near Quilon. Its length is 112 Kms.

The Achankovil:

It is a tributary of the Pampa rising from the
Achankovil hill, it flows through Kunnathoor, Mavelikara, Thiruvalla and Karthigapalli taluks and joins the Pampa at Vijayapuram. It has a length of 116 Kms.

The Pampa:-

This river is formed by the union of several streams that rise in the High Ranges of Quilon district. After joined by the Achankovil river, it flows for a further length of 32 Kms. and dividing itself into several branches, flows into the Vembanad lake. It runs for a total length of 144 Kms.

Some of the less important rivers running through south Kerala are the Manimala (91 Kms. long), Thikkara (56 Kms. long), the Atingal (80 Kms. long), the Karamana (67 Kms. long) and the Neyyar (56 Kms. long).

Communications:-

Kerala has 821 Kms. of railways of which 517 Kms. are broad gauge and 304 Kms. meter gauge. These railways connect Kerala to the neighbouring states of Karnataka and Tamilnad. Kerala has a very good net-works of roads. The road length in the whole of Kerala comes to
These include 430 Kms. of National Highway, 2,137 Kms. of State Highway, 6,144 Kms. of District roads and 14,304 Kms. of other roads. The inland waterways play a vital role in the economic life of Kerala. The coastal reaches of the rivers, back waters and lagoons are interconnected by natural and artificial canals, having a length of 1,931 Kms, are good for navigation. Cochin is the only major harbour in Kerala. There are a number of minor ports in Kerala coastline like Alleppey, Quilon, Trivandrum etc. There are two aerodromes in the State, one at Trivandrum and the other at Cochin.

Kerala had many ancient ports, which were very important from the historical points of view. Through these ports, right from the ancient times, there were brisk trade between Kerala and West-Asian countries like Egypt, Rome, Greece etc.

Muziris:

Among the ancient ports of Kerala Muziris occupies a very prominent place. The port was situated on the Western sea board, and had enough facilities for communication with the interior, by the Periyar river which
opens into the sea. From very early times Muziris (Cranganore) was an emporium of trade and Phoenicians, the Egyptians, the Greeks, and the Romans had commence through this port. It is referred to as Murachipattanam in the Valmiki Ramayana, as Muchiri in Tamil works and as Muyirikode in the Jewish Copper-Plate of Bhaskara Ravi Varman. During the period of Second Chera Empire (800 - 1102 A.D.) and after it was known Makotai, Mahodayapuram and Mahodayapattanam.

The port continued to be an important one till recently. In 1341 A.D., a flood in the Periyar river choked the mouth of the harbour of Muziris.

Tyndis:-

Next important port was Tyndis. It has been identified by different authors as modern Katalundi, Ponnani and Pantalayani Kollam. "To the kingdom under the sway of Keprabothras" says the author of the Periplus Maris Erythreoi, "Tindis is subject, a village of great note situated near the sea. It lies near a river a river at a distance of 500 stadia north of
Muziris (about 90 Kms.). In Sangam literature Tyndis is referred as Tondi and poets have praised the port.

**Brace (Bacare):**

South of Muziris, Brace was a prominent port in ancient period. Some scholars identify Brace with Purakkad, ten miles south of Alleppey, while others identify it as a port on the mouth of the river Baris which has been identified with Pampa river. Pliny has described this port better than Muziris because it was free from pirates. The port was of considerable importance till the rise of Alleppey in the later 18th century.

**Nelcynda:**

Nelcynda was another port mentioned by ancient authors. Pliny mentions Nelcynda as Neacyndan after mentioning Muziris and according to him Neacyndan belonged to the Pandyans. Periplus also gives the same opinion. Ptolemy calls the place Nelkynda and locates it in the country of Aioi, identified by Caldwell with South Travancore. Some scholars identified the place with
Nindakara, others identify it with Niranam. In view of the fact that far reaching geographical changes have taken place on the Kerala coast since the days when Pliny and Ptolemy wrote their accounts, it is difficult to say anything conclusive on the identification of Nelcynda.  

There were many other important ports excluding the above mentioned ones commercially and in maritime. Balita situated between Bracé and Kumari is identified as Varkala and as Vishinjam, which was the capital of the later Ay kings. Another important port was: Naura situated north of Muziris is identified as Cannaore. The next important one is Mantai which is not identified so far. The other two on the Malabar coast were Vakai and Pantar. Pantar was identified by some scholars as Pontalayani Kollam.  

Back waters:  

Apart from the rivers, Kerala has a continuous chain of lagoons and back waters that runs parallel to the sea coast and receive water from the numerous streams and rivers. They make the communications very easy between northern and southern parts of Kerala. The biggest of the back waters is the Vembanad, which stretches from
Alleppey to Cochin, 51 Kms. long. Its extreme breadth is 14 Kms. and covers an area of 205 Sq.Kms. The most important lakes in north Kerala are Kumbala, Kallnad, Bekal, Kavai etc. The chief lakes of south Kerala are the Kayamkulam lake, 30 Kms. long and 16 Kms. broad and Ashtamudi lake, 16 Kms. long and both of them covers an area of 32 Sq.Kms. The Anjengo is 19 Kms. long and 4 Kms. broad.

Among the fresh water lakes, Shasthamcotta lake in the Quilon district is the most important one which covers an area of 2 Kms. There are a number of important lakes in Kerala like the Parur, the Veli, the Kathinakulam, the Manokkoti, the Ernakakkal, Chattanad, Cochin and Kaithappula.

The total area of the back water system amounts to 380 Kms. Usually a narrow strip of land, of a width varying from 11 Kms. to 25 Kms. separate them from the sea into which they pass their water by several outlets. On account of the large volume of fresh water received during the monsoons, the water is comparatively free from salt excepting near the mouth where the effect of sea tide is
markedly visible. The points where the back waters meet the sea are called "Azhis" and "Polis" according as the opening is permanent or temporary. The chief Azhis are those at Quilon, Kayamkulam and the mouth of the Periyar and the Polis are those of Veli, the Parur and the Edavakales.

Passes:-

The western Ghats which forms almost an unbroken wall guarding the eastern frontier of Kerala, has several passes which facilitated inter-state contacts by land. In the northern Kerala, there is the Perambodi pass which gives access to Coorg, the Periya and Tamarasseri passes open to Mysore and the Kakkur pass to Nilgiri district. The most important passes of all is the Palghat gap which is about 34 Kms. wide, which connects Kerala to the Coimbatore district of Tamilnad. The important passes in South Kerala are the Bodinaikannur pass which connects Bodinaikkannur of the Madura district with the High Range and leads to Devikulam. The Thevaram pass opens up to Madura and Gudallur from the cardamom hills. The Gudallur or Kumali pass, connects Piramede and Kanjirappally with Kambam and the Aramboly pass which forms an important entrance into the former Travancore. The Trunk Road from Tinnevelly to Trivandrum passes through it. Among the less important ones are the
Mottachimala pass, the Thirukkurangady Bridle pass and Yedamala pass.

Flora & Fauna:

The distribution of the flora and fauna depends chiefly on the topographical and climatal factors. For flora, the rainfall, humidity, the composition of the soil and the depth of the permanent sub-soil water supply are the most important factors. Kerala having a tropical climate, low lands intersected with rivers and back-waters, hills covered with scrubby brush wood and the Ghats with deceduous and evergreen forests, are suitable for a rich variety of fauna.

Flora:

Diversity, beauty and economic value are the special characteristics of the flora of Kerala. The rich forest soil, the heavy rainfall and the tropical climate to the bracing temperate climate, have contributed to the richness of the flora. The flora of the state can be divided into that of the highlands and the plains.
The flora of the highlands:

Owing to the difference in the soil and rainfall, the flora of the higher slopes and the plateau and the valleys of Western Ghats, which runs throughout the entire border of Kerala, is evergreen and have a splendid luxuriance of foliage and flowers. It is seen on the western and eastern slopes to an elevation of about 1300 meters. Here the trees grow to an immense size. The common trees in this area are irumbayam or urupa (Hopea parvifolia), white cedar (Dysoxylon malabaricum), red cedar (Acrocarpus fraxinifolia), poonspar (Calophyllum elatum), ebony (Diophyros ebenum), aini (Acrocarpus hirusuta), jack (Artocarpus integrifolia), iron wood (Mesua ferra), pali (Dichopsis elliptica), white dammer (Vateria Indica), teak (Tectona grandis), vendan kerana (Bignonia xylocarpa), irul (Aylia dolobriformis), maruthu and koramaruthu or tenbavu (Terminalia peniculata and T. Tormentosa), Mailellu (Vitex altissma), Cherupunna (Calophyllum tomentosum), benteak (Layerstraemia lanceolata) and Kunnivaka (Albizia odoratissium). Among other valuable timber trees are elavu (Bombax Malabaricum); Puvaum (Schleichera trijaga); pala (Alstonia scholoris), murukku (Erythrina India) etc....etc....

Urens and wild areca trees are conspicuous, as also
several species of rattan and two fine red bamboos, *Oxylemma thwaitessi* and *Teirostachyum Wightii*. In the Wynad area, the most characteristic feature is the growth of a variety of bamboo (*Bambusa arundinacea*) which covers the sides and many of the summits of the hills. Together with the above, is a sprinkling of timber trees of stunted growth such as jack, aini and black wood and a considerable quantity of small scrubby evergreen growth. On the uncultivated areas are screw-pine (*Pandanus Odoratissimus*), Melostoma Malabaricum and *Higodium* are seen. The coffee and tea flourishes from 825 meters to 1500 meters and it is planted extensively in the Wynad area and in the High Ranges. Over and above mentioned plants, there are different varieties of ferns, mosses and orchids in these areas.

**Flora of the plains:**

The plants of the plains and the lower slopes of the Ghats are generally classed as summer deciduous. But there is no demarcation possible between evergreen and deciduous forests, they are intermixed. The deciduous forests of the plains and the lower Ghat slopes stretch in a continuous belt along the foot of the Ghats from the northern extremity of Kerala to the end of Kerala's southern border.
The most numerous as well as the most noticeable tree in the sandy plains along the sea and the back waters is the coconut palm (*Cocos nucifera*), but most of the trees growing in the laterite plains are also seen here. In the latter mango (*Manifera Indica*) and jack (*Artocarpus integrefolia*) are abundant. The peepal tree (*Ficus religiosa*) and Champaka (*Michelia champaka*), the banyan (*Ficus bengelensis*) are also seen in plenty. Cashew nut (*Anacardium occidentale*), the Gold mohur (*Poinciana regia*) and neem (*Melia azadirachta*), silk-cotton (*Eriodendron anfractuosum*), the portia (*Thespesia populrea*), the Casuraina (*Casurina equisitifolia*), the tamirand (*Tamirandus indica*) and drumstick (*Moringa pterygosperma*). The other trees found usually are the bread fruit (*Arkokarpus incisifolia*), the nutmeg (*Myristica fragrans*), the bamboo (*Bambusa arundinaceae*) etc.... Besides cononut, the chief palms to be found are the areca or betelnut palm (*Areca catechu*), which is grown in all parts of the state; the bastard sago (*Caryota urens*), the talipot (*Corypha umbraculifera*) and the palmyra palm (*Borassus flabellifer*). The plaintain is grown in almost all the areas in the state. Commercially the most valuable trees in this zone are the teak (*Tectona grandis*), rose wood (*Dalbergia latifolia*), wengtek (*Longer stroemia microcarpus*), irul (*Xyilia dolabri-formis*), Karimarudu (*Terminalia tomentosa*) etc.
Among the cultivated plants for oils, the important ones are gingely, castor, veppu and lemon grass. Among the cultivated cereals, different varieties of paddy is in use. Ghama (Panicum miliaceum), cholam (Sorghum vulgare) and Kambu (Pennisetum typhoidium) are also cultivated. Among the pulses, horse gram and dal (Cajanus Indicus) are the only varieties cultivated.

Several kinds of vegetables are grown in Kerala. The chief among them are brinjal (Solanum melongena), lady's finger (Hibiscus esculentus), the bitter gourd (Mormordica charantia), the snake gourd (Trichosanthes dioica), cucumber (Cucumis sativus), pumkin (Cucurbita peop and C. maxima), and water melon (Cucumis colocinithum).

Different varieties of edible roots are cultivated in Kerala and the important ones are tapioca (Marripot utilissima), elephant yam (Arum campanulatum), chembu (Caladium esculentum), Kurka (Larendula carnosa), Kachil (Dioscorea alata), and sweet potato (Convolvulus batatas).

Among the spices, pepper, cardamom and cinnamon are the most famous ones. Plantations of rubber (Hevia Brasiliensis) is done on an elaborate scale throughout Kerala on the hill slopes and plains.
Fauna:

Kerala belongs zoogeographically to the great Indo-Malay or oriental region. Having a tropical climate, low lands intersected with rivers and back-waters, hills covered with scrubby brush wood and the Ghats with deciduous and evergreen forests, is very rich in fauna.

Mammals:

Among the monkeys, several species are found, residing on the well wooded Ghats and on the plains. The most common among them the Malabar langur (Semnopithecus hypoleucus), the Nilgiri langur (Semnopithecus Joshni), the Lion-tailed monkey (Macacus silenus), the Bonnet monkey (Macacus radiatus), slender Loris (Loris Malabaricus) etc.

The flying fox (Pteropus Edwassii) is seen in large flocks. Tiger (Felis tigris) are very rare. The cheetah or Panther (Felis pardus) is very common. There is a black variety of it (Felis melas), which are uncommon now-a-days. The fishing cat or large Tiger cat (Felis Viverrina), common jungle cat (Felis chaus), Malabar civet (Viveira civettina), common grey Mongoose (Herpestes mungo), Jackal (Canis aureus) are very common.
The Hyena (*Hyaena Striata*) is found in the forests. The water Dog (*Luta Nair*) is found in the back water. The large Bear (*Melursus lybicus*) and Meyer are also very common.

The little striped squirrel (*Sciurus palmarum*) is found everywhere. The jungle squirrel (*Sciurus Maximus*) is a handsome animal. Two species of Flying squirrel (*Pteropus*), are also seen. The Hare (*Lepus Nigricollis*), porcupines are numerous, the former in the hills and the latter in the plains.

The Gour (*Bos cavifrons*), is abundant in the Ghats forests. The other animals found in the thick forests are the most famous Indian Elephant (*Elephas Indicus*), Indian wild Boar (*Sus cristatus*), Indian cherrotain (*Trigulus meminna*), Nilgiri Tahr (*Hemitragus hylocuris*), the sambar (*Rusa equira*), spotted deer (*Cervus axis*) etc.

Among the domesticated mammals, the most common ones are the Ox, the Buffalos, the Pigs, Dogs, Cats, Goats, etc.
Birds:-

Game birds and birds of brilliant plumage are abundant throughout the state. They are seen on trees, on the sandy plains, the muddy marshes, on the sea, and in the back water; some being nocturnal, others diurnal, in their habits.

Among the order of birds of prey, Raptones, and the family of Valuttires is the largest. The Indian vulture (Gyps Indicus), Kestril falcon (Tinnunculus alaudarius), the most common kite, the pariah (Milvus govinda) and eagles like Brahmanee kite (Haliastur Indus) are very usually found in Kerala.

Owls of different varieties like Bulo Orientalis, white Owl (Strine Javanica) etc. are common. In the second order of perchers, the Bee - eater, the king Fishers (Iial eyonidae) and other varieties are numerous. Among the fly catchers, the paradise Flycatcher (Tebhtrea paradisi) holds a prominent place. Different varieties of shrikes also found in Kerala among which the king crow (Dicruria balicassius) and the long tailed shrike (D.retifer) are common. The Jurge Myrah (Eulabes religiosa) and the Brahmanee
Myrah (Temnuchus Pagodarum) are found in the jungles and in the plains respectively.

Crows of different types like the Indian Carrion Crow (Corvus culminatus), the Grey-Headed crow (C. splendens) are very numerous. The Hornbills (Hornburius bicornis) are seen in the forest areas and the Pied Hornbill (Hydrornis cissa coronata) is common. Parrots like the Ringed Parroolet (Palaearcisis torgulatis), the Blue winged parroolet (P. Columboides) and other varieties are usually met with in the jungles.

Woodpeckers like the Green Barbet (Megalaima Caniceps), the Royal Indian Woodpecker (Chrysocolaptes sultaneus) are the most abundant ones. The chestnut cuckoo (Centropus rufipennis) is very common. The Coel or Eastern Black cuckoo (Eudynamys Orientalis) is numerous. The jungle Fowl (Gallus sonneratti) and the spur Fowl (G. Spadiceus) and the Pea Fowl are abundant in the forests.

Different varieties of pigeons, snipes, sand pipers, ducks, gulls and birds are frequenting the back waters and rivers are seen in Kerala.
Reptiles:--

There are different species of land and water tortoise found in Kerala. The turtles like Chelonia Midas, the Hawisbill Turtle (C.imbricata) are not uncommon. The Crocodile (Crocodilus porosus) is frequently found. Lizards of different types are also seen in Kerala.

Snakes:--

Snakes are very common, except in the sandy tracts along the sea and back waters, where they are scarce. Majority of the snakes are harmless ones. One of the most poisonous snake is the spectacle snake, (Naja tripudians). The Russel's Viper (Vipera russelli) and the krait (Bungarus caeruleus) are also poisonous ones. The king Cobra (Ophio phaguelaps) is also seen in the state. A very common harmless snake is the Coryphodon Blumen buchii. The Rock snake (Python Molurus) is seen in the forests.

Fishes:--

The sea, rivers and back waters teem with fishes innumerable. The sardine fish is plenty along the coast. The Mullet Nair - fish, the Seir fish, the Mackenal are also plenty. In the back waters, prawn is the popular one.
The Karimin or black fish (*Sacco - branchus fossilis*) is popular. In the fresh water lakes, rivers, ponds and reservoirs, many kinds of fishes are present in abundance.
References:


6. Ibid.


10. Ibid. p.33.

11. Devassy, M.K: Ibid.


15. Ibid. p.27.

16. This is according to the 1961 census.

20. Menon Sreedhara; Ibid.p.60.
22. Ibid.
23. Ibid. p.57.
24. Ibid.
27. Kareem, C.K: Kerala and Her culture, an Introduction, p.4.
31. Finn Frank
33. Ibid. p.25.
34. Kinnear Narman, B: Popular Hand book of Indian Birds, pp.1-
36. Ibid. p.99.