

# **THE PEOPLES AND CULTURES OF EARLY SRI LANKA**

**A STUDY BASED ON GENETICS  
AND ARCHAEOLOGY**

**DR SIVA THIAGARAJAH**

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**THE PEOPLES AND CULTURES OF EARLY SRI LANKA**  
**by**  
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## ABOUT THE AUTHOR

Dr. Siva Thiagarajah is a medical doctor with a special interest in human genetics, archaeology and history, a well known writer and an independent researcher. A native of Jaffna, he had his early education at Mahajana College in Tellippalai and at St.John's College in Jaffna in Sri Lanka.

He graduated from the University of Ceylon with a degree in Biological Science in 1963; obtained his Medical degree from the Faculty of Medicine, University of Ceylon in 1969; received a degree in Psychiatry from the University of London; and in 1992 a doctorate from the University of London for his work on *Genetic Variation among the Tamils and Some Inherited Disorders*.

In 1980 he was awarded the prestigious *Doctor Green Memorial prize* by the Jaffna Medical association for his four-year work *A Study of Ectopic Pregnancy* conducted at the General Hospital, Jaffna 1976 – 1979. To-date he has published ten books including a popular book on medicine and a Tamil translation of the world's first book ever written in clay tablets 5,000 years ago in the lost Sumerian language and brought to light through twentieth century archaeology, *The Epic of Gilgamesh*.



# PREFACE

Discovering prehistory is the outcome of a scientific quest primarily involving the disciplines of Archaeology, Archaeogenetics (genetics of ancient populations), Anthropology, and Palaeontology (study of past geological periods and fossils); assisted by Geology, Environmental Studies, Epigraphy, Numismatics and Ancient Linguistics. The academically trained professional historian comes into the picture much later when he collates, compares, cross-matches, assesses, and evaluates the findings of the above mentioned disciplines, and based on his conclusions posits them into a cohesive story.

I am not a conventional historian. However, I have had a passion for history for the last fifty years and the subject still continues to fascinate me. I have worked as a medical doctor for the past four decades mainly for the job satisfaction and the financial security it offered. I have been trained in Animal Biology, Medicine, Human Genetics and Archaeology at universities in Sri Lanka and the United Kingdom, and my field of proficiency is Population Genetics. I believe I have the capability to approach this subject from an advanced scientific context, and still be able to convey it to the understanding of the ordinary reader to whom this work is generally intended.

The methodology employed in approaching this subject in this book is an integrated focus of evidence from several disciplines including 1.Archaeology, 2.Archaeogenetics, 3.Anthropology, 4.Palaeontology, 5.Geology, 6.Ecology 7.Early Epigraphy, 8.Ancient Linguistics, 9.Numismatics, and 10.Literary sources. I had the opportunity to attend an academic conference convened by the McDonald Institute for Archaeological Research in Cambridge in 2002. At this conference Professor Peter Bellwood introduced the term *triangulation* to refer to the simultaneous association of evidence from the three major disciplines of *archaeology*, *genetics* and *comparative linguistics* to examine the origins and dispersal of farming and languages. I believe that the same three disciplines are equally important to establish the prehistory of any land or people. I preferred to make this quest through a multi-layered *panoramic process* by adding the other seven disciplines to the above three fields as the major areas of enquiry in my quest.

Although I have presented this subject essentially from a genetic and archaeological perspective which I am most familiar with, from time to time I have to stray into the other disciplines, and on every occasion I have done so I have sought assistance from the professional or learned academic acknowledging my debt to him or her.

As highlighted in an article which appeared in a Sri Lankan Journal last year (*The Island, Mid-Week review 16 April 2010*), Sri Lankan History at present has gone out of the purview of the professional historian. It is not only classical scholars but any Tom, Dick or Harry feels capable of writing history. It refers to nondescript charlatans, including academics, inventing history to suit a particular political agenda, and in today's context, to re-write history of the Sinhalese and Tamil people. Several academics find no compunction in venturing into a discipline other than their own and making definitive historical assertions, without a shred of empirical evidence to support them. I have studiously avoided such works.

**M**ost of the Sri Lankan people both the Sinhalese and the Tamils, mainly through the writings of our early historians were made to believe that their island was originally some kind of barren land that was peopled by successive waves of migrants from India over the past three thousand years or so. While the Sinhalese story propagated by the *Mahavamsa* asserts that the first colonisers were North Indians, the Tamil writers assert with equal conviction that the South Indian seafaring peoples of a bye-gone age have established settlements here long before the arrival of Vijaya and his followers.

It is true that there were migrations of people from India to Sri Lanka not merely over the centuries, but over hundreds and hundreds of millennia, at first by the *Homo erectus* and later by the *Homo sapiens* type of humans. These prehistoric hunting-and-gathering Stone Age people were not only the ancestors of the Veddas, but were also the ancestors of those who first practiced pastoralism and settled agriculture in Sri Lanka.

**P**rehistory refers to a period in our life-story before the emergence of writing; and the **historic** period begins after its appearance. In Mesopotamia and Egypt writing had appeared more than 5,000 years ago, hence their history begins at that date. In South Asia although a

pictographic writing had appeared about the same period in the Indus Valley it has not been deciphered; and the decipherable Brahmi script appears only during the second half of the first millennium BCE, evolving into the regional scripts of South and South-East Asia. Hence our historians have decided to call the period following the appearance of the Brahmi script as the onset of our historical period. However, in the South Asian context, historians call the period between the appearance of the Indus Valley script and the Brahmi as our *proto-historic* period.

The prehistoric period is divided into Stone, Bronze and Iron ages. The Stone Age is further divided into Palaeolithic, Mesolithic and Neolithic periods, during which the technology was primarily based on stone. Economically, the Palaeolithic and Mesolithic periods represented a nomadic, hunting-gathering life-style, while the Neolithic period represented a settled food-producing way of life. The introduction of copper ushered in the Chalcolithic or Bronze Age.

**T**he invention of agriculture in regions like Mesopotamia and China 10,000 years ago and its subsequent passage or diffusion into India and Sri Lanka brought about dramatic changes in economy, technology and demography of human societies. During the hunting-gathering Stone Age stage, human habitat was confined to the forests, hills and rocky regions, which provided abounding animal food and abundant wild plants. The introduction of agriculture saw the relocation of human habitats into the alluvial plains, which had fertile soil and the availability of water resources. New dwellings and abodes to withstand the sun and rain, wind and storm began to appear. The hills and caves, jungles and forests which had so far been the areas of attraction became areas of isolation and segregation.

Agriculture led to the emergence of villages and towns and brought with it the division of society into occupational groups. *The First Urbanization* took place during the Bronze Age in the arid and semi-arid regions of northwest India in the Indus River valleys but for one reason or another did not progress to encompass the rest of India. However the science of irrigation and agriculture moved eastward from there into the Indo-Gangetic divide and the Gangetic valley, shifted down south to the Tungabhadra- Krishna- Godavari- Kaveri basins, and thence to the Tamraparni River plains and into Sri Lanka.

The introduction of iron technology during the latter part of the second millennium BCE brought about a proliferation of irrigated agriculture, rapid population growth and heralded the *Second Urbanisation* of the Indian Subcontinent characterized by the formation of social clans and castes, religions, towns, cities, kingdoms, trade, coinage, script and ushered us into the historical period.

**T**he early history of human habitations in many lands is based on myths and legends and this should not be regarded as true history. As you would realise when you read this book, the myth about the origin of the Sinhalese people mainly as the descendants of Prince Vijaya and his followers does not have any scientific credibility at all. Similarly the mythical stories created about Ravana as the Dravidian king of Lanka has no historical validity.

The Mahavamsa compiled by Bhikku Mahanama of the Mahavihara tradition sometime during or after the sixth century CE, chronicles our story during the millennium following the legendary arrival of Vijaya. It was essentially a religious document, based on oral tradition written for the 'serene joy and emotion of the pious'. As historian Kingsley de Silva observed, 'the Mahavamsa and its continuation the Culavamsa were works of bhikkus, and naturally enough were permeated with a strong religious bias, and encrusted with miracle and invention. The central theme of Mahavamsa was to portray the historic role of the island as a bulwark of Buddhist civilization, and in a deliberate attempt to underline this, it contrives to synchronise the advent of Vijaya with the parinibbana of the Buddha'. To the compiler of the Mahavamsa, Sri Lanka was occupied by non-human beings in the past and civilization only began with the arrival of Vijaya.

**A**rchaeology of Sri Lanka, which was a part of South India until 7,000 years ago, well substantiated by archaeogenetic studies had shown that intellectual and cultural refinement of the modern man began in this part of the world with the advent of the first *Homo sapiens* about 55,000 years ago. With additions of new migrants from time to time, the inhabitants went through Palaeolithic, Mesolithic, Microlithic and Megalithic phases. It has been established through genetic and anthropological studies that a biological continuum exists between the pre-historic and present day populations of South India and Sri Lanka.

**D**uring the eighteenth century, when European scholars discovered a close relationship between the languages of Europe and those of North India, the idea that all these languages were derived from one parent language and that they all belonged to a single family came to be accepted. Among the names given to this family were Aryan, Indo-European and Indo-Germanic. The term Aryan, commonly used in South Asia is based on the evidence in *Rigveda*, wherein we find that the people who composed and used the Rigvedic hymns were known as *Árya*. Soon it was assumed that all those who spoke the Vedic language Sanskrit, and later languages that were derived from it were Aryans. These people were also differentiated by the name Indo-Aryans, since the speakers of the related languages elsewhere, including those in Europe were also assumed to be Aryans. Thus from the outset, which appears to be irrational and unscientific at that time, language was equated with ‘race’.

Having equated language with ‘race’, it was easy for the scholars and others to talk about migration and invasions of Aryans in the same breath as the spread of Aryan languages. On the assumption that all the Aryan languages descended from a single parent language, linguists began to reconstruct this ancestral language. This reconstructed language was named Proto-Indo-European. Assuming that the speakers of this Proto-Indo-European were the original Aryans who migrated to different parts of Asia and Europe from their homeland, scholars began the search for this original homeland.

Several scholars, notably among them historian Romila Thapar (Bombay) and archaeologist Colin Renfrew (Cambridge) challenged the wisdom of equating race with language. Romila Thapar always insisted that “Indo-Aryan is a language label indicating a speech-group of the Indo-European family, and is not a term referring to a race. To refer to ‘the Aryans’ as a race is therefore inaccurate” (Thapar, R. 2002: *The Penguin History of Early India*, p.xxiii). Renfrew criticized the manner in which prehistoric archaeology has been used to claim an original homeland for the Aryans. “The existing homeland theories”, he argued, “make the fundamental mistake of equating the emergence of a new culture complex with the intrusion of a new linguistic group” (Renfrew, C. 1998: *Archaeology and Language*, London: Pimlico, p. 238).

Is there a relationship between languages and particular genetic groups? Is it possible to learn anything about language diversity – and to understand the present distribution of world’s languages from the study of genetics? In 1988 the world renowned geneticist Luca Cavalli-Sforza and his colleagues at Stanford University decided to test this hypothesis. He

and his colleagues collected and examined genetic data from forty-two worldwide populations and drew a tree of their relationships. The tree that resulted – in effect, a genealogical tree of the populations – corresponded very well with the known linguistic relationships. For example, speakers of the Indo-European languages tended to group together in the genetic tree, as did the speakers of Bantu languages in Africa. Although there were some inconsistencies due to language replacement, overall the genetic and linguistic groups tended to come together (Lugi Luca Cavalli-Sforza, 2000: *Genes, Peoples and languages*, Allen Lane, The Penguin Press). Several other genetic studies since have shown that particular languages are associated with particular genetic groups. The original carriers of the Indo-Aryan languages into Iran and India were people with the genetic marker M17 in their male Y-Chromosomes. All the millions of their male descendants in South Asia today carry this genetic marker.

**G**enetics is one of the most accurate scientific instruments of the 21<sup>st</sup> century for the study of our prehistoric ancestors. The ability to sequence DNA set off a revolution in biology that has been continuing to this day. The year 2003 saw the completion of a 13-year study by the Human Genome Project (HGP) which began in 1990. This is an international scientific research project with the primary goal of determining the sequence of chemical base pairs which make up DNA and to identify and map the approximately 25,000 genes of the human genome. This project was initially coordinated and funded by the U.S. Department of Energy and the National Institutes of Health. The project was headed by Dr. James D. Watson of the National Centre for Human Genome Research. Soon the Oxford Wellcome Trust Centre for Human Genetics (UK) became a major partner of the HGP. Several international governments came forward to participate in this project. Most of the government sponsored sequencing was performed in universities and research centres in the United States, United Kingdom, India, China, Japan, France, Germany, Canada and New Zealand.

During this period a working draft of the human genome sequence of the entire peoples of this planet Earth has been mapped and stored; about 25,000 genes in the human DNA has been identified; the sequence of three million chemical base pairs that make up the human DNA has been determined; several improved tools for DNA analysis and mapping were developed. The Human Genome Project has opened up two great avenues for human progress and research: (1). Knowledge of the effects of variation of DNA among individuals can revolutionize the ways to diagnose, treat and even prevent a number of diseases that affect human beings. (2). DNA studies had contributed to our understanding of human

prehistory, has provided an account of the spread and mixing of the human species from its origin in Africa and across the globe which is scientifically accurate.

The Genographic Project, conducted under the auspices of the National Geographic Society is entirely devoted to charting the migratory history of the human species by using sophisticated laboratory and computer analysis of DNA contributed by hundreds of thousands of people from around the world. The Genographic Project is a five-year research partnership led by National Geographic Explorer-in-Residence Dr. Spencer Wells, who was previously head of the Population Genetics Research Group at Oxford's Wellcome Trust, and was involved with the HGP earlier.

In this unprecedented and of real-time research effort, the Genographic Project is closing the gaps of what science knows today about humankind's ancient migration patterns. Dr. Wells and his team of renowned international scientists and IBM researchers are using cutting-edge genetic and computer technologies to analyse historical patterns in DNA from participants around the world providing better understanding of our human genetic roots.

For the first time the global demographic history of mankind, ever since the origins of Homo sapiens, is being scientifically brought to light. As Dr. Spencer Wells puts it "DNA research has revolutionized the way we think about biology, so it isn't surprising that it has had a significant effect on anthropology and prehistory as well." In this book I have tried my best to present an honest, unbiased view of this subject, and have simplified it as much as possible so that the average reader can follow the intricacies of the chromosomes, genes and the DNA; and what does their significance means to our understanding of our prehistory.

**S**everal academic giants from the fields of Archaeology, Anthropology, Archaeogenetics, Palaeography, History, Numismatics and Linguistics like Sir John Marshall, Sir Mortimer Wheeler, Professor Raymond Allchin, Professor Kenneth Kennedy, Professor John Lukacs, Professor Robin Coningham, Professor Gregory Possehl, Professor Peter Bellwood, Professor Colin Renfrew, Professor Arthur Basham, Professor Romila Thapar, Dr. Vimala Begley, Dr. Siran Deraniyagala, Professor Leslie Gunawardana, Professor Karthigesu Indrapala, Professor S.K. Sitrampalam, Professor Sudharsan Seneviratne, Professor Ponnampalam Ragupathy, Dr. Osmund Bopearachchi, Professor Paramu Pushparatnam,

Professor H.D.Sankalia, Professor B.K. Gururaja Rao, Dr.S.Nagaraju, Professor Luigi Luca Cavalli-Sforza, Dr. Spencer Wells, Dr. N. Saha, Dr. Gautam Kumar Kshatriya, Dr. Sangamitra Sengupta, Dr. Toomas Kivisild, Professor Asko Parpola, Dr. Jane McIntosh, Dr. David McAlpin, Professor Thomas Burrow, Dr. Kamil Zvelabil, Dr. Badriraju Krishnamurti and hundreds of others parade through these pages. Without their contributions it would be impossible to produce a work of this nature. I express my sincere gratitude to all these academic giants from whose works I have freely quoted. I am also greatly indebted to those academics and institutions who had granted me permission to use extracts from their studies and have allowed me to use their pictures and photographs appearing in this work.

I am deeply grateful to Dr. Ponnampalam Ragupathy for his advice and guidance during the preparation of this work. His extensive knowledge of South Asian history and archaeology has come to my aid time and again. I wish to express my sincere gratitude to Mr.Ramalingam Kurunathan for checking the entire text; to Mr. Vairamuthu Varadakumar, general secretary of the TIC, who is bringing this out in print; and to Anandamurugan for his help with the layout of this book

There is already a *magnum opus* on the prehistory of Sri Lanka, an accomplished work by Dr. Siran Deraniyagala. Dr. Deraniyagala had approached his subject mainly from an ecological perspective and had not dealt with the genetic aspects of the migratory populations. There is another significant work on Sri Lankan Prehistoric Archaeology by Halwathage Nimal Perera published recently. This work too has avoided the genetics of prehistory. No modern history can be written without the incorporation of the science of population genetics which provides the evidence for human origins and dispersals, and this would be a valuable work to fill that deficiency.

**W**riting Sri Lankan historiography during the current political climate is an unrewarding business. Several aspects of our prehistory and proto-history are built upon myths and legends, and several of the academics and the intelligentsia who realise this are happy to keep it that way. The clergy in particular and the politicians too do not want to change the *status quo*. In this climate nobody wants to know the ‘truth’; and the ‘truth’ is often victimised.



In the current social and political climate prevailing in Sri Lanka even the most scientific investigative work is viewed with a sceptical eye, and even the so called 'academic' criticisms of such works remain biased. Only a few seem to care for the validity and reliability of the work. If the findings support one's perceived cause, it is praised in no uncertain terms; if it goes against it, it is condemned irrespective of its inherent merits. Even some of the high intellectuals in the country are not free from such shackles. In the final count, appreciation of this work lies in the integrity and the 'honest-eyes' of the beholder!

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Siva Thiagarajah

# **THE PEOPLES AND CULTURES OF EARLY SRI LANKA**

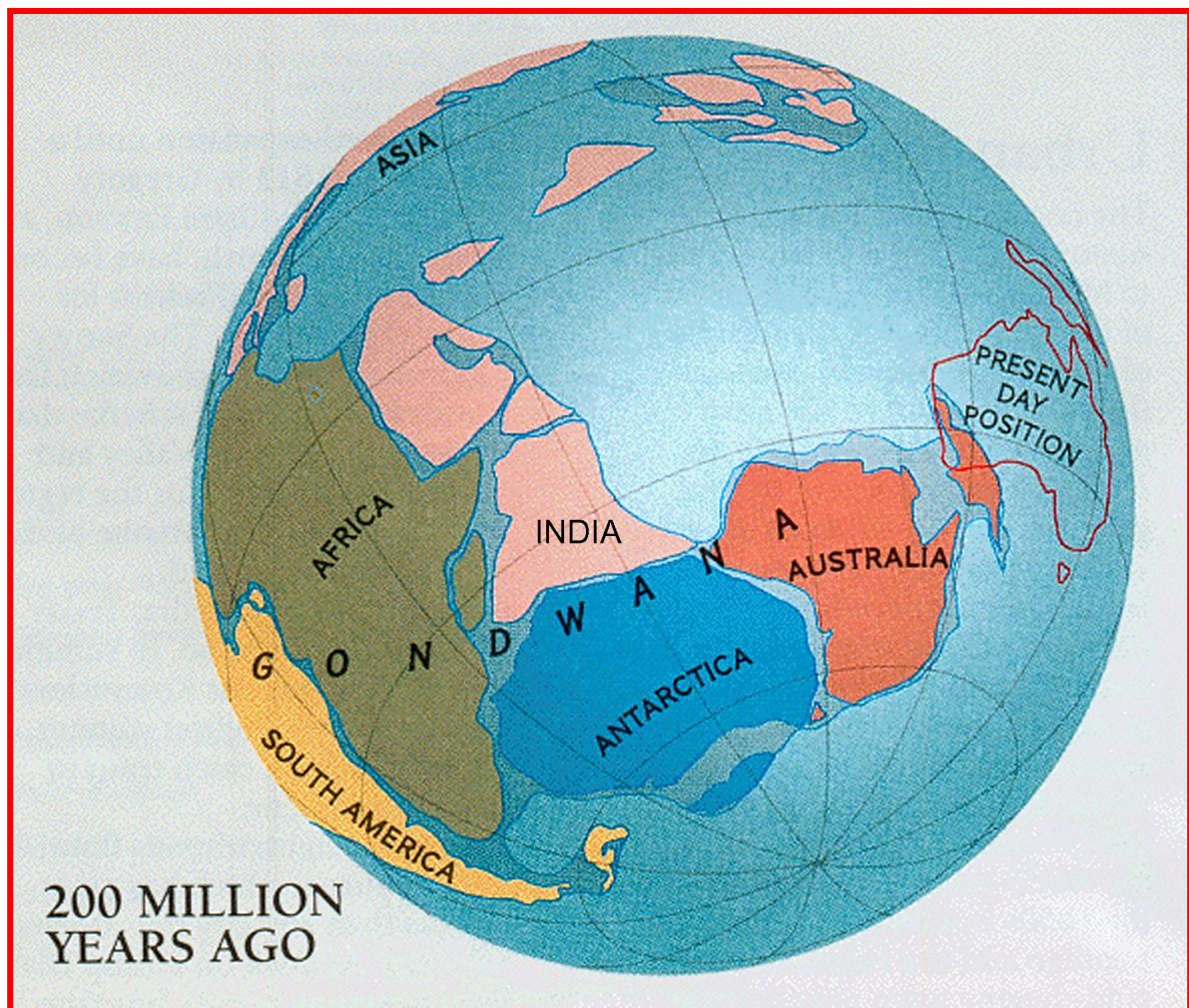
## **PART ONE**

### **THE PEOPLING OF SOUTH ASIA**

## CHAPTER

# 1

## THE FORMATION OF SOUTH ASIA THE INDIAN SUBCONTINENT

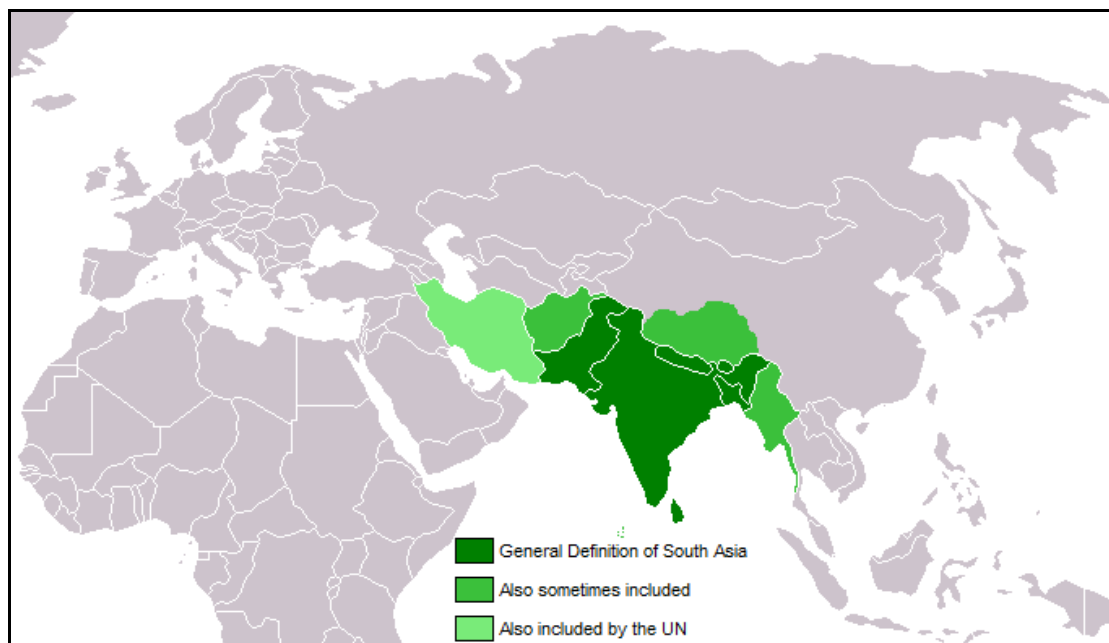


Courtesy: National Geographic 1988.

## THE GEOGRAPHY OF SOUTH ASIA

**S**outh Asia is the southern region of the Asian continent comprising the sub-Himalayan countries. Topographically it is dominated by the Indian Plate which rises above sea level as the Indian subcontinent south of the Himalayas and the Hindu Kush. South Asia is surrounded – clockwise from the west – by West Asia, Central Asia, East Asia, Southeast Asia and the Indian Ocean.

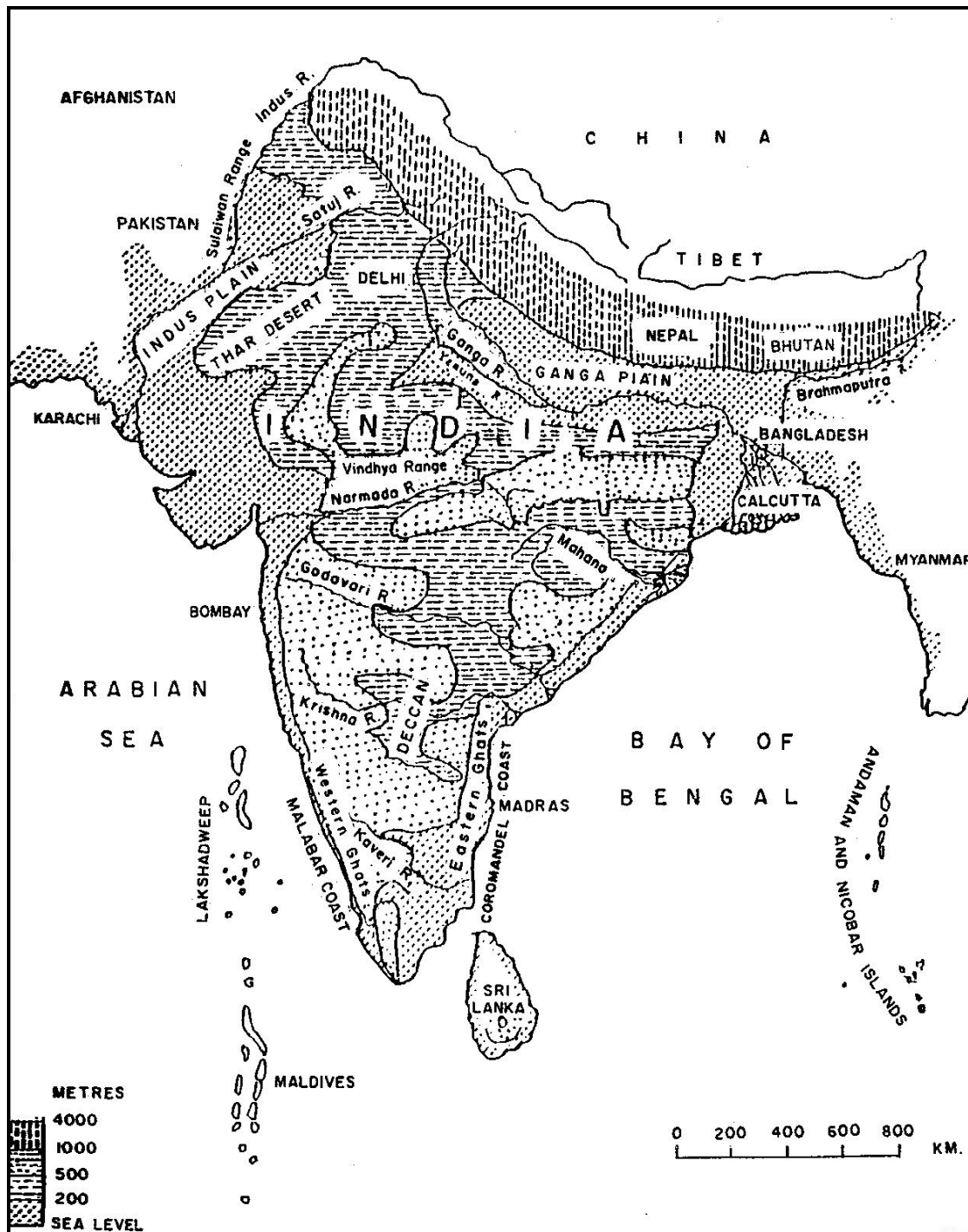
This broad unit of geographical region consisting of the nation states of India, Pakistan, Bangladesh, the Himalayan countries of Nepal, Bhutan and Sikkim; and the borderlands of Afghanistan and Iran (Persia) to the west and Burma (Myanmar) to the east together with the island of Sri Lanka constitute South Asia, also known as the Indian Subcontinent. Sometimes the general term ‘India’ is also used to designate this ancient land.



**The Geography of South Asia**

**Courtesy: Wikipedia.**

However there is no uniformity among the academic writers relating to the interpretation of South Asia. According to the United Nations geographical region classification (United Nations geo-scheme), South Asia comprises the countries of India, Pakistan, Bangladesh, Bhutan, Nepal, Maldives, Afghanistan, Iran and Sri Lanka. Some writers also include Tibet and Myanmar (Burma) in the region of South Asia.



INDIAN SUBCONTINENT : PHYSICAL FEATURES

Picture Courtesy: B.B.Lal

Within South Asia, the landmass named the *Indian Subcontinent* is a region in south-central Asia comprising mainly of seven present-day nations: India, Pakistan, Bangladesh, Nepal, Bhutan, Sri Lanka and the Republic of Maldives. The diamond shaped main landmass comprises of three major units: 1. A chain of massive mountains: the Himalayas on the north, the Hindu Kush in the northwest and the Arakanese in the

northeast bordering North India; 2. The block of Peninsular India extending southwards into the Indian Ocean with the Arabian Sea to the southwest and Bay of Bengal to the southeast; and 3. The Indo-Gangetic plains between these two regions. Sri Lanka and Maldives are islands in the Indian Ocean.

The terms 'South Asia' and 'Indian Subcontinent' are used interchangeably and due to political sensitivities some prefer to use the terms 'South Asian Subcontinent or simply 'South Asia' over the term 'Indian subcontinent' (McLeod, J. 2002: 1; Meyer, M.W. 1976: 1; Pye, L.W. 1985: 133). All the seven nations mentioned above rest on the Indian Tectonic Plate and cover about 4.4 million square kilometres which constitutes 10% of the Asian Continent (The Columbia Electronic Encyclopaedia, 2003).

### **THE MOUNTAINS AND RIVERS OF NORTH INDIA AND PAKISTAN**

As you would realise in the geology section, the Himalayan range is much younger than the peninsular land mass and was under the Tethys Sea until 50 million years ago. The Himalayan range runs from west to east for a length of about 2500 km with several peaks over 6000 metres and the Everest reaching a height of 8882.5 metres. The Himalayas form a natural barrier for any north-south movement. However there are three major rivers which cut across the Himalayan ranges in an east-west direction which may have provided passageways for the daring. These major rivers are the Indus and Sutlej whose headwaters are near the Manasarovar lake in the west, the Ganges arising from the foot of the Gangotri glacier in the west and the Brahmaputra emerging from the eastern Himalayas.

The Indus originating in the Tibetan plateau in the vicinity of the Lake Manasarovar near Mount Kailash runs its course through Ladakh region of Jammu and Kashmir, Gilgit, Baltistan and flows through the entire length of Pakistan before entering the Arabian Sea. The Ganges originating in the Indian state of Uttarkhand flows south and east through the Gangetic Plain of North India – Uttar Pradesh, Kanoj, Kanpur and Allahabad – before running into Bangladesh forming a trans-boundary between India and Bangladesh before emptying into the Bay of Bengal. The Yamuna River originating from the Yamunothri Glacier in the southwestern slopes of Banderpoo Peaks in the Lower Himalaya runs through Uttarkhand, Haryana, Uttar Pradesh and Delhi finally merging with the Ganges at Triveni Sangam.

Satellite imaging have shown that the Indus river had changed its course on several occasions and the earlier course through several of the Indus cities in the past have now dried up. During prehistoric and protohistoric times the Yamuna, now a tributary of the Ganges owed allegiance to the Ghaggar-Saraswati system and flowed southward. The Ghaggar, which now dries up in Haryana used to be a mighty river once, as indicated by its wide bed clearly identifiable at a number of places. Besides the Yamuna, the Sutlej also seem to have fed the Ghaggar system.

The mountain ranges Hindukush, Sulaiman, Kirthar and Kachi lying in the north-western and western parts of the South Asia are more accommodating than the Himalayas, in so far as the human habitations and movements are concerned. The reason for this seems to lie in two factors. In the first place, these and other adjacent ranges are not very closely knit providing valleys for habitation, large scale agriculture and consequent expansion. In the second place there are many passes through the ranges which link the hilly regions with the Indus plains on the east, such as the Khyber, Bolan and other passes. Similar gaps in these ranges link up the South Asian region of Baluchistan with Eastern Iran, Afghanistan and through the latter with Central Asia. This interlinking on the north-west did provide an opportunity for people to have intercommunication for many millennia before the dawn of civilization (Spate, O.H.K. 1957; Lal, B.B. 1997).

To the east, the Arakanese mountain ranges bordering Bangladesh provide a tough barrier as do the Himalayas in the north. The passes are few and far between and are not easy to negotiate. This explains the lack of communication and the exchange of cultural ethos between South Asia and Myanmar.

## **PENINSULAR INDIA**

The Peninsular Block is surrounded by the seas on three sides except the north, narrows down towards the south. In the north it spreads out in an irregular fashion from Kutch at the western end, via the Aravalli hills and hugging the southern border of the Gangetic plains, up to the Rajmahal hills in Bihar on the east. Considering the age or lithic composition this block does not constitute a single unit. Three major kinds of formations are seen in this block: the Kaimur ranges consists of sandstone, the Deccan plateau and parts of Kathiawar are formed by the lava, while the peninsular region in the south is predominantly granite. Minor formations consist of sandstone, basalt, quartzite, agate, chalcedony and others. These provided the raw materials for the large-

sized tools of the Palaeolithic peoples and the microlithic artefacts of a later age (Spate, O.H.K. 1957; Lal, B.B. 1997).

The Peninsular Block is drained by a kind of radial river system. The Chambal, Betwa and Son rivers flow northwards to join the Ganga-Yamuna system; the Narmada and Tapti flowing westward join the Arabian Sea; the Mahanadi, Godavari, Krishna, Kaveri and Tamraparni flow eastwards discharging into the Bay of Bengal.

In the upper regions most of these rivers are not very wide and thus the alluvium deposited by them does not cover very extensive areas as for example, the plains of the Indus or the Ganges. The only areas with substantial alluvium offered by the peninsular rivers are near the coast, which therefore, are more fertile than the inland regions and supported many of the ancient coastal towns and ports such as Kaveripumpattinam and Korkai (Lal, B.B. 1997: 9)

The rivers of the Indus-Gangetic system are fed by the Himalayan snows. Hence even during the hot summer months a reasonable quantity of water is assured since this is the time when the snow melts. This feature stands in marked contrast to the fate of the peninsular rivers which thin down considerably during this period. The rainy season swell is, of course, shared by rivers in both these regions.

## **SRI LANKA AND OTHER ISLANDS**

Outside the Indian mainland there are several islands which form part of South Asia. The **Andaman** and **Nicobar** islands in the Bay of Bengal fall within the jurisdiction of India. The Andamans comprises about 200 islands of which three are large; while the Nicobar consists of seventeen islands. The Andamans are populated by the descendants of the early Australoids while the Nicobarese are mainly of Mon-Khmer extraction.

Located about 500 km west of the Kerala coast are the **Lakshadweep** or **Laccadive** Islands consisting of hundreds of small islets of coral detritus. The people living there are of Kerala origin and trade with the mainland to obtain rice and other necessary products. These islands come within the jurisdiction of India. To the south of these chain of islands are the **Maldivé Islands** which belong to an independent country. Their native language is related to Sinhala. The terrain and climate are similar to Lakshadweep islands.



The most important island in the Indian Ocean off the main landmass of South Asia is **Sri Lanka**, located near the southern tip of the Indian Peninsula. Its location is not without significance, for it was part of the South Asian mainland until it was detached after the end of the Last Ice Age, forming a *continental island*. It is separated from the continent by the Palk Strait and the Gulf of Mannar, but a chain of sand bars known as Adam's Bridge links them. Roughly shaped like a pear, it measures about 435 km from north to south, and has a maximum width of 225 km across the southern part. The Jaffna Peninsula in the northern end is about 28 km from the mainland. The intervening sea is shallow measuring about 30 metres at its deepest.

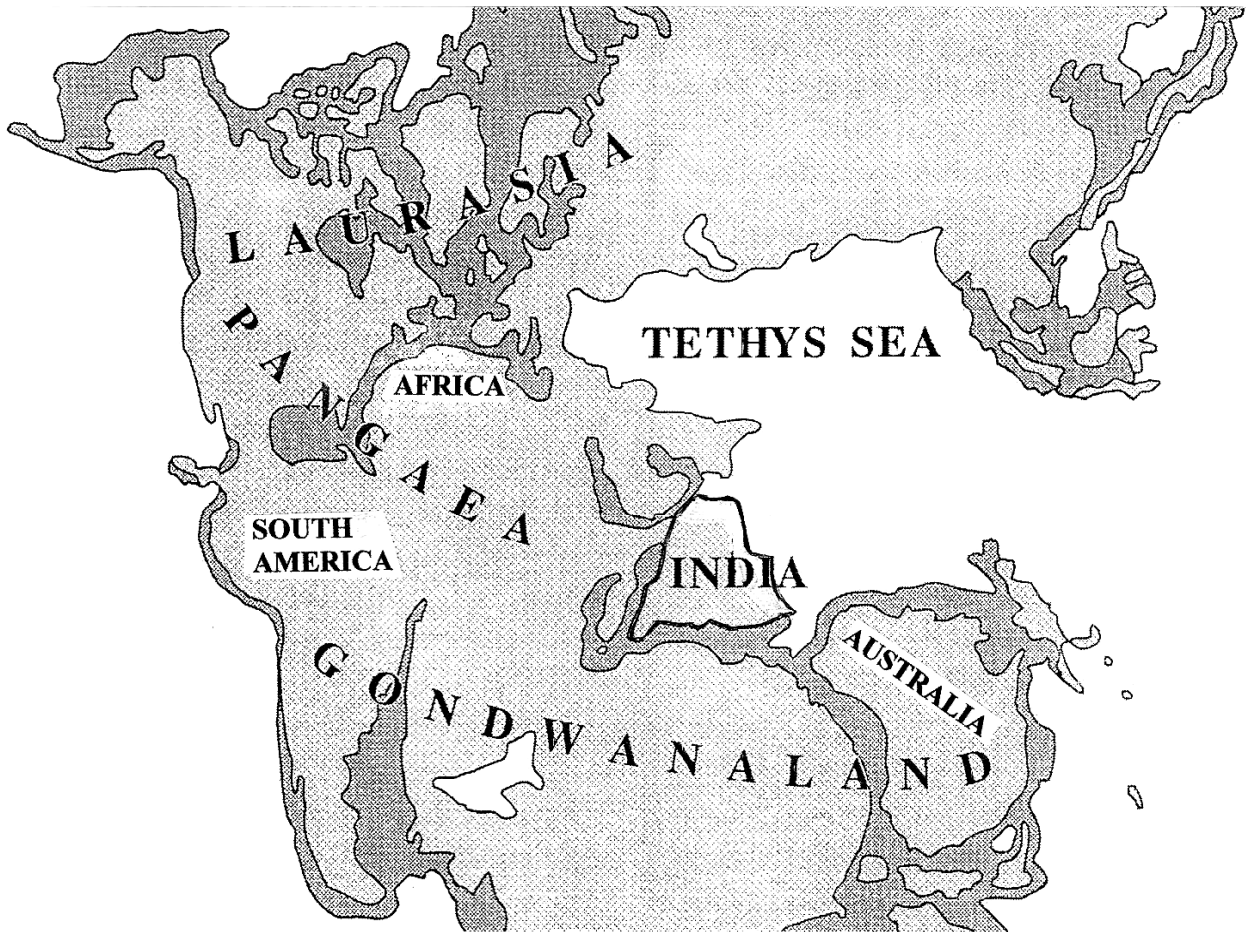
Geologically, weathering has deposited later soils on to the rock formations of the island. Its mineral resources are limited primarily to graphite and gemstones including sapphires and rubies, although explorations are under way for oil deposits off its coasts. The soils of the island are diverse and fertile, particularly the alluvial soils of the river basins.

The island has a terraced topography with the hills in the mid-south around Kandy reaching to a height of 1500 metres, descending down to the plains all round terminating in sandy seashores. Because of the nature of topography the drainage is radial. The longest river is the Mahaveli Ganga, emanating from the hills south of Kandy and going all the way to the northeast to join the sea south of Trincomalee.

Situated just north of the equator, Sri Lanka has a tropical climate, warm and moist the year round. The island receives both the southwest and northeast monsoonal rains, the former during summer and the latter during winter. The south-western parts, the areas near the hills receives the maximum amount of rainfall above 500 cm; while the north-eastern part is relatively dry with a mean annual rainfall below 200 cm. The mean temperature for the year ranges from 25 to 30°C. The climate as well as terrain is very suitable for rice cultivation. Coconut, tea and rubber plantations as well as fishing contribute to the food resources and economy. The population of the island consists of the Sinhalese who form the majority, the Tamils and Muslims.

## **GEOLOGY OF THE INDIAN SUBCONTINENT**

**F**or more than 300 million years the island we now call Sri Lanka was part of the Indo-Pakistan landmass, both being situated on the same continental shelf. This landmass was part of an ancient landscape called Gondwanaland, where begins the story of the Indian Subcontinent.



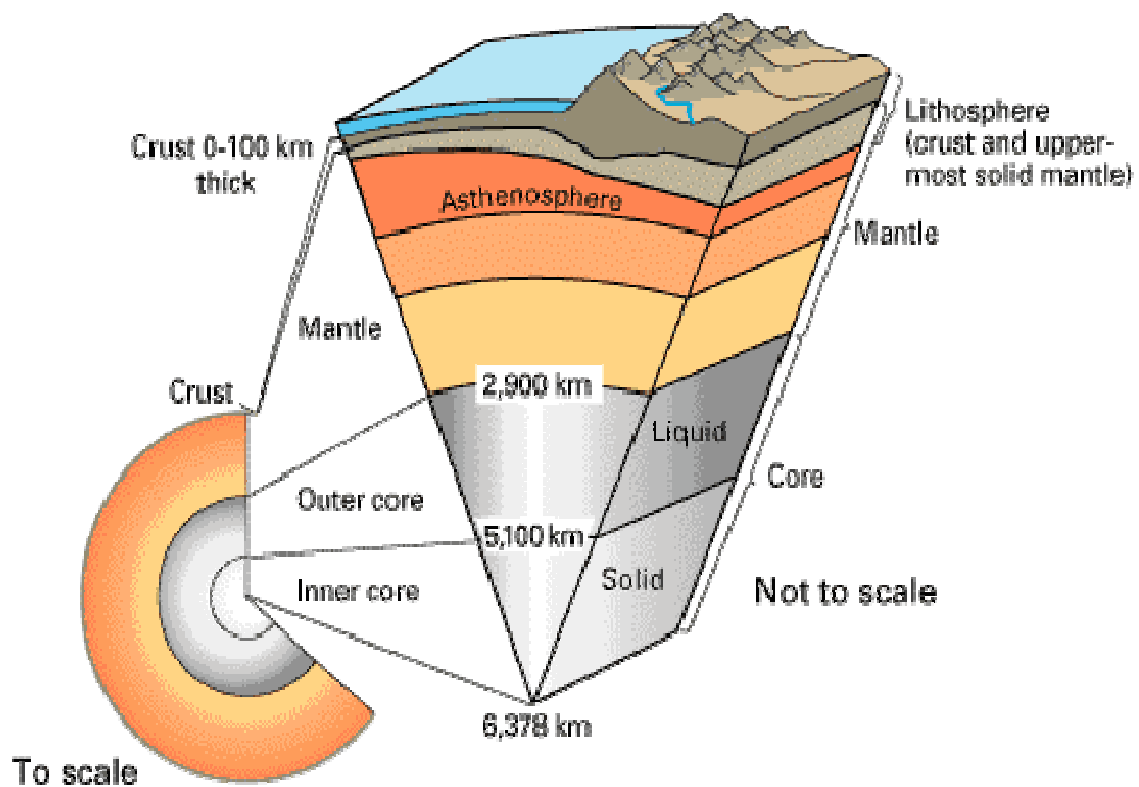
**The relative positions of South America, Africa, India and Australia in Gondwanaland 200 million years ago during the Triassic Period.**

300 million years ago during the period of earth's very early history known as the 'Permian Period' our Earth consisted of a single landmass called Pangaea, with the sea all around it. Gondwanaland was a super-continent which formed the southern and eastern extension of this massive mother continent Pangaea.

The whole of peninsular India with Sri Lanka were situated in the Southern Hemisphere as the upper regions of Gondwanaland. This super-continent when it later broke up, gave birth to India, Australia, Antarctica, Africa and South America (Trompette,R. 1994). The northern part of Pangaea which extended into the Northern Hemisphere was the super continent Laurasia (also called Laurentia), from which the continents of Asia, Europe and North America emerged (Dietz,R.S. 1970: 4939-4956).

## PLATE TECTONICS AND CONTINENTAL DRIFT

In 1915 the German geophysicist Alfred Wegener put forward his theory of continental drift in his ground breaking work *Die Entstehung der Kontinente und Ozeane* (The Origin of Continents and Oceans). His concept replaced earlier geological beliefs that the continents remained in their present locations since time began on earth, had land connections between them, and broke up only when the oceans engulfed them. Wegener's concept has been verified time and again over the succeeding years, and is now the accepted scientific norm (Alfred Wegener, 1966).



In our present state of understanding, the earth's mantle covering the central core (magma) is 2900 km thick upon which floats the continental blocks and ocean floors on a crust made up of 13 tectonic plates. These tectonic plates are massive rock formations which are up to 60-100 km thick under the mountain ranges and up to 5 km thick under the oceans. These tectonic plates slide into each other to form the crust surrounding the Earth.

The internal convection currents of the underlying mantle emanating from the central molten core makes the tectonic plates with the land masses and the oceans situated on top of them to shift. The continents may split if they are unable to stand the convection heat; or on the other hand, land masses may join up as they collide and stick together over subduction zones.

When the continental land masses are situated on more than one tectonic plate, it is when they slide upon one another we get the earthquakes; and when the molten magma finds a way through the mantle to escape out we get the volcanic eruptions. When magma spills through rifts in the earth's mantle, through the tectonic plates on to the ocean floors, new material is added to the oceanic floor crust which causes the floor to spread (**Dietz and Holden.: 1970**).



## GONDWANALAND

Courtesy: Wikipedia

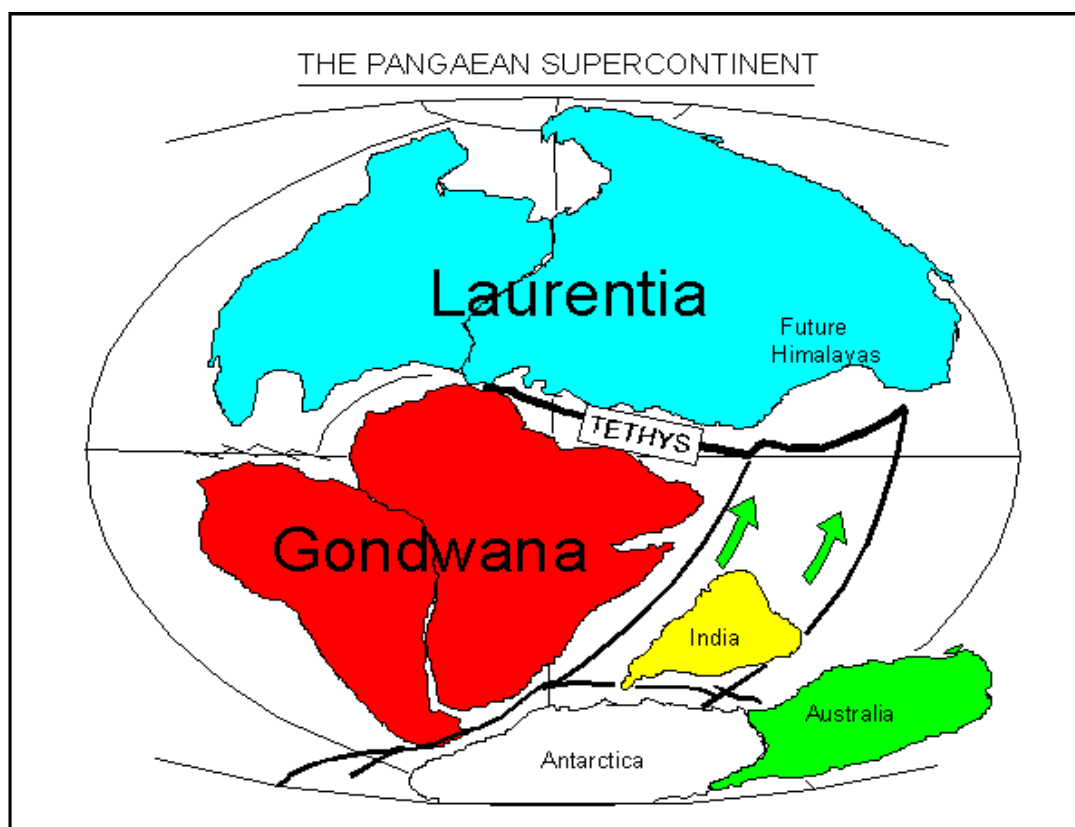
## THE BREAK-UP OF GONDWANALAND

**P**angaea, the mother continent of a bye-gone age consisting of the two super continents Laurasia and Gondwana was a horse-shoe shaped land mass situated over the sliding edges of a few continental blocks. This mother continent lasted for more than 100 million years.

The southern arm of Pangaea was the Gondwanaland. Situated in the Southern Hemisphere near the polar region, glaciers covered the elevated regions which later became South America and central Africa.

Between 180 and 160 million years ago, during the Triassic Period of earth's history Pangaea began to split up and Gondwana separated from the mother continent. South America split up from Africa and India split from the northern part of Gondwana. As India separated, along the newly formed continental margin entered the sea, marking the beginnings of the Indian Ocean (**Trompette, R, 1994**).

## FORMATION OF THE HIMALAYAS



Having separated from Africa and Antarctica, the Indian tectonic plate is moving north towards Asia 100 million years ago during the Triassic Period. *Diagram not to scale.*

**T**he newly separated Indian continent began to move northwards into the Tethys Ocean towards Asia, moving at the rate of 20 cm per year or 200 km per one million years.

Fifty million years ago the Indian continent smashed into Laurasia (Laurentia). The Indian tectonic plate went sliding into the Asian plate, moving 2,000 km north into the Asian landmass. As one land mass thrust into another the horizontal compression resulted in vertical over-thrusting creating the Himalayan mountain range (Van Andel,1985: 130-131). The penetration of India into Asia continues to this day at the rate of 5 cm per year, and the Himalaya too continues to rise at the appropriate rate.

Before the merging of India into the Asian part of Laurasia, Asia was a smaller continent. Iran, Afghanistan, Pakistan, Southern Tibet, Burma and parts of Indochina and China formed parts of this new South Asian subcontinent from Gondwana, which confluenced to form a larger Asia.

## **A CLIMATE FOR HUMAN EVOLUTION**

**T**he collision of India into Asia which caused the rising of the Himalayas and the Tibetan plateau, brought about a drastic change to the atmospheric air circulation and earth's climatic conditions

Cold winds diverted to the northern latitudes caused continued cooling and glaciations while dry conditions developed in peninsular India and Africa. This climatic change coincided with a burst of evolutionary activity among African animals and the first hominids began to appear in Africa (Kerr, R.A., 1994).

## **THE NAMING OF INDIA**

**T**he name India derives from the principal western river of the subcontinent, the Sindhu. In Sanskrit the word 'sindhu' referred to a river; for '*Sapta Sindhu*' meant the land of the seven rivers, which was what the Vedic Aryans called the land which later became Punjab. All these seven rivers as well as the Saraswathi drained into the proper Sindhu. In ancient Persian language, a near relative of Sanskrit, the initial 's' of a Sanskrit word was rendered with an aspirate 'h'. Thus *Sindhu* in Sanskrit became *Hindu* in Persian.

The earliest occurrence of the word 'Hindu' appears outside India. It makes its debut in an inscription found at Persepolis in Iran, which was the capital of the Persian (Archaemenid) empire of Darius I. The Persepolis inscription, datable to c.518 B.C. lists among his numerous domains that of Hindu (**John Keay 2000: 57-58**).

The Greeks learned of the river Hindu from the Persians. When this word found its way into Greek, the initial aspirate was dropped and the river was called Indu or Indus. All the lands lying to the east and south of the river Indus came to be known as India. In this form it reached Latin and most of the European languages.

However in Arabic and related languages it retained the initial 'h' giving '*Hindustan*' (Hindu Nation) as the name by which Turks and Moghuls would know India. The word also passed on to Europe to give '*Hindu*' as the name of the country's native people. In 1830 the British named its indigenous religion '*Hinduism*' (**Encyclopaedia Britannica, ed.14**).

Thus neither the name *India*, nor the term *Hindu* is of Indian origin. These words do not occur in India's ancient Vedic, Jain, Buddhist or Tamil literature. To the Vedic Aryans this land was '*Bharata-varsha*' or '*Arya-vartha*'; to the early Sanskrit authors of Mahabharata it was '*Jambudvipa*'; to the Tamils it was '*Navalantivu*'; and the name *India* was alien to all of them. If etymologically 'India' belonged anywhere, it is to the Indus River flowing in Pakistan.

## **THE LEGEND OF LEMURIA**

**T**he concepts of Charles Darwin and his theory of evolution brought new enthusiasm to the biological scientists of the nineteenth century. In the 1860's zoologist Philip Sclater during his field studies observed a strange biological phenomenon.

Species of lemurs were found in Madagascar and several other surrounding islands but nowhere else. However, fossil remains of lemur-like animals have been found all over India and Pakistan extending up to Malaysia; but these fossils were never found in Africa or the Middle East. Puzzled by this curious occurrence Philip Sclater in an article '*The Mammals of Madagascar*' in the *Quarterly Journal of Science* in 1864 proposed that once there must have been a large continent in the Indian Ocean extending from India to Madagascar which could explain the migration of these lemurs, and named his hypothetical continent *Lemuria*.

Sclater's theory was not unusual for its time. Since the acceptance of Darwinism scientists were tracing the diffusion of species from their points of evolutionary origins, and only the presence of a hypothetical land connection stretching from India to Madagascar and its subsequent submergence could account for the passage of lemurs between India and Madagascar. During his time the scientific concepts of plate tectonics and continental drift were not known.

After gaining some acceptance within the scientific community, the concept of Lemuria began to appear in the works of other writers. German Darwinist Ernest Haeckel proposed that the human species originated in this lost continent and claimed that the fossil records could not be found as this continent had sunk beneath the sea. Lemuria was a sensation of the Victorian-era science, and science fiction stories relating to this lost continent became a fascination among the readers.

Lemuria entered the realm of the occult through the works of Madame Helena Blavatsky who claimed in the 1880's to have seen an ancient map of Lemuria by the Mahatmas (no one knew who these Mahatmas were!). Others, notably American cult leader Thomas Lake Harris and the French writer Louis Jacollit continued to write fictional stories about Lemuria. James Bramwell in his book *Lost Atlantis* described Lemuria and claimed that "Lemurians, Atlanteans, and Aryans are the root-races of humanity (**Bramwell, J. 1974: 193**).

In 1896 the English theosophist William Scott Elliott published a book called *The Story of Atlantis and Lost Lemuria* in which he described in detail the geography of the continent of Lemuria stretching from the east coast of Africa across the Indian and Pacific oceans. Scott Elliott is not a scientist or a geologist or an archaeologist. When asked how he obtained the specific details of a lost land, the English theosophist replied that he received his knowledge from the Theosophical Masters by "astral clairvoyance". Surprisingly in some quarters this became a very influential work.

The concept of Lemuria has been rendered obsolete by modern understanding of geology and plate tectonics. By the beginning of twentieth century European scientists and geologists dismissed the concept of Lemuria as physically impossible, as an entire continent sitting on one tectonic plate cannot sink as a whole into another tectonic plate which carries the ocean. Furthermore in the geological Gondwanaland there was no tectonic plate between India and Antarctica to fit in another continent.



Oceanic surveys of the Indian Ocean conducted by the American and Russian geologists during the 1960s had shown that there is no geological formation at the bottom of the sea that would correspond to the hypothetical continent Lemuria. The only geological formation of note in the Indian Ocean occurs in the far south. It is the underwater volcanic plateau known as the *Kerguelan Plateau* situated 3.000 km to the south-west of Australia.

The 'Lemuria Theory' disappeared completely from conventional scientific consideration after the concepts of plate tectonics and continental drift was accepted by the larger scientific community. According to plate tectonics - the only accepted paradigm in today's geology- Madagascar and India were once part of the same landmass Gondwanaland, but plate movements caused India to break away millions of years ago to move to its present location. It is unlikely that there were lemurs 180 million years ago when Madagascar was joined to India.

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