



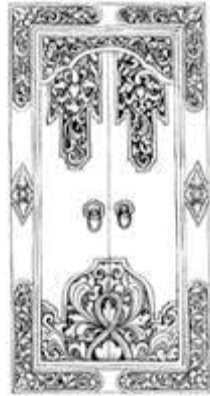
SECRETS OF  
BALI

Fresh Light on the  
Morning of the World

Jonathan Copeland  
with Ni Wayan Murni

# Secrets of Bali

Fresh Light on the Morning of the World



Jonathan Copeland  
in consultation with  
Ni Wayan Murni



Orchid Press

SECRETS OF BALI: Fresh Light on the Morning of the World  
Jonathan Copeland

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Cover: Ulun Danu Bratan Temple, Bedugul, Bali.

For Geoffrey Woolf  
who told me in 1986 that I should write a book on Bali




## About Secrets of Bali

“In *Secrets of Bali* Jonathan Copeland and Ibu Murni present a wonderfully fast moving account of Bali-from the outside in and from the inside out. *Secrets of Bali* places Bali into the warp and weft of the rich tapestry of historical context and ever changing contemporary life. It generously offers us a feast of rare and passionate insights from a man who has so obviously fallen in love with Bali and from a woman who, in so many ways, is Bali.”

Dr Rob Goodfellow


Author, journalist, researcher, academic  
and Principal Consultant of Cultural Consulting



“Fortunately for the reader, the author of *Secrets of Bali* is not in the slightest bit secretive. The outcome is an accessible and wide ranging guide to the island’s culture and history. The casual reader can dip into it to answer specific questions, whereas the enthusiast can read with equal pleasure from cover to cover.”

Professor Michael Hitchcock


Deputy Dean (Research and External Relations),  
Faculty of Business, Arts and Humanities  
University of Chichester



“Eloquent, enthusiastic, and jargon-free.”

Dr Angela Hobart


Visiting Reader at Goldsmiths College, University of London  
and Honorary Research Fellow at University College London



“From Balinese Gods to Balinese gamelan, difficult subjects are simply explained in this beautifully written and illustrated work.”


Bill Dalton

Author of *Bali Handbook*, USA




“Secrets of Bali is the best book about the island written and published since 1990...”

Roy Thompson  
The Bali Times, 18-24 June 2010




“This 412-page book tries to summarize every aspect of Bali. Starting from the creation of the universe from a Hindu approach (the major religion in Bali), Balinese architecture, rituals, and the arts and up to the paradigm shift among the modern Balinese. All are explained in the 60 chapters.”

Ni Luh Dian Purniawati  
Bali & Beyond, January 2011



“Secrets of Bali: Fresh Light on the Morning of the World is an excellent book that examines almost everything about the island.”

Hello Bali, February 2011




“I feel that Secrets of Bali will join the ranks of the definitive and authoritative volumes of reference books for lovers of Bali everywhere.”

Andrew Charles  
Tropical Life, September 2011  
Andrew Charles  
Writer and long-term resident of Bali



“In Bali they say... when the durians come down the sarongs go up.”

Julia Suryakusuma  
Author of *Sex, Power and Nation*



## About The Authors

**Jonathan Copeland** was born and went to school in Belfast, Northern Ireland before going to London to study law at University College London. He practised law in two major law firms in the City of London for 25 years. Throughout that time he travelled to Southeast Asia on a yearly basis and developed a passion for Balinese culture and a strong desire to understand it.

After retiring from the law, and with some brain cells still intact, he was able to spend more time in Bali, researching and photographing all aspects of Balinese culture. The fruits of that research appear in this book.

Jonathan is now an independent, freelance photographer and writer specializing in travel photography. He was the photographer in Murni's Very Personal Guide to Ubud, published as an ebook in October 2011, and is currently working on more books and more ebooks.

Jonathan's photographs have been published in magazines such as Garuda Indonesia in-flight magazine, Hello Bali, Ubud Live, and Bali and Beyond and newspapers such as the Jakarta Post, Bali Advertiser and The Times, Lombok.

He has contributed photographs to books, such as Dancing Out of Bali by John Coast, Indonesian Food by Sri Owen and The Ethnomusicologists Cookbook edited by Sean Williams.

He has created and maintains several web sites, including Murni's in Bali (<http://www.murnis.com>) and Secrets of Bali (<http://www.secretsofbali.com>) and his photographs are on <http://www.jonathaninbali.com>. Videos are on You Tube: JonathaninBali (<http://www.youtube.com/user/JonathaninBali>).

**Ni Wayan Murni**, born in Penestanan, Bali, is a very well-known personality on the Bali scene and a pioneer of Balinese tourism. During her career she has lived in Sanur and Ubud and has travelled widely. In 1974 she opened Ubud's first real restaurant, *Murni's Warung*, overlooking the Campuan River. Since then thousands of people have enjoyed her food and hospitality. She is still very active in the restaurant.

During her adult life Murni has been busy collecting and becoming an expert in Asian antiques and textiles and many of them are to be found in Murni's Warung Shop beside her restaurant. She was the first person in Ubud to have a proper gallery of antiques, textiles, costumes, old beads, tribal jewelry, stone carvings, masks and other ethnic pieces. Many of her pieces are museum quality. Her fine arts credentials are impeccable. She understands and participates in Balinese culture on a daily basis and plays in a women's gamelan group at important religious ceremonies.

In 2007 and 2009 she exhibited part of her collection at the prestigious shows in

San Francisco and gave a lecture on Balinese textiles to the Textile Arts Council at the de Young Museum.

In the early 1980s Murni started to construct Murni's Houses in Ubud, a complex of four units of accommodation and open-air pavilions amid a garden full of flowers, statues, fountains, trees and shrubs lying all by itself next to open fields. It is a wonderful introduction for first timers to Bali and a dependable refuge for her many guests who return each year. Just 5 minutes walk from the main road and accessed through a traditional Balinese roofed gate, it's a place of tranquility.

Murni's architectural abilities are best appreciated in *Murni's Villas*, which are twenty minutes outside Ubud and a world away from life's cares and concerns. These three luxury accommodations are known as *Villa Kunang-Kunang*, named after the fireflies that sparkle above the surrounding rice terraces at night. Murni lives in one and offers the others to guests.

Murni's latest venture is the creation of Tamarind Spa at Murni's Houses, which was listed as the top spa in Ubud on Trip Advisor within 3 months of its opening. It is intended to bring all these aspects of Balinese art, luxury, and culture together in one healing experience.

Murni's Very Personal Guide to Ubud was published as an ebook in October 2011.

Murni and Jonathan have a joint blog <http://murnisbali.wordpress.com>



## Prologue

The origins of this book go back to October 1984, when I went to Bali for the first time. I knew nothing but the name of the island and the only book I had was the first edition of the Lonely Planet *Guide for Bali & Lombok*, a travel survival kit. It had been published in February 1984 and was 200 pages. The 2011 edition is 404 pages.

Apart from a few days in Kuta, I spent three weeks in Ubud, which was a charming, sleepy village. Very few people spoke intelligible English, which was frustrating as this was clearly a fascinating place. I had many questions which were not covered by the Lonely Planet Guide. I was hungry to know the secrets of Bali.

Friends in London had recommended *Murni's Warung*, a famous romantic restaurant, perched on the river gorge in Campuan. I was extremely lucky to meet the eponymous owner, Murni, on my first visit. She speaks fluent English, is very active in the community and is a mine of information.

I have spent the following twenty and more years commuting between London and Bali, asking and reading as much as possible about this mysterious and complex island, and have tried to organise it into self-contained chapters that I wished had been available in 1984. Frequent sojourns in *Murni's Villas* helped the process.

I thank all my sources, especially Murni, without whom nothing would have been done. I also thank Roger Owen, who read the book in draft on a computer screen and made numerous helpful comments and observations. Richard Mann has been an enormous help. Over the years I have had the benefit of many stimulating conversations with Michael Hitchcock. I thank Roger Pipe who encouraged me to travel to the Far East in the first place. My thanks also go to I Made Ariasa for his wonderful illustrations which demonstrate the Balinese love of detail. I am very grateful to Andrew Charles, who meticulously corrected many infelicities of language, grammar and punctuation. It goes without saying that I am deeply indebted to Christopher Frape, who, to my great surprise, within the first twenty minutes of meeting him, agreed to publish the book.

The reader should be aware that the sources often conflict and in such cases I have favoured the most authoritative source. There is also the problem that it is difficult for anyone from one culture to represent another accurately and meaningfully. We all have cultural baggage and use words that have connotations, such as god and witch and many more. Mistakes are my own, and the only reason I can give is the answer that Dr Johnson gave when he was asked why he wrote the wrong definition for the word 'pastern' in his Dictionary: 'Ignorance, madam, pure ignorance.'

I hope to rectify any ignorance, errors and omissions in future editions and welcome all comments by e-mail. I plan in the future to devote the *Secrets of Bali* website ([www.secretsofbali.com](http://www.secretsofbali.com)) as a forum for supplementary materials, reactions, discussions, questions and answers.

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## Preface

**B**ali is the world's best-known 'tourism brand'. It is not just an island but a phenomenon. Ironically, until recent times, most Americans, Europeans, Japanese and Australians knew something about Bali, but were largely unsure where Indonesia (of which Bali is a province) actually was; but more importantly, what Indonesia actually is. Yet, increasingly, Bali is the prism through which the world sees, or rather judges, Indonesia—geopolitically one of the most important countries on Earth.

If all is well in Bali, then, in the most part, and as far as the all-pervasive global media 'industry' is concerned, all is well in Indonesia. The world-wide media coverage of the 2002 and 2005 Bali bombings is evidence of what happens when the perception of this relative tranquility is disturbed. Suddenly, Indonesian home-grown terrorism was thrust on to the world's conceptual radar screen—where it has remained. This has come into sharper focus as 'The West' (wherever that is and whatever that means) has become increasingly concerned about the advent of a pan-Southeast Asian Islamist movement—one that combines the mass base of Indonesia's 200 million Muslims, with the justified fury of the mistreated Southern Thai Muslims, with the organisational capacity and global connections of the Malaysian Muslims, with the oil wealth of the Muslims of Brunei and Aceh and the guerrilla warfare experience of the South Philippines Moros... and on the very outer geographical rim of this potential ideological 'ring of fire' is the extraordinary outpost of Hindu culture and religion we know of as the Island of Bali.

The Indian Prime Minister Jawaharlal Nehru once poetically and affectionately called Bali, 'The Morning of the World'. The island is in itself a glimpse of what Indonesia may have become had the Java-based Islamic Kingdom of Mataram not defeated Hindu Majapahit over five hundred years ago—irrevocably changing the character of the then 'East Indies', and in turn, modern Indonesia. For this reason Bali is sometimes referred to as 'a living museum of Hindu-Buddhist Java'. However, for many, the fascination with Bali is not about the past at all, but about right now—today.

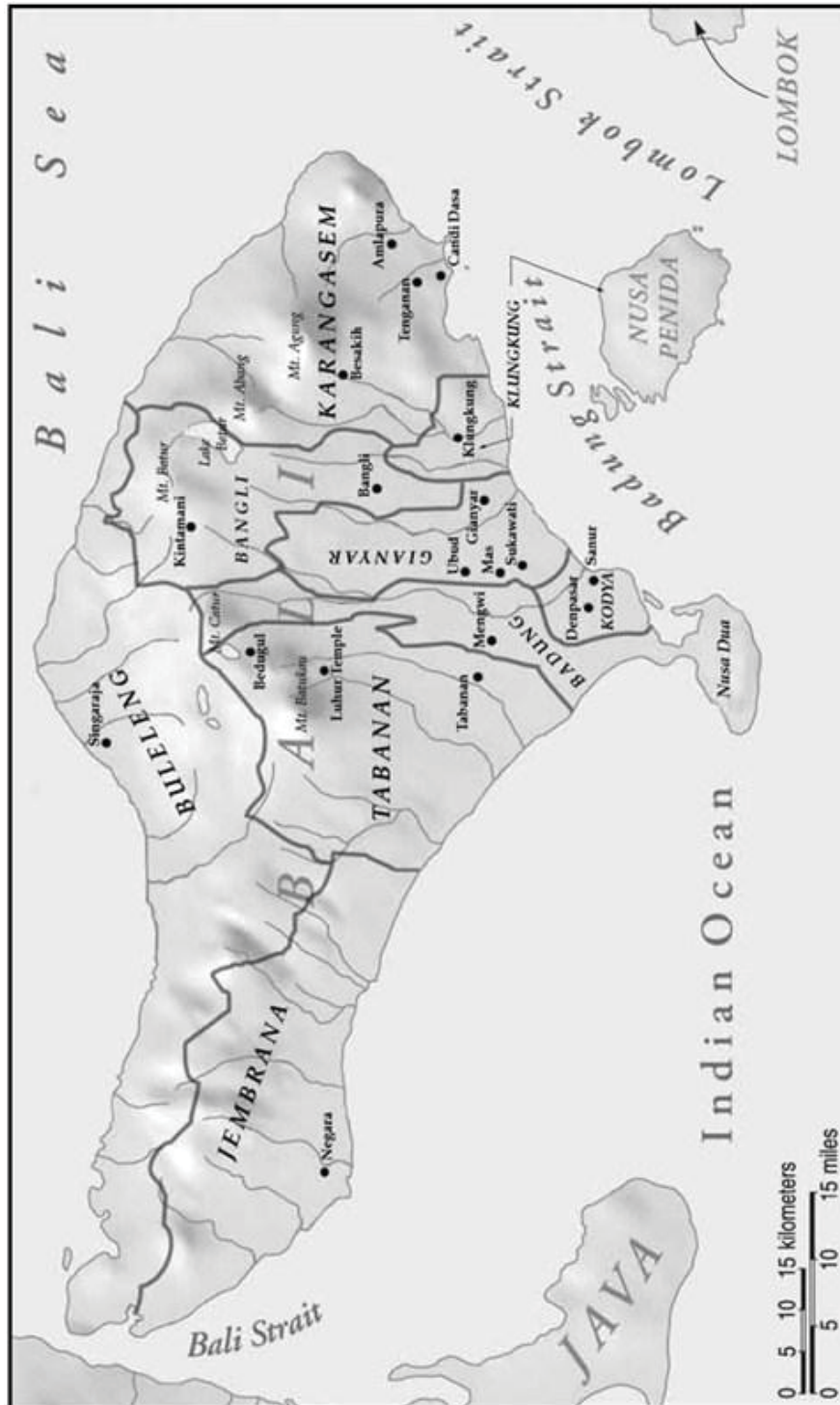
Bali can teach us many lessons. One lesson is about the values and virtues of an ancient culture that has stood the test of time—and withstood the trial of fire that is the worst aspect of globalisation—cultural homogenisation. Above all, Bali represents the hope that human diversity can survive the 21st century. For reasons not completely understood by anthropologists, Balinese culture remains vibrant, complex and colourful—both in spite of mass tourism and because of it. Bali has not withered into a pale brochure-like parody of itself because of the spoiling

onslaught of the shallow mores that accompany mass tourism, but rather has thrived and prospered by continually reinventing itself—in parallel with, and not in isolation from, other influences.

Human cultures are never static; they are always changing. They may be in decline like the tribal cultures of Africa, the Indian sub-continent, China, Russia and Australia, or they may be in the ascendancy, like American consumer ‘Coca Cola culture’, but they never stand still. And so Bali is changing, but in ways that often surprise and delight.

In *Secrets of Bali* Jonathan Copeland and Ibu Murni present a wonderfully fast moving account of Bali—from the outside in and from the inside out. *Secrets of Bali* places Bali into the warp and weft of the rich tapestry of historical context and ever changing contemporary life. It explains, clarifies and reveals. It generously offers us a feast of rare and passionate insights from a man who has so obviously fallen in love with Bali and from a woman who, in so many ways, is Bali.

Dr Rob Goodfellow  
Wollongong, Australia



Map of Bali

## Chapter 1

# Bali: Vital Statistics

### **Bali, the Island**

Bali is a small island with a big reputation. It is perhaps the most famous tropical island in the world. More or less in the middle of the Republic of Indonesia, it is the smallest province, becoming such on 11 August 1958. It is split into eight *kabupaten*, a territorial division based on the old pre-colonial kingdoms.

Bali is turtle-shaped (the Balinese think of it as a chicken and a couple of eggs) and measures about 90 miles (150 kilometres) east to west and about 50 miles (80 kilometres) north to south, and a little over 2,100 square miles (5,000 square kilometres) or 0.29% of the total area of Indonesia. You can drive around it in a day. Bali lies about 8° or 9° south of the Equator and between 114.6° and 115.5° longitude east.

The famous Wallace Line, which divides the lush flora and fauna of sub-tropical Asia from the arid landscape of Australia, runs along the very deep, narrow strait that separates Bali from Lombok, which is its neighbouring island to the east, 15 miles (24 kilometres) away. The large island of Java, about the size of California, 600 miles (966 kilometres) long and 100 miles (161 kilometres) wide, lies to the west.

### **Wild Life**

The environment is humid and encourages rich tropical vegetation. There are gnarled and twisted trees, bamboo thickets, creepers and ferns. Numerous wild plants provide food and herbal medicines. Rivers provide a habitat for freshwater crabs and prawns, fish and eels. Ravines are home to many forest-dwelling land animals such as porcupines, pangolins, lizards, cockatoos, civet cats, bats, green snakes and pythons. There are about 300 species of birds which live in or visit Bali and there is one endemic species known as the Rothschild's Myna or the Bali Starling. Sacred monkey forests are popular with locals and tourists alike.

Until the 1920s or 1930s deer and wild pigs roamed the forests and wild monkeys were common until the 1950s. Today these animals are found primarily in the dry, western part of Bali and the once numerous small Balinese tiger is probably now extinct.

Bali is pretty much self-sufficient. Apart from rice, there is maize, sweet potato and red peppers. Tobacco is grown in north Bali. Cassava or taller trees such as sugar palms, banana trees, coconut trees are common and clove trees have been growing since the mid-1970s. There are vanilla vines.





Sacred monkey forests are popular with locals and tourists alike. The Monkey Forest, Padangtegal, just south of Ubud has been there for hundreds of years. The temple in the forest is at least 400 years old.

### **The Balinese**

There are almost 4 million people. The census of June 2000 recorded 3,383,572 people and indicated a population growth of 1.22% between 1990 and 2000, a success for its birth control programme, and a population density of 555 people per square kilometre, which is high. The May 2010 census recorded a population of 3,890,757. For rural Balinese, life expectancy is 64.6 years and for urban dwellers 61.1. The average white Australian male can expect to live to 77 according to research published in the *Medical Journal of Australia* in December 2002.

Raffles in his *History of Java* (1817) said,

The natives of Bali, although of the same original stock with the Javans, exhibit several striking differences, not only in their manners and the degree of civilisation they have attained, but in their features and bodily appearance. They are above the middle size of the Asiatics, and exceed both in stature and muscular power, either the Javan or the Malayu.

### **What's in a Name?**

Bali's name reflects its Indian heritage: it is Sanskrit, much older than the name Indonesia. It means 'offering' in Sanskrit. In High Balinese, Bali is called *Banten*,

which also means offering, usually to the gods.

Bali may be named after the monkey called Bali or Subali in the Ramayana epic. Subali did a wicked thing: he stole Tara, the wife of his half-brother, Sugriwa. On discovering this, Sugriwa challenged Subali to a fight, which was seen by Rama, who killed Subali with an arrow in order to get Sugriwa's help. Subali was therefore an offering given by Rama to Sugriwa.

## **Village Life**

The Balinese live in villages. In pre-colonial times, before the Dutch took control at the beginning of the 20th century, there was just one kind of village, called the *desa* which is now called the *desa adat*. *Desa* is a Sanskrit word. *Adat* is a Malay word of Arabic origin and means 'custom' or 'tradition'. It was not based on territory, but on a feudal system whereby the ruler could call on villagers' labour. Although the right to insist on labour has gone, *adat* villages still exist and there are about 1,500 of them.

The *adat* village organisations deal primarily with ritual and religious affairs, which are extensive in a society where religion permeates every daily activity. Religion is of critical importance, because the Balinese believe that the prosperity and safety of the world depend on harmony between people and the gods. The *adat* village is centred on three communal temples.

During the colonial period the Dutch reorganised village administration along territorial lines in order to control the inhabitants easily and created villages called *desa dinas*. They are responsible for civic matters and security. There are therefore two concurrent village organisations.

## **Republic of Indonesia**

Bali is part of Indonesia, formerly the Dutch East Indies, and the fourth most populous country in the world with about 237.6 million people according to the 2010 national census. In terms of population, it is only overtaken by the People's Republic of China, India and the United States.

It is the biggest Muslim nation in the world: about 90% of all Indonesians are Muslims, but not the Balinese, who follow Balinese Hinduism, a unique religion. A British naturalist, George W. Earl, coined the word 'Indonesia' in 1850 from the Greek words *indos* meaning 'Indian' and *nesoi* meaning 'islands'. It was first used by his colleague James R. Logan, but was not used by the locals as a political term until April 1917. Nationalists liked the word as it implied a single people and used it consistently in the 1920s. It caught on despite being banned by the Dutch.

There are more than 17,000 islands, but only about 6,000 or so are inhabited, and more than 250 ethnic groups. These diverse peoples, speaking about 550 languages, or approximately a tenth of all languages in the world, are united by a

common language, very similar to Malay, called 'Bahasa Indonesia'. Malay is an Austronesian language, probably originating in East Kalimantan, which has been spoken throughout the archipelago for centuries by traders. It was a trading *lingua franca* also spoken in the Philippines, Japan, Sri Lanka and Madagascar. Unlike the British in India, the Dutch discouraged Indonesians, except civil servants and servants, from learning their language, and refused to allow them to speak Dutch. They communicated to them in Malay. At Independence, after 350 years of Dutch rule, less than 2% of Indonesians spoke Dutch.

The greatest Dutch legacy was the idea of Indonesia as a national entity. It was by no means a foregone conclusion in such a diverse region. An important milestone was the Youth Congress of 1928 which proclaimed 'One Nation, One People, One Language'. The language was the local version of Malay, now called Indonesian. This famous 'Youth Pledge' is still repeated on its anniversary every year.

### **Unity in Diversity**

The Indonesian motto 'Unity in Diversity' underlies most aspects of Balinese life. In the religious sphere, the diverse gods and spirits are a manifestation of the Supreme god, Sanghyang Widi Wasa. There are many examples of the desire to achieve unity. The high priest aims to achieve unity with God through his mantras. In village affairs individual interests are subordinated to the group through organisations like the *banjar* and *subak*.

The Balinese love uniforms, which identify individuals with the group, whether at school or the temple or the gamelan orchestra. For example, there is no star performer in the gamelan. The ensemble plays as a whole. Indeed it is a criticism if they lack unity or do not play in time with the dancers.

## Chapter 2

# The Big Bang

### Creation, the Hindu View

The Hindu view is that the world began with Divine Oneness, but, refreshingly, there is no certainty about the matter. About 3,500 to 1,000 years ago, the poets of the *Rig-Veda*, the oldest religious text on the planet, wrote of their doubts in the *Hymn of Creation*:

But, after all, who knows, and who can say  
Whence it all came, and how creation happened?  
The gods themselves are later than creation,  
So who knows truly whence it has arisen?

Whence all creation had its origin,  
He, whether he fashioned it or whether he did not,  
He, who surveys it from highest heaven,  
He knows—or maybe even he does not know.

From the Divine Oneness, the supreme god, Sanghyang Widi Wasa, created the other gods, who in turn created the waters, earth, sky, sun, moon, stars, clouds, planets and wind. Then, at the direction of the Supreme god, Siwa created the world in the following order: mountains, rice, trees, people, rain, fire, fish, birds and animals. The order of creation, to some extent, indicates Balinese priorities.

Unlike the Big Bang and many other religious views, the Hindu view of creation is not bringing into being something from nothing, but rather a fragmentation of the original Oneness and unity of nature into countless forms. Hindus believe in a cycle of birth and death and rebirth and the purpose of life is to escape the cycle and merge into the original Oneness.

### Saraswati, the Later Hindu View

A later Hindu view is that Saraswati, the goddess of poetry and wisdom, brought humans into existence by writing. Christianity, which post-dates Hinduism by perhaps 3,000 years, also saw creation through the medium of the Word. 'In the beginning was the Word, and the Word was with God, and the Word was God' (*John 1.1*). Christ is seen in terms of the Word: 'The Word became flesh and dwelt among us, and we beheld His glory...' (*John 1.14*).

## **How Old is Mother Earth?**

After creating the waters, the gods created the Earth, both of which are fundamental to human existence, but how old is the Earth? It is about 4,500 million years old. We know this because the age of the Earth can be measured by radiometric clocks, which measure radioactive elements in rocks.

## **Year Zero**

There are other plausible views, of course, like the Western scientific view, which is that in the beginning, there was nothing. So far, so good. It gets more difficult.

Edwin Hubble (1889-1953), an American lawyer, boxer and astronomer, made the discovery in 1929 that the universe is expanding. Just before that, in 1927, a Belgian astronomer and cosmologist, Georges Lemaître, realised that if galaxies are moving farther and farther outwards in time, it must follow that if you go back and back in time, you reach the point where everything collapses into a hot, small, dense sphere, which he called the 'primaeval atom'.

He thought that the universe began when this atom spontaneously exploded and matter and radiation were hurled forth into the, well, yes, the universe. Time and space also began at this point. A microsecond earlier, there had been absolutely nothing, not even a microsecond.

Sir Fred Hoyle, an astronomer from Yorkshire working at Cambridge University, was the theory's leading opponent and mockingly called it the 'Big Bang' in a radio broadcast in 1952 and the term stuck. If you know the speed of any galaxy, you can work out the age of the universe. It is 15 billion years, give or take a few years.

It is indeed curious that something can be created out of nothing, but obviously it can, because before the universe was created, there was nothing, and now we have a universe. It has been explained by quantum physics: in the quantum world particles pop into and out of existence and in the 1970s physicist Edward Tryon of New York City University suggested that the tiny atom from which the universe grew could have come into existence in that way.

Sir Roger Penrose put forward the theory in 2006 that before the Big Bang there could have been a series of Big Bangs.

## **How Old is Bali?**

Bali was built by volcanic action. The subterranean shakings of tectonic plates heaved the continental rock under the sea above sea level perhaps only a couple of million years ago and Bali was born.

## **How Old are Humans?**

Simple life, such as bacteria, appeared 3,500 million years ago and complex forms evolved during the last 600 million years. Many, many millions of years later, about 195,000 years ago, our species, *Homo sapiens*, appeared. We were the last to arrive at the Life on Earth party and we were party animals.

To get an idea of how recently we showed up imagine the history of the Earth as having taken place in a single year. If the Earth was formed on 1 January, apes appeared on 30 December, the first modern humans appeared in the last 20 minutes of New Year's Eve, and Christ was born at 15 seconds to midnight.

## Chapter 3

# Balinese African Origins: The First Wave

### **Out of Africa into Bali**

Humans originated in Africa. We know this because the first two to three million years of fossilised humans are entirely in Africa, and the first appearance of fossilised humans outside Africa is much later. There is a debate as to whether early humans evolved in Africa and then moved to the rest of the world, the 'Out of Africa' theory, or whether they evolved separately in Africa, Europe and Asia, the Multiregional theory. There are many theories in between these two models.

### **The Lay of the Land**

Continents drift slowly over millions of years. Sea levels depend on the amount of frozen water in the north and south poles. During ice ages, there is more water locked up in ice, and therefore more land over which animals and humans can travel.

Over 250 million years ago, there was only one giant landmass called Pangea. It split into two parts, separated by a mid-world ocean. Laurasia lay to the north and Gondwana to the south. Over time, India moved to the north, collided with Asia, and created the Himalayas, while Arabia and the Fertile Crescent moved east towards Asia.

There have been many ice ages. In an ice age, many of the islands of Southeast Asia become part of the Eurasian mainland and Australia forms a single landmass with New Guinea and Tasmania. This phenomenon made migration possible without a boat. About 14.5 million years ago, Africa ceased to be isolated from Europe for the last time and fossilised apes appeared in Europe for the first time. There was a land connection between Africa and the Middle East, and when sea levels were low, migration was possible.

### **Apes and Us**

It is not possible to pinpoint when humans first evolved. Human characteristics appeared gradually in apes over millions of years. About 4 million years ago a new species of ape, called *Australopithecus* (Southern ape) *anamensis*, was walking upright in Kenya; we believe that this species was ancestral to our own genus, which is called

*Homo*. Brain size more or less tripled over the last 3 million years, the greatest growth being between 1 and 2 million years ago. A large brain and a complex nervous system were initially required to enable bipedalism. Having been formed it was useful for other things, including eventually, about 50,000 years ago, language.

When creatures become sufficiently like humans, they are classified as *Homo*. The earliest is called *Homo habilis*, meaning 'handy man', because he seems to have been the first toolmaker, with a brain size of 500 cc. Chimpanzees have a brain size of between 300 and 500 cc and modern humans about 1200 cc.

*Homo habilis* was discovered in Olduvai Gorge, Tanzania by Louis and Mary Leakey between 1962 and 1964. It was short, not much more than three feet (one metre) high, and its bones were accompanied by crude stone tools. They dated it to about 1.8 million years ago, but similar ones have since been found dating to about 2.4 million years ago.

## **Java Man**

Java Man was *Homo erectus*, meaning 'erect man'. It is generally accepted that *Homo erectus* was indeed human, and many believe the first human. Java lies just across the shallow strait to the west of Bali, less than 2 miles (3 kilometres) away, and if the sea is low, is actually joined to Bali. There is no evidence that Java Man reached Bali, but equally no evidence that he did not.

Charles Darwin had postulated that Africa was Man's birthplace in *On the Origin of Species* (1859). Eugène Dubois, a young Dutch doctor, went to Java in 1889 to find proof that Asia was Man's ancestral homeland, and not Africa. Some scientists still think that this is or could be the case. Like the Scottish geologist Charles Lyell and British naturalist Alfred Russel Wallace, he believed that the home of the orangutan and gibbon was more likely to be the cradle of mankind than that of the African apes, the chimpanzee and the gorilla.

Within two years he discovered the skull cap of a very human-looking primitive. He found a strong thighbone the following year, which indicated that the creature could walk upright, hence he called the creature *Homo erectus*. He had discovered Java Man.

Dubois published his findings in 1894. The claim that human ancestors went back a million years threatened current scientific and religious teachings. The outcry became so intense that Dubois buried his discoveries under his house, where they remained for the next thirty years.





Eugène Dubois, a young Dutch doctor, discovered *Homo erectus*, Java Man, in 1891.

Later, in 1929, *Homo erectus* was also found at the village of Zhoukoudian on the outskirts of Beijing, and in that part of the world he is called 'Beijing Man'. The discovery was made in a limestone quarry. His (or her) braincase was larger than earlier creatures and about 75% of our brain size. The teeth were large, but already human. They were hunter-gatherers. Agriculture had not yet been invented; it started in various parts of the world shortly after the end of the last ice age around 10,000 years ago.

A number of other *Homo erectus* remains have been found in Java. The earliest are about 1.5 million years old and the youngest are about 100,000 years old. Over this time brain size increased slightly.

### **Dwarf Human**

In 2003 a new human species, 3.2 feet (1 metre) tall with a grapefruit-sized brain (380 cc and overlapping with the size of a chimpanzee's brain), an unknown branch on the family tree, was discovered in the Liang Bua caves on the island of Flores, 350 miles (563 kilometres) east of Bali. The Manggarai people live in this part of Flores and the Manggarai name Liang Bua means 'Cool Cave'. The archaeological

team found thirteen individuals and fossils of animals including a snake, frog, monkey, deer and pig. It is thought that *Homo erectus* made the journey to Flores about 840,000 years ago, part of which must have involved crossing by sea, became isolated for several hundred thousand years and evolved their small size. Having no predators they had no need to be big, requiring a large amount of food, a phenomenon known as island dwarfism. Despite their small brains they were smart and made use of fire and made stone tools, but created no art or adornments nor buried their dead, all characteristics of modern humans.

It is a momentous discovery because it is the only known case of dwarf humans. They have been given the name *Homo floresiensis*. The 'hobbits', as they are popularly called, existed until a mere 12,000 years ago. At that time a massive volcanic eruption probably wiped them out or possibly they were all killed by a wave of modern intruders from nearby Papua. It is a curious fact that local stories are told of a past time when small, hairy people with flat foreheads lived in Flores. That suggests that modern humans may have a folk memory of sharing the island with another human species.

The discovery is resulting in a major revision of theories of hominid evolution and dispersal in this part of the world. It could be that the first human may not be African at all but from the other side of the world. Did *Homo* evolve in Asia and move to Africa rather than the other way around? Maybe Eugène Dubois was correct that the ancestors of Man lie in the East. The explanation reported in the prestigious science journal *Nature* has, however, been questioned. An analysis, published in *Proceedings of the National Academy of Sciences* for August 2006, says the small head was probably a case of microcephalia, a developmental condition often inherited and that the bones do not represent a new species at all. It states that a far more likely explanation is that the bones belonged to a sick modern human being who suffered from microcephalia, a disease which causes small brain size, often associated with short stature. This conclusion has, needless to say, been roundly rejected by Professor Mike Morwood of the University of New England, Australia, the co-discoverer of the hobbit with Professor Raden Soejono of the Indonesian National Research Centre for Archaeology.

Peter Brown, one of the authors of the original University of New England paper, was quoted in the January 2006 edition of *Discover* magazine as saying that Robert Eckhardt, one of the authors of the *Proceedings of the National Academy of Sciences* was as 'thick as a plank' for trying to refute *Homo floresiensis*. Eckhardt, attending a scientific meeting, took off his shirt and had his wife measure his chest. He said, 'We were able to establish to the satisfaction of the audience of 300 people that I was in fact thicker than two short planks'.

Dean Falk, world-renowned paleoneurologist and chair of Florida State University's anthropology department, along with an international team of experts,

compared computer-generated reconstructions of microcephalic human brains and normal human brains and concluded the hobbits' brains were properly classified with normal humans rather than microcephalic humans. The hobbit's brain is unique and nothing like a microcephalic's. It merely got rewired and reorganized and is consistent with its attribution to a new species. These findings were published in the 29 January 2007 issue of the journal, *Proceedings of the National Academy of Sciences*.

The debate goes on. In March 2008 Dr Peter Obendorf and Dr Ben Kefford, from RMIT's School of Applied Sciences, and Professor Charles Oxnard of the University of Western Australia, published their findings that the hobbits were dwarf cretins and human. Their small stature and distinctive features were the result of severe iodine deficiency in pregnancy in association with a number of other environmental factors. Iodine was absent from their diet. Its main source is in fish and seafood which would have been at least 14.9 miles (24 kilometres) away on the coast. Need I say that the claims are disputed by the team that found the hobbit?

## **Out of Africa 1**

The origins of *Homo erectus* are uncertain, but most experts think they originated in Africa about 1.9 million years ago. Their departure from Africa has been called 'Out of Africa 1'. They probably left in search of food but maybe it was a case of the Everest syndrome, a desire to explore new lands simply because they were there. Their descendants, acclimatised to new climates, moved on bit by bit, until they reached Java and China.

## **Out of Africa and Multiregionalism**

*Homo erectus* evolved into our species *Homo sapiens* ('wise man') between 400,000 and 130,000 years ago, most probably about 195,000 years ago. The debate at the two extremes is whether our species evolved only in Africa or also and separately in other parts of the world where *Homo erectus* has been found, such as Java and China. The Multiregional theory is very much a minority view, especially since the recent advent of genetic research. Most people now support the Out of Africa theory. The terminology is confusing, as even the Multiregionalists agree that *Homo erectus* was originally from Africa. We are just talking about the date that we, and the Balinese, came out of Africa and survived. It is thought that Java Man and Beijing Man became extinct, and all modern humans emerged from Africa in the second wave, the event being called 'Out of Africa 2'.

## **The Eve Gene**

One tiny piece of our DNA ('deoxyribonucleic acid') is very stable and inherited

only through the female line. It is mitochondrial DNA, popularly called the Eve gene, and mutates approximately once every 1,000 generations. By knowing all the different mutations around the world, we can reconstruct a gene family tree on the female side, right back to the shared mother of that gene. Because of the consistent rate of mutations, we can also calculate the time when mutations occurred and the age of the person we are testing.

Genetic evidence has added greatly to archaeological and fossil evidence and brought new theories and revisions to existing ones. From the late 1990s migrations of humans around the world have been traced and when they took place. We now know that there was a single common female ancestor for all non-Africans. She came out of Africa and has been called 'the African Eve'. The population of Africa, when *Homo sapiens* came into being around 195,000 years ago, may have been only between 2,000 and 10,000 people. We, and the Balinese, made it by the skin of our teeth.