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27. Indonesia: Land of Volcanoes, Heart of Fire

by
Wimpy S. Tjetjep
Asnawir Nasution
Susan F. Hodgson

“To obtain heavenly elixir, *amerta*, the gods sent Anantabhoga to uproot mighty Mandara mountain. The tortoise Akupa went under the milky sea, to be the fulcrum on which the mountain would rest. ‘Be kind, great ocean, and let your waters be parted by this island. Great will be the rejoicing in the three worlds when *amerta* has been distilled.’ Divine serpent Basuki was the rope, wound about Mandara mountain. As the rope was pulled the mountain would turn to churn the milky sea.

“King of the gods Indra sat, steadying the mountain, on its peak. Ready to begin work, the gods held the tail end of the serpent, the demons its head. As they pulled in turns, poisoned fire appeared in the snake’s hot breath. But their striving did not diminish, as both sides struggled mightily, joyously, to obtain the elixir. The sea rumbled as thunder, and all nature on Mandara mountain was in turmoil for the churning....”

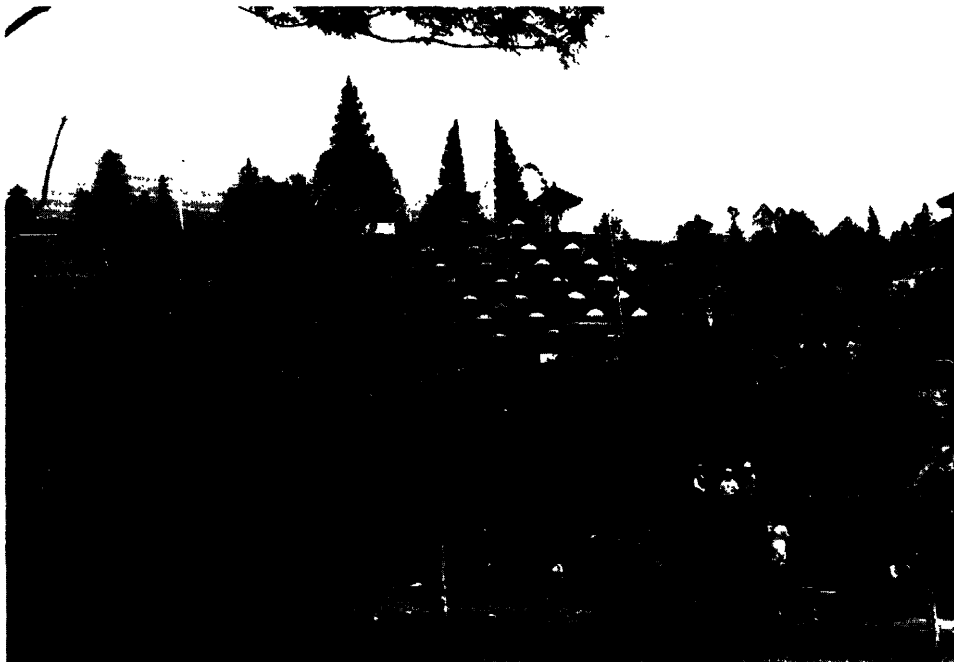
—From a Balinese version of the *Adiparwa*, the creation sequence and first book of the great Indian epic, *Mahabarata*. Translation by Mary Zurbuchen and I Wayan Wija (Lueras, 1987)

ORIGINS AND INFLUENCES

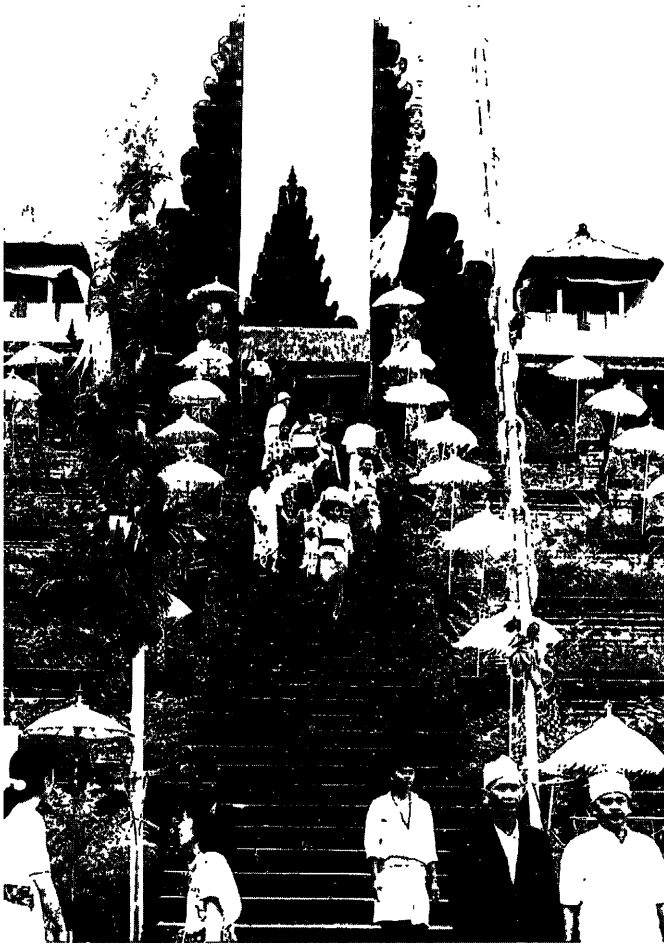
THE STORY OF INDONESIA IS WOVEN ON A GEOTHERMAL LOOM. MANY COUNTRIES POSSESS AREAS with geothermal resources, but few have almost all national territory on volcanic terrain. In Indonesia almost every island is volcanic, and volcanoes and other geothermal phenomena reverberate from the core of ancestral memory. The chapter starts with geothermal influences from over a millennium and a half ago when Indian religious traditions first came to Indonesia, reaches into mists of prehistory for ancient legends and beliefs, and returns at last to modern-day practices.

It was gradually, early in the first millennium, that Indian culture came to Indonesia, introduced by early Indian traders who described Indian Hinduism and Buddhism to the islanders and entertained their own countrymen back at home with tales of the rich, volcanic islands. From this mutual exchange of cultural and material goods on a constantly increasing scale, which on Indonesia's part extended to trade with China and additional Buddhist influences from that quarter, a peaceful amalgamation began of Indonesian, Hindu, and Buddhist beliefs. According to Claire Holt (1967), such blending continues today about 1,600 years later, and the present religion of Bali is an offshoot of the union.

Many intricate structures built throughout Indonesia in basalt and other volcanic rocks express the evolving religious consensus, and these structures reached their creative peak in the 7th through the 10th centuries. Much designing and building was supervised by Indian Hindu or Buddhist priest-architects, commissioned by Indonesian political rulers to base the undertakings on Indian treatises of the arts, called *shastras*. The earliest reference to priest-architects is from Indonesia's earliest known stone inscription, found in East Borneo and dated about 400 A.D. The Indonesian builders and the Indian-trained carvers must have given their own countrymen new knowledge of the great Indian epics and Buddhist legends and fables, creating inspiration



Pura Besakih, the greatest Balinese temple, is on the southwestern slope of the volcano Gunung Agung. The huge complex was begun in the 8th century and building has continued ever since. Note the split gate, the *candi bentar*, in front of the Bale Pegat, a shrine with three seats enthroneing the three aspects of God.



Close up of the *candi bentar*, the split gate, whose carefully carved sides blend with the multi-roofed temple pagodas.

for the chants of the storytellers and designs sculpted in relief on the narrative stones decorating Java's ancient sanctuaries (Holt, 1967).

A Cosmic Mountain is important in many early Hindu creation epics, and perhaps Indian cosmology matched naturally with the Indonesian concept of a sacred mountain, such as the volcano Mount Semeru on the island of Java and the volcano Gunung Agung on the island of Bali, considered the seat of the gods. Certainly the Cosmic Mountain theme has influenced many religious and secular forms of expression on Bali, such as the *candi bentar* ("split gates") found on the island. These stylized temple entryways of carved volcanic rock resemble triangular, erect stone slabs, shaped like volcanoes with the

mountain slopes carved from the base to the top into ever-smaller upturned curves. Split vertically down the center and pushed apart slightly for passage, the halves are said to represent the two parts of the legendary Cosmic Mountain separated by the Hindu god Shiva, who placed both halves in Bali, one as the volcano Gunung Agung and the other the volcano Gunung Batur, the island's second highest peak (Lueras, 1987).

Another mountain symbol found in Bali is the tapered temple pagoda itself, or *meru*, which rises from a basalt base in a series of stylized roofs, three to eleven in number, each smaller than the one below, the count depending on the Hindu deity or deities honored (Lueras, 1987). Such pagodas are part of Bali's pavilion courtyard architecture, which was influenced by the Javanese in the 15th century, a time when many Hindus fled the growing influences of Islam on that island.

SHRINES AND MONUMENTS

IT IS NOTEWORTHY THAT THE VOLCANIC THEMES FEATURED IN INDONESIAN BELIEFS AND THE volcanic influences—sometimes cataclysmic—woven throughout Indonesia’s everyday life have not led to an emotive cosmology filled with eruptive violence and impassioned chaos. From the earliest times, the Balinese have believed in an ordered universe stretching from the heavens and the volcanic peaks, home of divine spirits who bring prosperity and good fortune, “down to the plunging depths of the sea, home for threatening, harmful forces. Everything within nature has direction, rank, and place. All that is holy is associated with height, the mountains, and the direction upstream toward the majestic volcano Gunung Agung. All that is threatening or harmful belongs to the forces of the underworld, the fathomless ocean and the direction downstream toward the sea” (Black et al., 1993). The fertile plains between the two extremes are home for



Map of Indonesia, showing the locations of the major islands in the archipelago.

the Balinese, who strive through ritual to maintain harmony between the poles (Black et al., 1993). Balance, order, and control without exaggerated contrast prevail in uniquely Indonesian Buddhist and Hindu expression, without the drama of Indian evocation. The great Indian poet Rabindranath Tagore once exclaimed on a 1927 visit to Indonesia, “I see India everywhere, but I do not recognize it.”

Perhaps the most famous and inspired Buddhist monument in Indonesia is the Borobudur, found on Java, near the City of Yogyakarta. The 7-acre shrine, built on a hilltop about 800 A.D., rises

VOLCANOES IN INDONESIA, THE GEOLOGY

“Beginning possibly around the end of the Cretaceous period, perhaps 63 million years ago, the deep-sea area and parts of the Sunda Shelf were compressed and folded, thrown up into two parallel ridges, which here and there appear above water as islands. This folding extends northwest beyond Indonesia. Its northward course is marked by the Nicobar and the Andaman Islands, the Arakan Range of Western Burma, and finally by the Himalayas, which swing westward. Each of the two Indonesian ridges has the shape of a great arc with a northwardly turning hook at its eastern end. The more westerly of these two ridges is marked by small islands that parallel the west coast of Sumatra, as well as by Sumba, Timor, and the Tanimbar (Timor Laut) group, with Ceram and Buru forming the hook. The eastern ridge is marked principally by Sumatra, Java, and a single line of islands from Bali to Wetar, with the Bandas at the tip of this arc’s hook. The two ridges are different in certain geologic features, notably in the degree of volcanic activity. On the islands of the westerly arc, such activity has nearly or quite ceased, and ominous volcanic peaks are not a prominent feature of the landscape. In contrast, the islands of the easterly arc are dotted with volcanoes. Indeed, from almost any point in this arc at least one volcanic cone is likely to be visible, perhaps slumbering blue-gray on the distant horizon, or perhaps actively trailing a plume of smoke by day, and reddening the sky by night. A majority of Indonesians spend their lives in sight of a volcanic crater.

“Indonesian volcanoes are not confined to the easterly ridge, for they are also present on Sulawesi and in the Northern Moluccas. In the stretch of islands from Sumatra and Java eastward through the Bali-Wetar chain, and thence northward through Sulawesi and the Moluccas, more than 400 volcanoes exist, and more than 100 of these have been active in historic times. About 77 of them are regarded as still active, but the figure is tentative, for a crater will occasionally come to life after decades or even centuries of quiescence. For example, in the year 1646 the little volcanic island of Makian, west of Halmahera, was rent by a violent eruption, which opened a chasm into the heart of the crater. In 1860, when the English naturalist-explorer Alfred Russel Wallace visited Makian, he found it clothed to the summit in vegetation, and with a dozen populous villages on its flanks. But in 1862, after 215 quiet years, Makian exploded again, killing most of the inhabitants, showering the islands with ash, and darkening the air with dust at Ternate 35 miles away.

“As another example, in 1883 the volcanic island of Krakatau (more accurately Rakata), west of Java, blew up with inconceivable violence, a blast in the 10,000-megaton range. Six cubic miles of Earth, rock, forest, farms, people, livestock, and wildlife were blown into the upper atmosphere to drift as dust for years, providing the world with unusually colorful sunsets.... Gunung Agung (‘prominent mountain’) on Bali, quiet for more than a century, erupted three times in 1963, taking 1,700 lives and leaving 87,000 people homeless; and then nearby Batur, quiet since the 1920s, exploded and forced 1,200 people to flee their villages. Papandajang in Java is now about 8,600 feet high, but it was once much higher; in the year 1772 it blew its summit away, destroying 40 villages.

“[Except for a nonvolcanic peak in New Guinea called Irian Barat], the highest elevations of Indonesia are provided by volcanoes, active or otherwise. On Sumatra, Kerintji is 12,484 feet high. Almost as high, at 12,224 feet, is Rindjani on Lombok, just east of Bali. Rindjani is often called simply Lombok Peak, for its towering presence dominates the comparatively small island.

“The Indonesian population is strongly concentrated in regions of recent or continuing volcanic activity.... This situation would at first appear surprising, but it is easily explained. Young volcanic soils are by far the most productive ones, indeed the only ones that could support a large population of farmers. The rural inhabitants of Indonesia feel that any given volcano is likely to erupt only at long intervals. In the meantime, why starve on poor land? So the farmers...move to fields by a volcano for the promise of richer soils” (Neill, 1973).

on four rectangular and three rounded terraces of andesite—a volcanic rock—forming themselves a mountain in the volcanic skyline, a home for the gods. A supreme creative achievement, the Borobudur represents Mahayanist Buddhist belief in the form of a *mandala*, an aid to meditation, and climbing the monument replicates the journey of mankind from Earthly travail to eternity. Walking in contemplation around the terraces up to the top of this shrine, one passes on the lower four levels sacred texts illustrated by 1,460 sculptures on over 1½ miles of bas-relief panels depicting the pleasures of Earthly life. Along the three upper circular terraces, the panels end and the atmosphere changes to the serene, unadorned simplicity of cosmic bliss. One passes Dhyani Buddhas meditating, protected by open *stupas* (see photo at the beginning of the chapter). “On the highest terrace of all a single enormous *stupa* rises, enclosing—invisible to the human eye—that which stands for the Buddha himself—empty space—for the Buddha is the beginning, the center, and the end of all life” (Vlekke, 1960).



The Borobudur, near the City of Jogjakarta on Java. The shrine was built about 800 A.D. *Information Division, Embassy of Indonesia*

Hindu art in Indonesia is equally famous and equally influenced by volcanic surroundings and materials. The supreme emanating force in Hinduism is the god Shiva, the destroyer. At a Javanese Shivite site in a collapsed caldera on the heights of the Dieng plateau, remains of temple groups dating perhaps from the early 800s stand on a volcanic terrain of hot springs and sulfurous fumes. The temple city in this sacred place once held not only the priests and their attendants but many pilgrims, including royalty. It was a “proper abode for divine ancestors from whom Javanese kings eventually claimed their descent” (Holt, 1967).

One of the most sacred places in every temple on the island of Bali is a shrine for offerings dedicated to the volcano Gunung Agung. These shrines have conical roofs peaked with a spire



Looking across the plain from a high terrace of the Borobudur. *Information Division, Embassy of Indonesia*

of twisted fiber. High on the southwestern slope of Gunung Agung is Bali's most sacred "mother temple," the Hindu complex of Pura Besakih, first built in the 8th century and added to ever since. The rite of Eka Dasa Rudra, the largest and most sacred ceremony in Bali, is held to purify the universe once every 100 years at the Pura Besakih temple. During the ceremony, animal sacrifices are thrown directly into Gunung Agung's crater (Lueras, 1987, with reference to Peter Jennings, 1969). Colors associated with the shrine are red, white, and black: red symbolizing the Earth as lava, white symbolizing light, and black symbolizing water and outer space (Black et al., 1993).

In 1963, preparations for the Eka Dasa Rudra ceremony had begun when fire and ash spewed from Gunung Agung, dormant for over a century, a sign that a priestess interpreted as a sacred portent sent to purify the temple. By the time of the great sacrifice, the volcano was issuing thick, dark columns of smoke and shortly afterward, Gunung Agung erupted, destroying hundreds of homes, taking about 1,700 lives, and leaving about 87,000 people homeless. The priests then decided the calculations had been wrong and reheld the ceremony in 1979 without incident at the ancient site, most likely a terraced sanctuary from prehistoric times where the god of Gunung Agung was worshiped and received offerings (Black et al., 1993).

Rocks ejected during volcanic eruptions are called volcanic bombs and volcanic blocks. These spinning mixtures of lava and rock, shaped by flight in air, usually are sized somewhere between a fist and a football, with some vastly larger and weighing tons. After an eruption, the people of Bali select from the larger rocks sacred shrine objects, new sites for homage and regular offerings (Lueras, 1987).

From the beginning in Indonesia, when people at the end of the Stone Age first lived together in permanent settlements, belief in animism probably existed, the conviction that natural phenomena and objects, like wind, rocks, and trees, have souls and were formed by good and evil supernatu-

ral forces. At pyramidal *maraes*, stone platforms of volcanic rock, the early people of Bali gathered to invoke the blessings of natural phenomena, including the mountains. They called on spirits of their ancestors in the high places, at the tops of volcanoes (Lueras, 1987). They also used these high places for city planning, for ancient peoples “placed linear mountain villages on axes aligned radially from the centers of Bali’s three great volcanoes” (Black, et al., 1993).

Still today, “high volcanoes are regarded to have a life and spirit of their own, and are venerated. The ruling princes of Central Java send elaborate propitiatory offerings, including precious



Incredible view of the steep peak and the crater of Merapi volcano, Java. Propitiatory offerings of precious silk textiles are thrown into the crater. The very active volcano is kept under volcanic watch. *Information Division, Embassy of Indonesia*

silk textiles, to be thrown into the craters of the towering Lawu, Merapi, and Merbabu volcanoes. In East Java, the Tenggerese hold annual ritual processions to the top of Mt. Bromo, making offerings at the edge of its crater” (Holt, 1967).

GEOTHERMAL LEGENDS

SOME LEGENDS TELL HOW THE VOLCANOES CAME TO BE. ONE SAYS THAT MOUNT MAHAMERU, the Indian World Mountain and abode of the gods, was brought to Indonesia. The highest mountain of East Java is called Semeru, and “a description of the legendary transportation of the gods of the Semeru to Java is given in a 16th century East Javanese work, *Tantu Panggelaran*. An attempt to plant the mountain in the west caused the island to tip, so that for the sake of balance it was moved eastward. On the way pieces kept chipping off its lower rim, and thus the mountains Lawu, Wilis, Kelud, Kawi, Ardjuna, and Welirang were formed. The mountain’s damaged foot made it difficult to steady it on the spot; it shook, and the top cracked off and fell away, becoming Mt. Penanggungan” (Holt, 1967).

A West Javanese legend from the famous Sundanese Sang Kuriang myth explains how the truncated volcano Takubang Prahu was created. It was made by an unwelcomed suitor who hurriedly tried to build a mountain overnight on demand of a woman whom he desired. Unbeknownst to him she was his mother, and she frustrated his labors by causing a cock to crow prematurely, falsely signaling the arrival of morning (Holt, 1967).

Not only were early religious rites and legends centered around volcanoes and volcanic rocks, but practical uses were made of volcanic resources, such as obsidian. Knife blades, points, and scraper-like instruments fashioned of obsidian, probably dating from the last Paleolithic age, were discovered in two caves in Central Sumatra (Heine-Geldern, 1935). Such paleolithic uses may continue today in New Guinea, where a sago pick-head of obsidian was seen and where leaf-shaped points of obsidian may tip the shafts of hunting arrows (Neill, 1973).

HOT SPRINGS

INDONESIAN HOT SPRINGS, SITES FOR ACTIVITY IN THE EARLIEST TIMES, STILL ARE USED FOR religious ritual, medical cures, and pure enjoyment. In ancient times, the Balinese believed in

omens. Hot springs and fumaroles were considered sacred places and most were in remote areas, isolated tropical jungles on the volcanic slopes, usually reached after hours of walking. Here dying animals were sometimes found, along with strong smells of sulfuric acid. The villagers considered the sites mysterious places that could kill innocent animals, a sign, they believed, from God to do the right thing. To inform visitors to be careful and to be on their best behavior, the people built *puras*, special places for praying, close to hot springs and fumaroles. On the slopes of Mount Batukau, one of the three highest volcanoes on Bali, the holy hot spring of Air Panas issues from a river bank. Spirits are believed to frequent unusual natural areas such as this, and at a small temple people pray and leave offerings (Black et al., 1993).

In Lombok, four natural hot spring areas are in isolated areas of tropical jungle, on the flanks of the inactive Nanggi volcanic complex. Most natives of Lombok are of the Sasak Tribe, who believe in God and believe that any disease may be cured at hot springs. In a special month, close to Ramadan, a leader takes hundreds of old and young people from the tribe to the hot springs. They spend one or two days camping by the springs, submerging themselves in small hot spring pools, hoping that this, plus faith and prayer, will cure their ills.

On the islands of Sumatra, Nusa Tenggara, and North Sulawesi farmers usually bathe in the hot springs on returning home from the fields. They believe that the hot mineral waters will cure many diseases. Some hot springs have carbonate deposits useful for tooth ailments, especially those of the elderly.



The great fumarole (in Dikit Geothermal Field) in the Humluyang caldera, Central Barisan volcano, Jambi, island of Sumatra. Hot springs and fumaroles cross the caldera along a fault, and farmers use the hot water to treat the fibers they weave into handicrafts. *N. Akbar, 1978*

On the island of Sumatera, farmers in the Kerinci area of Jambi submerge rattan and wild pandanus leaves into hot springs for several days to increase the strength, durability, and pliability of the fibers. The rattan and leaves are woven into handicrafts, such as mats and baskets.

Some hydrothermally altered rocks turn to white clay. In Indonesia, this clay usually is found around fumaroles in remote areas. Villagers use the clay to paint walls instead of purchasing paint, for the clay is free and readily available to dig out and carry away. Such clay is used in small villages like Sembalun on the eastern part of Lombok and Marga Bayur on the southern part of Sumatera.

In the fumarole areas of Tompasso and Bora, Northern and Central Sulawesi farmers use the heat from fumaroles to cook corn, sweet potatoes, and eggs.

From the beginning, geothermal resources in Indonesia have nourished both body and spirit, offering pleasure and danger, beauty and horror to a populace who understands well that nobody knows what the next moment will bring in a terrain of volcanoes with a heart of fire.

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The Authors:

Wimpy S. Tjetiep
and
Asnawir Nasution
Volcanological Survey of Indonesia
Jalan Diponegoro No. 57
Bandung, Indonesia
Telephone: 62.22.771402
Fax: 62.22.70276

Susan F. Hodgson
California Department of Conservation
Division of Oil, Gas, and Geothermal Resources
801 K Street, MS 20-20
Sacramento, CA 95614-3530 USA
Telephone: 916.445.9686
Fax: 916.323.0424
E-mail: shodgson@consrv.ca.gov



**"Bella, a Maori guide, sitting at the edge of Rotorua geysers."
By William Henry Jackson, 1895. *The Library of Congress***
