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STUDIES IN CERAMICS

KHMER CERAMICS

BY DAWN ROONEY

From the dust jacket:

Amongst the wealth of ceramic ware from South-East Asia, the ceramics of the Khmer empire of Angkor are probably the least well-known, just as this aspect of the art and culture of that great civilization is also the least explored. In this important contribution to the growing body of literature on the ceramics of the region, the author presents the first comprehensive study of Khmer ceramics to be published. The study examines the background, influences, characteristics, shapes and uses of this branch of the ceramic industry and provides the reader with a composite picture of the Khmer contribution to the craft. The volume is lavishly illustrated with twenty-five colour plates and more than one hundred black and white pictures and drawings of examples of Khmer ware, providing examples many of which are in private collections and therefore not accessible to the general public.

Dr. Dawn Rooney is an art historian and presently lives and works in Bangkok.

Jacket illustrations:

Front Pot; diam. 6 cm; first half i2th century; brown monochrome.

Back Urn ; ht. 60 cm ; 12th century ; The Thompson House, Bangkok Ace. No. 611, brown monochrome.

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To Jim and Sarah

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Photo Credits

Museums which supplied photographs for this book are:
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Tokyo National Muséum
Virginia Muséum.
All photographs of pieces in private collections were taken by James P. Rooney.

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Glossary

Angkor—centre of the Khmer Empire from AD 802 to 1432;located in Kampuchea

anthropomorphic—used in a ceramic context to identify a form that is shaped or decorated to resemble a human or divine being

applied—potting term; a separate piece of clay is applied or added to the basic form, giving it a dimensional appearance

Ban Kruat—Khmer kiln site in Buri Ram Province, Northeastern Thailand *(ban* is the Thai word for 'village')

Ban Phluang—Khmer temple in Surin Province, Northeastern Thailand, where a large quantity of Khmer ceramics have been excavated

biscuit—potting term; a fired but unglazed clay form; alternative name: bisque

carving—potting term; a method of decoration; cutting a design into clay with a broad tool; similar to incising but leaves larger impressions

celadon—glaze with the following characteristics: an iron oxide content, a green colour, and fired in a reducing kiln atmosphere

coiling—potting term; method of forming a vessel by building up the walls with ropelike coils of clay

cover—movable top of a vessel; an essential part of the total form

crazing—potting term; a fine network of cracks visible in the glaze, not done intentionally; different degrees of shrinkage in the body and glaze cause tension

devaraja—manifestation of a god in the person of a king

Dong-son—a culture centred in Vietnam; existed approximately from the fifth or fourth century BC to the first century AD; primary products were bronze artifacts

earthenware—low-fired clay (85O°C-1,100°C); porous; usually red or tan colour

finial—ornament used at the top of an architectural structure

flange—used in a ceramic context to identify a ridge on a vessel

incising—potting term; method of decoration; cutting a design into clay with a pointed implement that is moving

Kampuchea—country in South-East Asia, formerly called Cambodia; homeland of the Khmers and their culture

kendi—vessel characterized by an opening at the neck and a spout on the side; used for drinking

Khmers—ancient inhabitants of Kampuchea who established the Angkorian empire; their modern descendants

laterite—a residual product of rock decay abundant in the soil of Kampuchea and North-eastern Thailand; characterized by a porous texture and a red colour; hardens on exposure to air; used as a building material, particularly for foundations of Khmer temples

lid—movable top of a vessel; used to close an opening in a hollow receptacle

Lop Buri—city in central Thailand; a former Khmer stronghold

luting—potting term; two unfired pieces of clay are luted or joined together, usually with liquid clay

miniature—very small ceramic vessel; any form under five centimetres in diameter or height

modelling—method of forming a clay shape by hand

naga—semi-divine serpent in Hindu and Buddhist mythology

oxidizing firing—potting term; an atmosphere in the kiln when a sufficient or excessive supply of oxygen is available

pooling—potting term; collection of glaze where colour darkens and texture thickens

reducing firing—potting term; an atmosphere in the kiln when there is an insufficient supply of oxygen

shard—broken pottery fragment; alternative spelling, sherd
slip—liquid clay; often used to coat a vessel before decorating or glazing
stoneware—high-fired clay (1,100°C-1,25O°C); non-porous, dense, usually grey in colour but may be tan or red
Two-colour—classification for Khmer ceramics with a combination of green and brown colours on a single vessel
varman—suffix often attached to the names of Khmer kings, meaning the protected or protégé
waster—irregularly-shaped ceramic vessel as a result of damage in firing

References to Published Examples
(see Bibliography for details of works cited; figures in brackets refer to plate numbers in the relevant works)

1. Willetts: Ceramic Art of Southeast Asia
   Bird-shaped pot(I); Ant-eater(2); Bowl(10); Jar(7); Pot(3, 4).

2. Brown: *The Ceramics of South-East Asia: Their Dating and Identification*
   Bird-shaped pot(I/3, L/3); Elephant(I/4, J/3, M/4); Frog(78); Rabbit(K/4); Turtle(77); Finial(69); Basin(70); Bottle(68, J/4, 75); Bowl(67, 76, I/2); Box(79); Conch(71, 82); Jar(K/3, 83, 72, 73, 85); Pot(L/4 L/I); Urn(K/I, M/I).

3. Stock (ed): *Khmer Ceramics: 9th-14th Century*
   Bird-shaped pot (10, n, 42a, 42b, 523, 53a, 53b, 53C, 53d, 64, 66a, 66b, 66c, 79a, 79b); Jungle-fowl-shaped pot(78); Owl-shaped pot(8oa); Elephant(87, 88, 89, 90, 93); Fish(94, 97); Rabbit(43, 44, 96), Tile(4); Bottle(27b,46, 47); Bowl(14, 15, 16, 60, 8, 9, 82, 17, 18, 19, 20); Box(25); Conch(36, 37); Jar(28, 29, I, 30, 31, 38, 39, 40, 59, 73, 85, 86); *Kendi(62);* Pot(49, 50, 69a, 69b, 70, 71, 72a, 72b, 84b, 92, 48, 51, 55, 56); Urn(41, 57, 58, 83).

4. Brown *et al: Legend and Reality: Early Ceramics from South-East Asia*
   Bird shaped pot(39a, 39b, 40, 42, 43, 44, 45a, 45b); Owl-shaped pot(4i); Elephant(5O, 51, 57); Fish(101, 103); Rabbit(49, 54, 55); Ant-eater(56); Cat(46, 47, 48, 94); Deer(52); Pig(53); Tile(97); Bottle (65, 69a, 69(b); Bowl(29, 31, 32, 33, 35, 37, 38a, 38b, 84, 85); Box(59a, 59b, 60, 61, 62); Jar(86, 63, 64, 90, 91); *Kendi(96);* Pot(74, 75, 76, 77, 78, 79, 80, 81,82, 8_3a, 8_3b, 8_3c)

5. Frasche: *Southeast Asian Ceramics: Ninth through Seventeenth Centuries*
   Bird shaped pot(13); Elephant(10); Rabbit(11); Bowl(6);
   Box(2); Jar(3, 4); Pot(8, 9); Urn(1)

6. *South-East Asian and Chinese Trade Pottery: An Exhibition Catalogue*
   Bird-shaped pot(237); Elephant(241); Cat(236); Bowl(242, 243); Box(234, 238); Jar(162, 233); Urn(245)

7. *South-East Asian and Early Chinese Export Ceramics*
   Bird-shaped pot (211, 213); Bowl (215); Jar (206, 217); Pot (2O9, 214)

8. Richards: *Thai Ceramics from the Art Gallery of South Australia, Adelaide*
   Elephant(4); Bowl(7); Jar(3, 11); Pot(5)

Museums Exhibiting Khmer Ceramics

Asia

National Museum, Kuala Lumpur.
Muzium Brunei, Kota Batu
Muzium Sabah, Kota Kinabalu
Muzium Seni Asia, University of Malaya, Kuala Lumpur
National Museum, Bangkok
National Museum, Jakarta
National Museum, Singapore
Tokyo National Museum

Australia

Art Gallery of South Australia, Adelaide National Gallery of Victoria, Melbourne

Canada

Royal Ontario Museum, Toronto

Europe

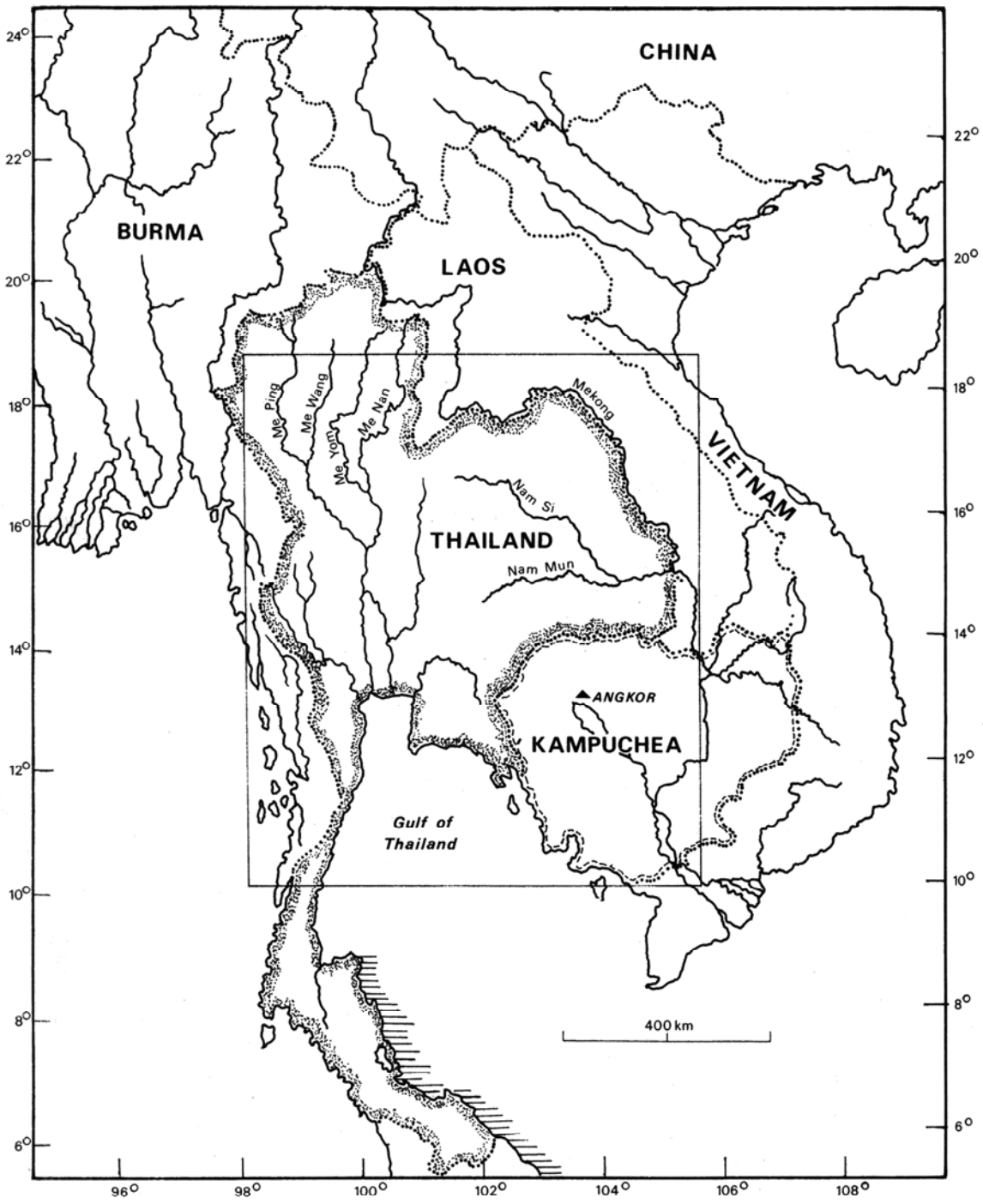
Gemeentelijk Museum Het Princessehof, Leeuwarden, The Netherlands
Musées Royaux d'Art et d'Histoire, Brussels, Belgium

United Kingdom

British Museum, London
Victoria and Albert Museum, London

United States

Asian Art Museum of San Francisco
Brooklyn Museum
Herbert F. Johnson Museum of Art, Cornell University, Ithaca, New York
Los Angeles County Museum of Art Metropolitan Museum of Art, New York Museum of Art, Pennsylvania State University, University Park
Philadelphia Museum of Art Towson State College, Baltimore, Maryland Virginia Museum of Fine Arts, Richmond



Map 1 Mainland South-East Asia

Introduction

KHMER civilization emerged from a background of organized states which flourished in the Mekong delta region of Mainland South-East Asia in the early centuries of the Christian era. It grew to become a powerful and dynamic empire. Between the ninth and early thirteenth centuries the brilliance of the Khmers was unsurpassed.

Ceramic legacies stimulate our awareness of this ancient civilization and serve to elucidate life in the Khmer Empire. Ceramics of the period reflect the strength and robustness that were characteristic of an expanding empire. These functional wares tell about the domestic lives of the ordinary people and give an insight into their economy, social structure, culture, and religious practices.

The appeal of Khmer ceramics lies in their simplicity. Only a few natural materials and basic techniques were used. The affinity of the clay and glaze materials with the earth becomes the strength of these wares.

Most Khmer ceramics were stonewares formed from clay with a high iron and sand content. The body is dense, hard, and impervious to liquids. The colours of the clay and glaze are warm and subdued, which is a characteristic of ceramics produced in surrounding cultures during the same period. The decoration on Khmer wares is unaffected and never dominates the shape. It is almost always an incised geometric design rhythmically repeated around the neck, shoulder, or body.

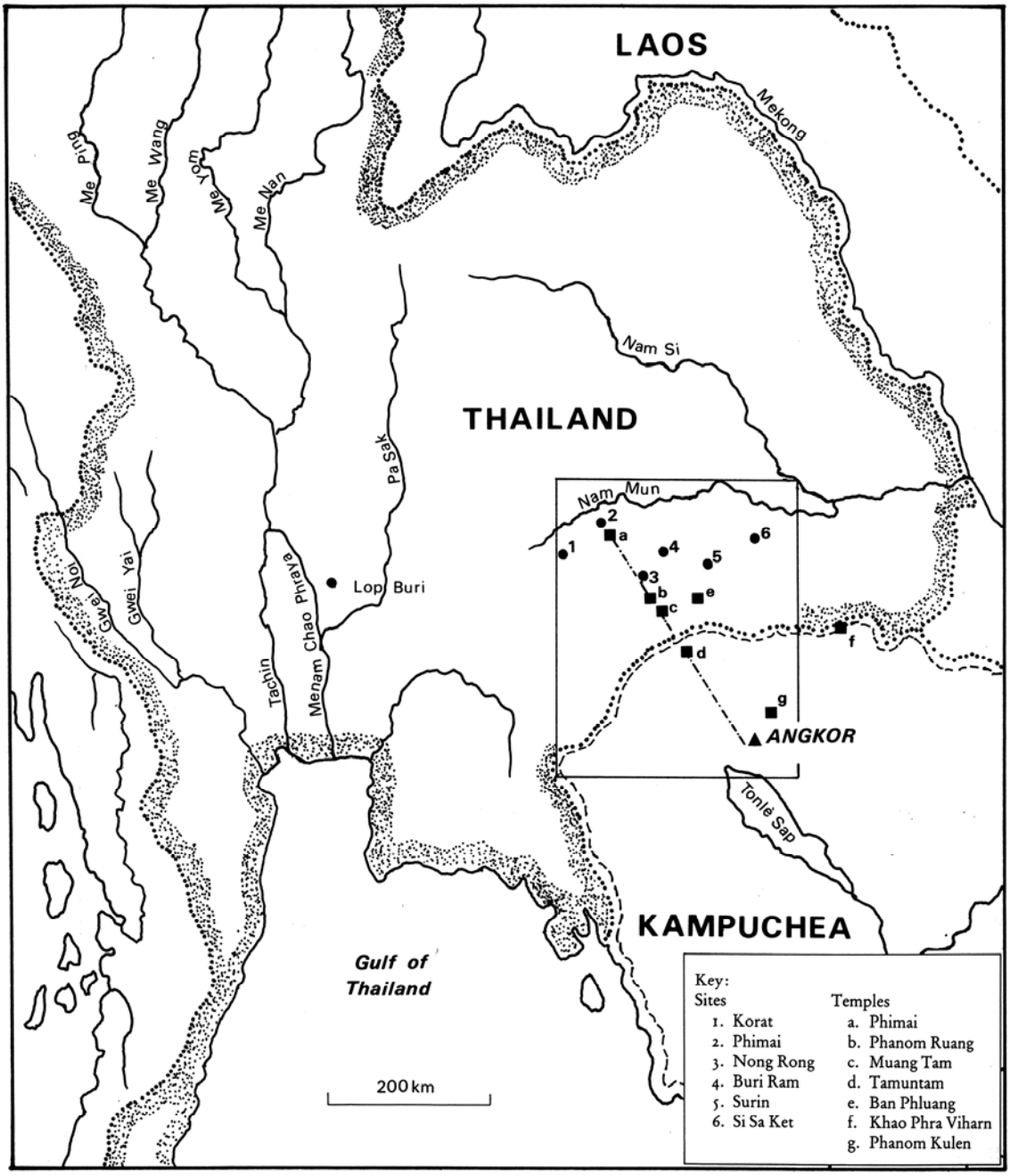
The simple and balanced forms with restrained decoration express sensitivity and an appreciation for the original qualities of clay. These sturdily potted stonewares have withstood the ravages of time and nature while the more fragile materials have perished. They are a valuable archaeological source for the reconstruction of the past as well as forming a model of Khmer craftsmanship; they serve to give an insight into Khmer civilization and remain for our aesthetic pleasure and enjoyment.

The geographic area that formed the nucleus of the Khmer Empire corresponded to modern Kampuchea, formerly known as Cambodia. But at the height of its power the boundaries of the Khmer Empire extended over most of Mainland South-East Asia and, in addition to Kampuchea, included major parts of the modern countries of Thailand, Laos, and Vietnam (Map I). Evidence of Khmer ceramic production has been found in two of these countries, namely Kampuchea and Thailand.

Nomenclature

Previously Khmer ceramics have been classified into groups and given names based on the chronology of rulers or the excavation dates of architectural monuments. But these classifications should be treated with caution as there is only circumstantial evidence that the development of Khmer ceramic production in the Angkorian period parallelled either the architectural styles or the reigns of the kings. Ceramic production seems to have been continuous between the ninth and thirteenth centuries, making it difficult to align it precisely with specific years of dynastic reigns.

The stylistic similarities between the wares found in Kampuchea and Thailand indicate that they evolved from the same art style and share a similar chronology. The relationship seems to be strong enough to group these wares collectively as ‘Khmer Ceramics’, regardless of their place of origin. Although certain shapes, clays, and glazes indicate the use of local materials and ingenuity, the general characteristics are similar enough to suggest that all the ceramics were produced under the cultural direction and influence of the Khmer Empire, which emanated from the capital at



Map 2 (Inset Map 1) Khmer Empire: sites in Thailand and temples in Kampuchea and Thailand relevant to Khmer ceramics

Angkor. However to enable a more precise classification, distinctions regarding provenance should be made, if known.

Documentation

The main source of information about the pre-Khmer states is Chinese dynastic records. However, the data are fragmentary, and a chronological sequence of the early historical period between the first and eighth centuries is incomplete. The history of the Khmers between the ninth and the fourteenth centuries is documented primarily by inscriptions, reliefs, and ceramics found in association with dated architectural sites. Inscriptions written on stone in Pali, Sanskrit, and Khmer have been found within the boundaries of the Khmer Empire and provide historical information beginning in the seventh century. The inscriptions describe the religious and official life of the Khmer kings and members of the court and relate the social structure of the slaves. An inscription may include the date or name of the reigning king, the names of donors, favoured gods, and original owners of the land; details of the price paid for the land; the type of revenue used for the transaction; a list of precious objects given to the foundation; warning of punishment for abuse of the foundation or its possessions; and the names and duties of donated slaves.[1]

Knowledge of the daily lives of the people is lacking, which limits investigation. The only direct account of Khmer life was written by Zhou Da-guan, a Chinese envoy, who lived at Angkor for one year in 1296-7. Undoubtedly his report was based on a comparison with China and was most likely assembled through an interpreter. He described the opulent life in the capital and, although the Khmer Empire was a weakened state in the late thirteenth century, this did not seem to have affected the inhabitants of Angkor.

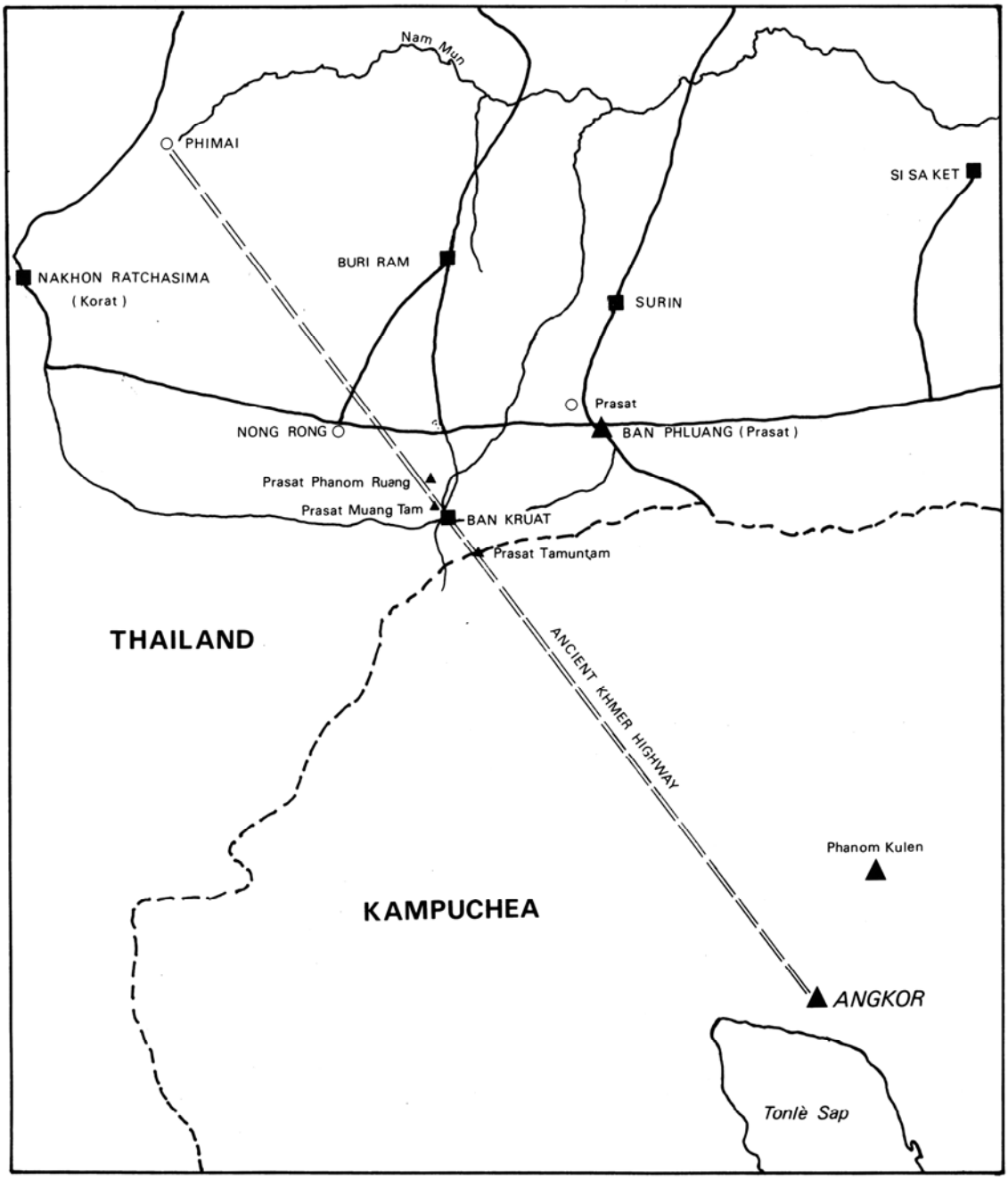
Direct evidence of the shapes of vessels is provided by scenes depicted on stone reliefs at Khmer temples, which offer an insight into the domestic and ritualistic uses of the wares, although the nature of the material is not easily discerned. It is difficult to distinguish between metal and ceramic vessels in stone representations.

Ceramic whole pieces and shards have been found at certain stratigraphie excavations of architectural sites, which provide dating parameters. In the late 1950s and 60s Bernard Groslier unearthed two Angkorian sites: the Royal Palace at Angkor Thom, and Sras Srang, a burial ground from the late eleventh and early twelfth centuries (Map 2).

Ground and aerial surveys indicate that there was a large Khmer population in North-eastern Thailand in the eleventh and twelfth centuries. Within an area of approximately 250 square kilometres over 100 Khmer temples have been identified. Evidence includes remains of ancient cities, reservoirs, and, of particular interest, an ancient highway on a laterite base built by the Khmers as a link between Angkor and Phimai. The highway crossed the Dangrek mountains and extended over 225 kilometres (Map 3).

One of the most complete archaeological ceramic excavations in Thailand took place at Ban (i.e., ‘village’) Phluang, a Khmer temple located in Surin Province, dated to the middle of the eleventh century. The temple fits into the Baphuon (1050—66) style of architecture. Over 4,000 pieces of ceramics were unearthed, representing the largest number of Khmer pieces ever found at a temple in Thailand. The shards were dated, classified, and whenever possible, reassembled into whole pieces.

Other sources used for documenting Khmer ceramics are surface finds from Ban Kruat, Buri Ram Province, in Northeastern Thailand, where kilns have been identified and surveyed, although excavations have not been conducted. A controlled and thorough study of the kilns would contribute toward an accurate method of dating



Map 3 (Inset Map 2) Ancient Khmer highway between Angkor (Kampuchea) and Phimai (Thailand) with relevant sites.

Khmer wares. Examination of Khmer pieces preserved in public and private collections is also useful. Another source available for identification is a stylistic comparison of the wares with other ceramics that were produced in contemporary cultures. Although a relatively large number of Khmer ceramics can be found in the antique market in Bangkok, Thailand, it is difficult and highly speculative to use this source for dating and classification because the origins are unknown.

The developmental stages in Khmer ceramic production are not clearly defined and archaeological evidence supporting the existence of Khmer ceramics from the pre- and post-Angkorian periods is meagre. Relatively few glazed Khmer ceramics attributable to the ninth century or earlier have been found in South-East Asia. Dating after the middle of the thirteenth century is extremely difficult because of the paucity of Khmer stone monuments built after that time. Sources of information on these two periods rely on random finds of complete vessels, which frequently lack documentation.

Finally, what information is available provides sufficient evidence to suggest a broad chronological development of Khmer ceramic production and an evolution of shape and decoration, which generally progresses in a cycle from simple to complex. Our knowledge is continually advancing with the aid of research, but there are still gaps in our understanding.

Geography

South-East Asia is a relatively recent name for the area situated south of China and east of India. It lies within the tropical belt on both sides of the equator. The countries comprising South-East Asia are Brunei, Burma, Indonesia, Kampuchea, Laos, Malaysia, the Philippines, Singapore, Portuguese Timor, Thailand, and Vietnam. In ancient times these political designations did not exist. The area was called ‘Nanyang’ or ‘Nan-hai’ (South Seas) by the Chinese. It was occupied by several groups of people who inhabited mainly the coastal and deltaic areas, and who were loosely organized into small states.

Two distinct regions can be identified: Mainland South-East Asia, comprising all the modern states in continental South- East Asia north of the Malay Peninsula, ^nd Island South-East Asia including Malaysia, Indonesia, and the Philippines. Although there is no common language among the countries of South-East Asia, there are broad similarities in terms of geography, climate, agriculture, flora and fauna, trade, culture, and religion.

Mainland South-East Asia is intersected by six rivers: the Irrawaddy, Salween, and Sittang in Burma; the Mekong in Laos, Kampuchea, and Vietnam; the Chao Phraya in Thailand; and the Red River in Vietnam. The northern part of Mainland South-East Asia is dominated by the Dangrek mountain range, extending 4,000 kilometres east and west. It is a natural barrier which limits inland contact between neighbouring countries. The less habitable interior and mountain areas are occupied by nomadic tribes. The southern part of Mainland South-East Asia is a coastal region supporting a maritime culture which has been exposed to trade with foreign countries since at least the beginning of the Christian era. The earliest cultures developed in the areas near river basins and the sea, where the soil was fertile and the environment suitable for habitation.

The contrast between the low coastal plains in the maritime region and the high plateaux on the mainland was apparent in prehistoric times. The technology of metallurgy seems to have been known in highland South-East Asia much earlier than in the lower areas. The cohesion of organized states took place in this part of Mainland South-East Asia. The differences between these two parts of Mainland

South-East Asia became increasingly pronounced in historical times. Even though the Khmer Empire included both the maritime and highland regions, the geographic and economic contrasts remained and impeded the unification of the areas.

The tropical climate of Mainland South-East Asia consists primarily of two seasons: wet (May-October) and dry (November-April). They are governed by two monsoons. The south-west, which comes across the Indian Ocean bringing rain during the wet season and the north-east monsoon, which blows from the continental mass of Asia bringing dryness to some parts of South-East Asia and rain to other parts. The average temperature is 27 degrees centigrade and the average rainfall is 100 centimetres.

'Kambujadesa' is the original Sanskrit name for what is today Kampuchea. In the inscriptions its inhabitants were called 'Kambuja' and later 'Khmer'. Covering 182000 square kilometres, it is bordered by Laos and Thailand in the north, Vietnam in the south and east, and Thailand in the west. A large fertile plain covers one-third of the region. The remaining two-thirds consist of forests. Mountains with rich deposits of granite and sandstone terraces encircle the plain, which is dominated by the Tonlé Sap Lake. The Mekong River and its tributaries flow through Kampuchea, and are important sources of fish and water.

Thailand, formerly Siam, covers 514000 square kilometres. It is bordered in the north by Laos, in the south by Malaysia, in the east by Kampuchea, and in the west by Burma. Thailand is divided into four geographical regions. The Central region is a low flat river valley dominated by the Chao Phraya River. Southern Thailand is a long panhandle with mountains extending for 1000 kilometres in a north-south direction. This area is a rich source of minerals. Northern Thailand lies between the Salween and the Mekong Rivers. It is characterized by parallel ranges of high steep mountains which form part of the Himalayan chain. The primary water sources are tributaries of the Mekong. The North-eastern region, where Khmer influence was greatest, is a dry, flat area that encompasses the Korat Plateau.

History

Although a date for the beginning of the Neolithic period in South-East Asia has not been firmly established, it is generally accepted that a settled social life existed in contemporary Thailand at least as early as the first millennium BC.[2] The inhabitants of the area were familiar with rice cultivation, the domestication of animals, the techniques of producing pottery, and the use of bronze. Religious beliefs focused on animistic and ancestral worship.

Excavations of pottery at prehistoric sites in Kampuchea and Thailand have increased our knowledge of the period and strengthened the possibility of the early existence of a well-developed social structure in South-East Asia which arose independently of external influences. The prehistoric pottery found in Mainland South-East Asia is characterized by a diversity of materials, shapes, decoration motifs, and potting techniques.

At least seven neolithic sites have been identified in five provinces in Kampuchea. They were occupied over a long period of time and experienced very little cultural change. Radio-carbon datings are based on an analysis of the remains of shells and coal. The oldest site is Laang Spean in Battambang Province. It was inhabited continuously between the fourth millennium BC and the ninth century AD. Bas-Plateaux is a later site in Kompong Cham Province, which was active between the second century BC and the eighth century AD.[3]

Evidence indicates that the neolithic sites in North-eastern Thailand were abandoned in the early centuries of the Christian era. It is therefore not possible to

piece together a continuous chronological evolution between the prehistoric and the early historic periods. However, excavations at three sites in Central Thailand have produced results which may help to close the gap. U Thong and Chansen began in the third or second century BC and were occupied until the seventh century AD. Phimai began at the end of the first millennium BC and developed continuously into historic times. In the eleventh century it was a provincial capital of the Khmer Empire, and a military headquarters for a Khmer king in the first half of the twelfth century. The material produced at these sites indicates that Central Thailand was a primary region for the development of iron metallurgy. It is probable that the early settlements in this area expanded and served as the forerunners of later civilizations in South-East Asia.[4]

The early historic period of South-East Asian habitation and development is neither clearly defined nor adequately documented by archaeological investigation. It seems likely that it was a period of movement of people, ideas, and boundaries. It was characterized by fluctuations among cultures, growth, expansion, and interaction with outside influences. The period was originally reconstructed with the aid of Chinese records. Subsequent translations of inscriptions in Pali, Sanskrit, and Khmer provided additional information and challenged some of the original assumptions. The primary point of change in the data supplied by the inscriptions is that the early historic period is identified with groups of people rather than with large kingdoms. These cultural groups were loosely organized into small states, which exercised varying degrees of power. They were not highly developed urban centres and most likely did not have a centralized or extended power equivalent to that of a kingdom. The states may have had capitals, although these have not been identified. Undoubtedly their inhabitants built temples for worship. The populations were probably migratory and shifted their centres frequently, perhaps for economic reasons such as the search for more fertile areas, for religious purposes, or because of pressure from their enemies.

Most of the inhabitants of Mainland South-East Asia migrated from southern China before the Christian era and settled in the Irrawaddy, Chao Phraya, and Mekong Valleys. Later they consolidated into identifiable groups such as the Mons, Pyus and Chams. The Burmans and the Thais moved into their present homelands later.

The Mons formed small states near the Salween and Sittang Rivers in Lower Burma and the Chao Phraya Valley in Thailand. In the sixth century AD, the first Mon state, Dvaravati, emerged. Its political and cultural centre was situated at Nakhon Fathom in western Thailand. Later the Mons established two additional centres at Lop Buri and Lamphun (Haripunjaya) in Thailand.[5] The Mon states were most prominent between the sixth and eleventh centuries. However Mon cultural influence continued in certain areas until the end of the thirteenth century. Mon culture was strongly influenced by India. It seems likely that the Mons may have served as disseminators of Indian ways for the surrounding areas which now constitute Thailand, Burma, Kampuchea, and Laos.

The Pyus established a capital at the ancient city of Prome (Srikshetra) in Lower Burma in the middle of the seventh century AD. Excavations at the site of the capital have helped to reconstruct the history of the Pyus. Chinese records describe the capital in the ninth century as a city enclosed by a massive wall, which was made of green glazed bricks, and was surrounded by a moat.[6] Diplomatic missions were sent to China at the beginning of the ninth century. At one point the Pyus controlled eighteen states.[7] The Pyu capital was either abandoned or destroyed in the first half of the ninth century, presumably by rebels from the north.

Shortly after the disappearance of the Pyus a group of Tibeto-Burmans migrated south from Tibet and settled at Pagan in Central Burma. They did not consolidate into a powerful state until the middle of the eleventh century when the king of Pagan

conquered the Mons in Lower Burma. Pagan fell to the Mongols in the last quarter of the thirteenth century.

Champa was located in the Mekong Valley, north of Funan. The area corresponds to central and southern Vietnam today. According to Chinese records, it was founded at the end of the second century. Indian influence probably reached Champa in the fourth century AD and Hinduism was the dominant religion. Linguistically the Chams belong to the same group of people as the Indonesians. Decorative motifs used on Cham temples in the late ninth and early tenth centuries reflect an Indo-Javanese influence. Geographically the region was not conducive to the development of a centralized state because of natural barriers. Fertile plains and deltaic areas suitable for rice cultivation were lacking. The Chams concentrated on maritime activities and developed into a strong naval power. After the collapse of Funan at the end of the sixth century (see below), the Chams extended their influence southward, but by the first half of the thirteenth century Champa was a province of the Khmers. Throughout history the Chams were enemies with the Vietnamese and the two groups spent much of their time fighting each other. Champa remained an independent state until the last half of the fifteenth century when it was finally absorbed by the Vietnamese.

The state of Srivijaya emerged at the end of the sixth century, after Funan had been conquered. Although archaeological evidence of the existence of Srivijaya is lacking, it is documented in Chinese records and in local inscriptions. It is believed to have been centred near modern Palembang on the island of Sumatra. Palembang was a major port of call on the sea route between India and China. Srivijaya continued to be a strong state until the eleventh century. It declined when the trade routes changed as a result of the growing piracy that plagued the Straits of Malacca and the Sunda Straits.

The Sailendras, an Indonesian dynasty, emerged in the eighth century in central Java. The growth of their power was associated with the rise of Buddhism. The Sailendras gained control of Srivijaya in the middle of the ninth century. The cosmic stone mountain of Borobudur was the Sailendra's cultural contribution to history. The dynasty remained in power until the fourteenth century.

The Thais migrated gradually from south-eastern China to the northern part of Thailand. One of the first centres of Thai power was established at Sukhothai in Northern Thailand at the beginning of the thirteenth century. About the same time the Thais conquered the Mon state of Haripunyajaya, and established the principality of Lan Na with its capital at Chiang Mai. The Thais also controlled the area at the mouth of the Chao Phraya River which later became the kingdom of Ayutthaya. Therefore by the end of the century, the Thais had gained control of a large part of modern Thailand.

One of the earliest of the pre-Khmer states was called Funan by the Chinese. It dates approximately from the second to the end of the sixth century AD. Its territorial boundaries are not clearly defined but it is believed to have exercised control over the area of modern Kampuchea, Central Thailand, and southern Vietnam. An important centre of Funan was Oc-eo, a seaport which was strategically located on the maritime trade route between India and China. Funan became an important centre because it controlled strategic land routes in addition to coastal areas. Funan was primarily a fishing economy but also produced rice, cotton, and sugar cane. A local trading system must have existed to supply the additional commodities required for subsistence. Funan built a highly developed canal system, which formed the base for the irrigation network used later at Angkor. The canals regulated the supply of water to the rice fields for cultivation and were used for internal transportation. The language of Funan was an early form of Khmer and its written form was Sanskrit.

Funan had contact with external cultures which resulted in an exchange of political, economic, social, and religious ideas. Indian and Chinese traders visited Funan. Chinese records refer to a political exchange that took place between China and Funan in the third century AD.[8] By the end of the fourth century, Indian influence was firmly implanted there and a Brahmin became king. During the late fifth and early sixth centuries, Buddhism co-existed with Hinduism in Funan.

Funan disappeared from Chinese chronicles after the seventh century. However, even though China considered it less important at that time, Funan may have continued to exist for a little longer. The survivors of Funan may have migrated or fled south to central Java in the eighth century to help found the Sailendra dynasty.[9] It is believed that Funan was conquered sometime between the middle of the sixth and the first quarter of the seventh centuries by Chenla, one of her vassals.

Chenla occupied the area of present day south-eastern Laos and eastern Thailand. Originally Chenla was an inland state. Maritime communications existed only after Funan had been conquered. At the beginning of the eighth century Chenla split into two parts: Upper (Land) Chenla, which bordered modern Vietnam, Thailand, and South China, and Lower (Water) Chenla, which bordered on the basins of the lower Mekong and the Tonlé Sap. Lower Chenla was the precursor of the Khmer Empire.

Hinduism and cult worships dominated at Chenla whereas Buddhism seems to have declined. The language was Khmer and the written form was in Sanskrit.

In the last half of the eighth century, an Indonesian ruler probably from Java staged a surprise attack on Lower Chenla. He beheaded the king, usurped the throne, and returned to Java.

Jayavarman II, a Khmer prince who may have been a descendant of the beheaded king, spent several years on the island of Java, perhaps to pay homage to the conqueror or possibly as a hostage. Late in the eighth or early ninth century he returned to Kampuchea from Java and established the Khmer Empire in 802.

The period which follows up to 1432 is known as the Angkorian period of Khmer history, taken from the name of the capital, which was either at, or near, Angkor. It is considered the classical period in the history of Kampuchea. It corresponds approximately to the Middle Ages and the Renaissance in Europe.

Inscriptions from the reign of Jayavarman II have not been found but it seems certain that he established himself as supreme ruler, initiated the cult of the *devaraja* (a Sanskrit word that means ‘the king of the gods’ i.e. favoured by the gods) as the official religion of the kingdom, and declared Kampuchea’s independence from Java. According to this cult, the king was a living god identified with the deities of his choice.

Concurrently a temple-mountain concept, which provided a suitable site to worship the god, was introduced. Succeeding kings created their own temple-mountains. The concept of worship on hill-tops was not unique. It was spread throughout Asia including the Middle East and was even known to the Maya civilization in Guatemala.[10] According to Hindu mythology, Mount Meru, a mythical mountain, was considered the centre of the universe. The form of the temple-mountain is imitated in Khmer ceramics. Lids are modelled in tiers and culminate in a lotus bud shaped knob.

The social structure of Khmer society was headed by the king and his courtiers. The priests were the most important group after the king. Besides conducting religious duties, they were also teachers and served as administrators for enforcing the rules of the kingdom. Next in rank were the artisans, such as sculptors. The largest social class was the peasantry who provided the labour and the manpower for the army. The lowest class of Angkorian society consisted of slaves, which included hill tribesmen, prisoners of war, debtors and criminals.

In the early historic period, a matriarchal social system prevailed in much of South-East Asia, and royal descent was matrilineal. Succession in the royal family through the female line is attested, for instance, by an inscription in the Ta Keo, a temple at Angkor.[11] Inheritance of property was likewise often transmitted through the female line. Women held a high social and political position in the Angkorian government. Certain offices were transmitted through the female line. Chinese writers praise Khmer women for their knowledge of government and astrology. Women also played a prominent role in the economic structure. They exhibited good commercial instincts and were in charge of trade. In the palace women served as guards, servants, entertainers, and royal concubines. In India domestic crafts were primarily carried out by women but it is unknown whether or not this custom was practiced in Kampuchea, although the production of contemporary pottery is exclusively a female craft. In one inscription female slaves were given titles whereas the men were not.[12] Burials indicate that women were granted equal status with men.

Because of the long distances involved and the lack of communication the provincial areas of the Khmer Empire were fairly autonomous. They had their own leaders, government officials, system of taxing, and laws. Provincial leaders had to make periodic journeys to Angkor to confirm their loyalty to the king. The ancient Khmer highway was a primary link between Angkor and the area in North-eastern Thailand where the Khmer settlement was concentrated. Several major Khmer strongholds and temples were located along the highway (Maps 2, 3). Obviously the closer an area was to Angkor the more it identified with the capital in terms of culture, religion, and government.

Throughout the Angkorian period the security of the Khmer Empire was rarely challenged by an external force until Thai power consolidated and the Thais attacked Angkor in the thirteenth century.

What caused the decline of the Khmer Empire? The internal unity and strength of the Khmer Empire rested on the maintenance of an efficient irrigation system and the continuity of the cult of the *devaraja.* The introduction of a popular *(mahayanist)* form of Buddhism in the last half of the twelfth century undoubtedly undermined the aristocratic *(hinayanist)* form practised by the rulers of Angkor. Extensive building over a relatively short period of time must have caused a drain on the labour force and contributed to the deterioration of the internal structure. Additionally, at about the same time, regions such as Lop Buri asserted their independence and broke away from the Khmer Empire. Continuous attacks by the Thais also weakened Angkor. All of these factors contributed to the Khmer inability to reunite the kingdom after the first quarter of the thirteenth century.

The decline of ceramics was less pronounced than other aspects of Khmer culture because ceramic production did not reach a high degree of evolution or refinement, and most of the wares seem to have been made without royal patronage.

Religion

The practice of animism, or spirit worship, was the earliest form of religion in South-East Asia. The people lived close to the soil and depended on the powers of nature. Their lives were strongly influenced by the presence of spirits which they believed inhabited every material thing, such as trees, plants, rivers, mountains, stones, fields, jungles, and the earth. These spirits were either invoked or appeased through rituals and ceremonies. Devotion to animistic beliefs has remained steadfast in South-East Asia throughout history.

Two religions, Hinduism and Buddhism, were transmitted from India to South-East Asia in the early centuries of the Christian era. Buddhism penetrated Mon centres

in Lower Burma and western Thailand and was most likely transmitted concurrently to China via overland routes: a southern route from India through Bengal, Assam and Upper Burma to Yunnan, and a northern route through Central Asia. The Khmers probably received Buddhism through the Mons. Hinduism penetrated the region via Champa and spread to other cultures in Mainland South-East Asia.

Hinduism is a complete way of life, influencing its followers physically, mentally, and spiritually. One of the great strengths of Hinduism is that it is very tolerant of other beliefs. Through the centuries it has absorbed rather than succumbed to other doctrines. It maintains a belief in a pantheon of gods and deities.

It was the dominant religion at Angkor until the middle of the twelfth century. Shiva was the main Hindu god worshipped by the Khmers. He symbolized destruction and reproduction and was frequently depicted in the form of a stone lingam, which is a forthright phallic emblem representing Shiva's masculine creative power.

Hinduism was reserved for the élite and was primarily a court religion. It did not penetrate the masses. Brahmins, who were members of the priestly class and disseminators of religious tenets, confined their knowledge to royalty and the aristocracy.

The caste system, an aspect of Hinduism, was firmly implanted in India's social structure by the sixth century BC. Dividing Hindus into status groups, each caste has its own traditions and rules. The system imposes rigidity and restriction on social growth.

Buddhism began in northern India as a movement to reform Hinduism. It was partly opposed to the caste system and the exclusivity of certain Hindu practices, and was founded by Siddhartha Gautama, or Buddha the Enlightened One.

Buddhism split into two major sects in the early centuries of the Christian era, namely Hinayana Buddhism, and Mahayana Buddhism. Hinayana or Theravada Buddhism (the Lesser Vehicle) preserved the original doctrines and was epxressed in the Pali language. Between the eleventh and the fifteenth centuries, it spread from Sri Lanka to South-East Asia. Today this branch is followed in Burma, Kampuchea, Sri Lanka, Laos, and Thailand. Mahayana Buddhism (the Greater Vehicle) recognized Buddha as a god and used the Sanskrit language to express its principles. It was the dominant religion in Funan in the fifth century and at Angkor in the last half of the twelfth century. Today this form is practised in China, Japan, Korea, and Vietnam.

From the beginning the doctrines of Hinduism and Buddhism overlapped so it is not surprising that parts of both religions were adopted in South-East Asia. Buddhism retained many tenets of Hinduism. And Buddha was made an *avatar,* or god, who comes to earth in human form in Hinduism.

Trade

EXPORT

Although Khmer ceramics have reportedly been found outside the boundaries of the former empire, archaeological evidence is lacking. The limited number found elsewhere indicates that they were not made for export.

Khmer wares from the late eleventh and early twelfth centuries have been found at Chaiya and Nakhon Si Thammarat, which were trading ports on the eastern coast of peninsular Thailand during the Angkorian period. They are primarily brown monochrome pedestal urns and storage jars, and were probably used by Khmers who lived and worked in the area. Khmer pieces from the twelfth century have been found

at Sukhothai which was controlled by the Khmers in the last quarter of the eleventh and the early twelfth centuries.

A joint project between the University of Adelaide, the Art Gallery of South Australia, and the Thai Government has been established to conduct a study of the Thai ceramic export ware which was produced between the thirteenth and sixteenth centuries. One of the goals of the project is to determine the relationship of the Thai ceramic industry to Khmer wares. So far research focused on Sawankhalok sites has not produced a single Khmer piece.

Indonesian ceramic finds include a brown monochrome pedestal urn from western Kalimantan. Shards and whole pieces have been found in eastern Java around Trowulan, which was a town of the Majapahit Empire that flourished in the fourteenth century. Surface finds of brown monochrome vases and bottle jars from the thirteenth and fourteenth centuries have been reported at Pasar Ikan in Jakarta, Indonesia.[13]

Other finds outside of the boundaries of the Khmer Empire include a ewer now in the British Museum in London, which was reportedly excavated in Burma, and three pieces in the Muzium Sabah, Kota Kinabalu, which were found in Malaysia.

Khmer ceramics have not surfaced in controlled excavations at the Philippine sites of Calatagan, Sta Ana, and Pinagbaynan, or in Brunei or Sarawak.

The few examples of Khmer ceramics that have been excavated outside the Khmer Empire may have been transported by migrant Khmers. It has been suggested that Khmer ceramics may have been taken to Indonesia by members of royal families for gifts to their relatives. The discovery of Khmer ceramics in Indonesia supports the existence of a close relationship between the Khmer and Javanese empires.[14] Alternatively these wares could have been used as barter in exchange for other goods in high demand.

Other items were actively exported by the Khmers. They sent hides, horn, and perfume to China and sandalwood, teak, aloes, cardamon, bees-wax, kapok, and kingfisher feathers to India.

IMPORT

The earliest evidence of the importation of ceramics to South-East Asia is an Indian or Sri Lankan shard of a bowl that was excavated in Malaysia and is dated around the first or second century AD. It is an indication that ceramics were transported from India to South-East Asia at an early date.[15]

The first significant influx of Chinese export wares in South-East Asia was at the beginning of the tenth century. The demand for Chinese glazed wares in South-East Asia continued on an increasing scale until the early Ming period, when the government prohibited trade with foreign countries in an effort to restore their internal economy and social structure. The ban was lifted in the late fourteenth century.

There is no indication that the Khmers made an effort to take advantage of the increasing demand for glazed ceramics in other parts of South-East Asia, particularly the Indonesian archipelago, by exporting their own products. Conversely they imported Chinese wares as early as the end of the Tang period. However the number of Tang pieces found at Angkor was limited to a few examples of Yue and Ding wares. The largest number of Chinese ceramics were celadons from the beginning of the Northern Song period. Minimal amounts of other types of Chinese wares have been excavated. In contrast, no Chinese celadons have been found in Thailand at Khmer sites although numerous examples of southern Chinese white wares were excavated at Ban Phluang.[16] The number of Chinese shapes that were imported by the Khmers was limited and confined primarily to utilitarian forms.

INTERNAL

While evidence indicates that Khmer wares were not produced for export it seems probable that internal trade existed. Early trade relations between different parts of Mainland South-East Asia as well as a growing cohesion in the area by the third century AD is attested to by the widespread discoveries of bronze drums from the Dong-son culture in Vietnam. Chinese records of the ninth century AD mention that the Pyus engaged in internal trade by selling earthenware jars to neighbouring countries.[17]

The waterways throughout Kampuchea and Thailand are made up of branches that follow the rivers and are used for trade and commerce. In Kampuchea man-made canals linked these branches to form a circular network. Long established trade contacts existed between the central and northern areas of Thailand. It is possible that during the Khmer Empire these trade links extended into Laos. Carriers used for transport could have included boats rowed by slaves, and wooden rafts, which carried heavier and bulkier items such as sand and stone used for temple construction.

It is possible that some trade between Kampuchea and Thailand took place overland, as a route has been identified. It connected the two major rivers, the Chao Phraya and the Mekong, passing through the Korat Plateau, Si Thep, and the Mun Valley.[18]

Local markets existed just as they do today. They were run by women. There were no fixed prices and, according to inscriptions, barter was the form of payment. The inscriptions mention the use of the conch shell, cloth, paddy, and silver for payment of goods. Honey was exchanged for oil; cloth for syrup, and cotton for ginger conserve.[19] Other goods used for barter were copper, tin, jewellery, carts, latérite blocks, husked rice, and alcohol. Cloth was highly valued and often offered as payment for land. The daily requirements of villages included rice, fish, livestock, vegetables, oil, spices, salt, cloth, pots for preparing, cooking, and storing food, and utensils and iron for making tools. Timber products included gums, oils, resins, and bamboo. Undoubtedly these items were traded through an internal system.

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17. Coedès, *The Making of South East Asia,* op. cit., p. 110.

18. Wales, H. G. Quaritch, *Towards Angkor: In the Footsteps of the Indian Invaders,* London, George C. Harrap & Co., 1973, p. in.

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2 Influences

BEFORE the arrival of external influences South-East Asia was inhabited by indigenous groups of people who were already significantly developed with established social and technological systems. The early inhabitants assimilated outside influences into their own existing beliefs and practices, resulting in the development of unique cultures which have retained their individuality throughout history.

The largest external influences on South-East Asia have come from India and China. Although the majority of inhabitants of South-East Asia migrated from the north, the external influences seem to have travelled in reverse, starting from the sea and moving inland. Since contact was first established in the early centuries of the Christian era, India and China have affected the course of South-East Asian history. Influences were disseminated from their origins in different geographical areas by land and sea over a long period of time and the primary goal seems to have been trade. India and China had traded with each other by the northern overland route through Central Asia for centuries. But in the second century BC two events occurred that caused them to look for alternative routes. First, the overland route was frequently blocked by movements of nomadic tribes in Central Asia. Second, China focused her attention on the provinces south of the Yangtze River, particularly the south-eastern coastal areas and increased her interests in that region. Thus India and China commenced trading by sea.

The degree and area of influence varied, but the flow was a continuous interaction in two directions. The commercial enterprise that instigated foreign traders to come to South-East Asia most likely stimulated South-East Asian traders to go to India and China. Thus a two-way exchange developed. South-East Asians on returning home probably introduced foreign customs into their cultures, without, however, losing their own identity.

Indian influence seems to have arrived earlier in South-East Asia than that of the Chinese. India had the technology to construct ships that could withstand the ocean winds and the mariners who were skilled in navigational techniques. Indians were familiar with a humid and tropical climate so exploring South-East Asia presented no major climatic problems. They were probably encouraged to seek new articles of trade as commerce with the Mediterranean increased.

The spread of Indian influence was a peaceful and tenacious movement that started in the coastal areas of South-East Asia and gradually moved inland. The regions closest to India received a stronger and more enduring degree of influence. It spread primarily west of the Dangrek mountains whereas the Chinese influence penetrated the eastern areas of South-East Asia.

Indian ships sailed from the eastern coast of India across the Bay of Bengal to peninsular Thailand and Malaysia. Then they went either north, following a coastal route to China via the Gulf of Thailand, Funan, and Champa, or south to insular South-East Asia.

Indian influence may have travelled to Kampuchea via Java. Evidence of relationships between the two countries is shown in Javanese temple scenes from the seventh and eighth centuries. Javanese influence is found in architecture at Phra Khon Chai on the Korat Plateau in Thailand, dating from the late eighth century.[1] Jayavarman II, who lived in Java before he inaugurated the Angkorian period, was exposed to Javanese culture and customs. A strong Javanese influence continued in Khmer art of the ninth and tenth centuries but disappeared by the end of the twelfth or the beginning of the thirteenth centuries.

Certain influences may have entered Kampuchea from Champa. In the first half of the ninth century Cham influence is visible in Khmer architecture. Perhaps it was transmitted by Chams who fled to Kampuchea from attacks by Indonesians in the last quarter of the eighth century.[2] Additionally Indian influence may have started in Java and travelled to Champa, then to the Khmers. Some aspects of Cham art seem to represent a transition between Javanese and Khmer art.

Dvaravati, the Mon centre in Thailand, may have been a cultural relay station for the Khmers. Indian art from the Gupta period and a Roman lamp (first and second centuries AD) have been found at Dvaravati sites. Glazed pottery has been found at U Thong, an eighth century Dvaravati site. Dvaravati influence was evident in Khmer stone sculpture until the eleventh century.

A Burmese historical record refers to Khmer prisoners of war who settled in Mon territory and may have influenced Burmese pottery production in the last half of the eleventh century. Evidence of a pottery tradition exists at two ancient Mon sites located in Lower Burma, which were inhabited between the seventh and eleventh centuries.[3] The pottery shows similarities with wares found at Dvaravati centres.

Traders travelled eastward with the south-west monsoon and waited in South-East Asia for the north-eastern winds to return to India. A round trip probably took at least eighteen months. Small settlements were established to conduct trade. During their stay in South-East Asia the foreigners were probably occupied with commercial activities such as locating and collecting merchandise. They may have established agricultural colonies to produce food for their return trips. Seasonal travel by sea and land from India to South-East Asia for trading purposes marked the pattern of early contact between the two countries.

An important aspect of Indian influence transmitted by trade was the religious, conveyed by Brahmins who voyaged with the trading vessels. Hinduism and Buddhism moved in concurrent waves from India across South-East Asia in the early centuries of the Christian era.

Religion was the primary vehicle for the dissemination of the Indian heritage in Kampuchea. It was expressed through the written language of Sanskrit, mythical legends, ceremonies and rituals, and the arts. Through religion, a hierarchical state with a semi-divine ruler was installed at Angkor. By-products of religion that penetrated Khmer civilization were the sciences: mathematics and astrology. Systems of law, government, and technology were transmitted concurrently with the religious elements but they were most likely installed for commercial purposes related to trading and were less enduring.

India’s penetration into South-East Asia, which started in the early centuries of the Christian era, reached a peak in the fourth and fifth centuries. During this time, when the influence was the strongest, local art closely resembled the Indian prototypes. But as the influence spread inland it was diffused and tempered by the individuality and beliefs of the local craftsmen. So by the beginning of the Angkorian period in the ninth century direct contact with India waned, the artistic ingenuity of the Khmers strengthened and climaxed in the classic Khmer art style, and Indian influence seems to have been completely assimilated into Khmer art. The importance of this influence diminished as a local style emerged.

In contrast to India’s peaceful penetration of South-East Asia, China’s influence was transmitted in a direct and forceful manner. China's earliest military encounter with South-East Asia was in the Han period when Vietnam was conquered by an overland attack. Archaeological evidence of the Chinese presence in Vietnam at this

period has been provided by Han pottery and tomb finds. Vietnam was China's only military conquest in the region.

Other early contacts between China and South-East Asia are reported in Chinese historical records that mention the existence of relations between China and Funan in the middle of the third century.

The decrease in contact between India and the pre-Khmer state of Chenla coincided with an increased southward movement of the Chinese. Previously China's interest was focused on the north because of the location of the dynastic capitals and the lucrative overland trading route. Expansion and development in southern China fostered coastal trade and strengthened Chinese influence in South-East Asia.

But Chinese influence, except in Vietnam, seems to have been transmitted to South-East Asia later than Indian influence and China's penetration in other areas was less direct and more circuitous than in Vietnam. The tributary system, which was established by the first century AD, served as China's point of contact with other cultures. According to Chinese records various South-East Asian states regularly sent diplomatic missions to China. Indigenous products presented as gifts to the Chinese dynastic rulers were an integral part of such missions. Typical gifts included items that were exclusively produced in certain areas, rare animals, or groups of people, usually with special skills such as musicians, or, perhaps, potters.

For centuries intercourse between China and South-East Asia took place in China rather than in the virginal states of South-East Asia. The relationships were politically oriented and influence was transmitted at government levels. Diplomatic emissaries from China began to go to South-East Asia in the tenth century.

The exact source of influence for glaze technology has not yet been pin-pointed. Although India strongly influenced other aspects of Khmer culture, ceramics seem to have developed independently, except for a few shapes. Glazed ceramics were not widely used in India and the development of a large-scale production was curtailed because of religious taboos. According to caste rules, a dish, or any other eating vessel made of clay, was considered impure once it was used, and reuse was forbidden. Therefore metal vessels were used for eating and the art of metal-work reached a high level of development.

Most likely the Khmers learned the technique of glazing from the Chinese, whose influence in ceramic technology extended to almost every culture in Asia. Chinese influence is also visible in certain Khmer shapes. Nevertheless, individuality prevails in Khmer ceramics that seems stronger than in other Asian wares. The ceramic technology may have been an assimilation of outside influences from China, and perhaps Vietnam, that was parallelled with an indigenous development. Assimilation is a primary characteristic of other aspects of Khmer culture.

Present evidence indicates that Chinese potters may have come directly to Kampuchea, in the ninth century from southern China. Recent finds at the Xicun kilns in Guangdong Province show striking similarities to Khmer wares and indicate a connection between the two ceramic producing centres.

Chao-an, a county in the eastern part of Guangdong Province, produced similar types of wares, but they were superior in the quality of materials and workmanship to the wares of the Xicun kilns.

The Hui-Zhou kilns were also contemporary with Xicun wares and they produced the same types of wares with a darker body.[4]

Khmer admiration of Chinese ceramics is reflected in their bottles and jars. The impact of China and its ceramic tradition was always present with attempts to copy Tang and Song wares. Yet the shapes, techniques, and motifs were adapted to the tastes of the Khmers.

Many of Khmer wares were modelled on Yue wares (early celadons). The shapes were often the same and similarities existed in incised decoration and the use of motifs and details of technique were closely copied. Yue wares were made over a long period extending from Han to Song. They were produced in Zhejiang Province, near Hangzhou. These wares were widely exported from the Tang period to early Song times.

Yue and Khmer wares were contemporary between the tenth and twelfth centuries. Likenesses can be seen in modelled animal shapes, narrow necked bottles with carved tiers around a wide mouth, glaze colours that range from dark brown to light green, the use of brown glaze for decorative accents, and a flat base.

The majority of the Chinese ceramics found at Angkor belong to the second half of the tenth century. During this period the Chinese imports found at the Royal Palace excavations at Angkor exceeded the local glazed ceramic finds. Over 70 per cent were Yue celadons. The white wares were mostly Qingbai. Limited pieces of Jun, Guan, and Cizhou were found. No pieces of Cizhou painted wares, polychromes, or lead glazed wares were found.

Recent excavations on the north-eastern coast of the island of Mindanao in the southern Philippines have revealed Chinese ceramics identified as wares from the Xicun kilns in Guangdong Province, southern China. They are so similar to Khmer wares that sometimes there has been confusion between the two types. They were found at Butuan City, situated on a low-lying swampy delta at the mouth of the Agusan River.

The ceramics were found there in association with a buried wooden boat. A large amount of artefacts were found, indicating the existence of a developed community that pre-dated the arrival of blue and white glazed ceramics in the area. However a physical and chemical analysis of the soil revealed a moderate amount of organic material, showing that the area was occupied for a short period of time. Similarities can be seen in the shapes, the finely-crazed yellowish green glaze that flakes easily, and in the stoneware bodies.

Certain aspects of Chinese influence may have come to Kampuchea via Vietnam. Strong similarities exist in certain types of clay.

Burma is another possible source of influence on Khmer ceramics. Although records of exchanges between the two countries in areas such as politics and economics are lacking, it seems likely that communications must have existed as early as the ninth century because of geographical nearness, the migrations of the Mons, who inhabited both countries, and the inheritance of a common religion from India. Green glazed tiles were produced at the ninth century capital of P'iao, ten kilometres east of Prome, an ancient Pyu centre.[5] But the tiles were brick and covered with a lead glaze material mixed with copper sulphate. The technology and content were quite different from the green glazed stoneware tiles made by the Khmers. Chinese records of the eighth century refer to wheel-made pots and glazed jars in the Pyu kingdom that were made for export.[6] Today green glazed pots produced in Burma are covered with an ash glaze made from burnt vegetable matter. A heavy iron content prevails in the clay of contemporary Burmese pottery. An unglazed wide mouth basin is used as a container for a clay lacquer mixture that is spread over the raw bamboo surface of forms in making contemporary lacquer-ware.

It is also possible that Persian influences penetrated Khmer civilization. The cylindrical coiffure of Vishnu in pre-Angkorian art shows Persian influence.

By the late thirteenth century, Sukhothai art was developing. Both Thai and Khmer cultures influenced each other but the original source of influence is still difficult to determine in the art found in certain areas of Thailand.

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4. Watt, James C. Y., 'Hsi-ts'un, Ch'ao-an and Other Ceramic Wares of Kwangtung in the Northern Sung Period', paper read at Symposium on Trade Pottery in East and South-East Asia, 4-8 September 1978, at Hong Kong, p. 3.
5. Coedès, *Indianized States of Southeast Asia*, op. cit., p. 104.
6. Lowry, John, *Burmese Art*, London, Victoria & Albert Museum, 1974, plate 23.

3 Characteristics

KHMER ceramics are strong, dense, and heavy stonewares. The shapes are vigorous and functional. Whether the end purpose was ceremonial or utilitarian, the wares were meant to be used. The clay and glaze colours are closely related to the earth. Although the glaze hues are limited, the range of tones is broad and varied. Firing conditions were relatively primitive and relied upon kilns constructed of clay to achieve and sustain high temperatures. Decoration was used sparingly and always to enhance, never to dominate the form. Decorative motifs drew inspiration from parallel crafts such as textiles, metal-work, jewellery, and lacquer. An appreciation of Khmer ceramics is augmented by knowledge of the types of wares that were produced and of the materials and methods used for potting, decorating, glazing, and firing.

Types

The types of ceramics produced by the Khmers were: green and brown monochromes, two-colour wares, and unglazed wares.

GREEN MONOCHROMES

Green monochromes were the earliest glazed products of the Khmer kilns. Shards from the late ninth century have been excavated in Kampuchea at Roluos, south of Angkor. It is possible that glazed wares were made earlier, since the Angkorian period of the Khmer Empire was established in the beginning of the ninth century, but excavations have not been conducted. The finest quality and greatest quantity were produced during the first half of the eleventh century. Thereafter production decreased progressively and by the middle of the twelfth century the green monochromes had practically disappeared from the ceramic repertoire of the Khmer potter. Green monochromes comprised approximately one-quarter of the production at Ban Kruat in Thailand and the total production at Kulen in Kampuchea.

The term ‘Kulen’ was used as a classification for the green monochromes in a provisional ceramic chronology established by Bernard Groslier. It was based on ten excavations that were conducted in Kampuchea between 1957 and 1969 to determine the living patterns of the Khmers. The most important ceramic finds were at the Angkorian sites of the Royal Palace at Angkor Thorn, and Sras Srang.

Originally the term was applied to an early style of Khmer architecture that emerged in the first half of the ninth century. It is also the geographical name of a site in Kampuchea where an abundance of green monochrome shards have been found.

Subsequent research and finds compel a cautionary use of the term 'Kulen'. It is certain that the production of green monochromes exceeded the dates of the Kulen architectural period, and identical shards found in Thailand provide substantial evidence that they were produced beyond the area of Kulen.

BROWN MONOCHROMES

Based on excavations in Kampuchea, brown monochromes were definitely produced by the middle of the eleventh century, and evidence from field surveys indicates that they may have been made as early as the end of the tenth century. They continued to be produced throughout the duration of the ceramic industry. Brown monochromes were the primary output of the Khmer kilns in Thailand, and represented approximately three-quarters of the total production at Ban Kruat.

Although brown monochrome vessels have been excavated in habitation and burial sites at Angkor, brown glazed shards have not been found at kiln areas in Kampuchea. However they have appeared in abundance at kiln sites and areas surrounding excavated temples in North-eastern Thailand. There are two possible suppositions for the absence of brown glazed shards in Kampuchea. First, the kilns that produced them have not yet been discovered, which is not surprising since excavations have not specifically focused on ceramics. However it seems that kilns might have surfaced incidentally through the extensive archaeological work that has been conducted at the temple sites. Second, all of the brown monochromes were probably produced at Ban Kruat, and perhaps other sites in Thailand. The wares could have been transported from Thailand to Kampuchea over the ancient highway that connected the two centres. Elephants or wooden carts drawn by oxen or humans, as depicted in temple carvings, could have been used for transport.

TWO-COLOUR WARES

Green and brown colours on a single piece are classified as 'two-colour' wares. They were produced for a short period of time from the middle to the end of the eleventh century and represented only a small per cent of total ceramic production. The influence undoubtedly came from China, where the colour combination was used as early as the third century in Guangdong Province.[1] Features on light-coloured animal style wares were accented with brown in the early Tang period. The two colours were combined on the exterior and interior of Cizhou wares in the late tenth and early eleventh centuries. Light and dark colours were also used on Vietnamese brown inlay wares from the late tenth to early twelfth century. However it is unlikely that they influenced the Khmer wares since the earliest evidence of Vietnamese ceramics in Kampuchea dates from the first half of the twelfth century, although communications between Vietnam and Kampuchea probably existed already by the middle of the tenth century.[2] The technology and inspiration was probably transmitted by the Khmers to the Sankampaeng kilns in Northern Thailand where similar two-colour wares were produced in the fourteenth and fifteenth centuries.

The two colours are combined on vessels in different ways. They usually form distinctly separate parts of the vessel, which may be marked off by carved lines. The divisions emphasize the horizontal aspects of the form. A typical combination is a light green mouth and neck with a brown body. Sometimes the green covers a larger area such as the mouth, neck, and shoulder and the body is a dark brown colour. This arrangement was applied to jars, bottles, and pedestal urns of varying sizes.

One of the earliest examples of two-colour ware is an urn from Ban Phluang. It is an important piece because it can be positively dated 1050-66, based on stratigraphic excavation. The oval body with sloping shoulder is scantily covered with a mottled brown glaze. Brush strokes are visible on the body. The neck is pale green in colour (Plate 100).

Occasionally the colours are integrated. The green colour covers the top portion of the vessel and tends to run on to the brown colour, forming an uneven line around the body. This combination appears on bottles and pots (Plate 43). A few green-glazed wares have been found with a medium to dark brown slip on the interior.

The two colours are also used as decorative accents on applied appendages, especially on animal-style wares. For example, brown may be used to emphasize features such as the ears, eyes, trunk, and fittings on a green elephant. Sometimes the shoulders of brown urns are highlighted with green applied motifs. Two colours are sometimes used on lids (Plate 81).

Some of the most sensitive and delicate examples of Khmer craftsmanship are revealed in two-colour representations of semi-divine beings. A predominately green shard displays the arms of a female goddess with the palms pressed together in a gesture of respect. Both wrists are adorned with bracelets, which are intricately patterned and brown glazed (Plate 33).

An exceptionally rare example of Khmer ceramic art is the modelled head of Shiva. Two colours are used for delineation. The face and outline of the halo are green; the interior of the halo is brown. The halo symbolizes divine light and solar power. The sensitive workmanship reveals carefully-formed facial features and a well-carved motif on the halo. The head may have been used as an architectural ornament. It is attached to an unglazed shard that resembles a roof tile (Plate 34).

Through numerous finds at Ban Kruat, it has been determined that two different methods were used to make the two-colour wares. Perhaps the choice of method was determined by the availability of clay and glaze materials. Both produced the same result which was a combination of light green and dark brown colours on a single piece. Since two separate glazes were not always used to achieve the two colour effect, the term 'Two Glaze' ware is an inaccurate classification.

One method of making two-colour wares was to alter the clay to achieve the desired result. To obtain a light-coloured body, which was required for the green coloured parts of the vessel, either a light-coloured slip was applied, or a layer of light-coloured clay was wrapped around a core of dark-coloured clay. Then a glaze with low iron content was applied over the entire piece. It was probably fired in a combination oxidizing and reducing atmosphere. The result is a straw to light green colour on the light clay and an olive to dark brown on the dark clay.

A second method used for producing two-colour wares was to apply two glazes. A vessel was potted with light coloured clay. Then the parts that required a green effect were covered with a celadon glaze; a glaze with higher iron content was applied to the parts where a brown colour was desired. It was fired in a reducing atmosphere.

UNGLAZED WARES

Unglazed utilitarian wares were most likely produced in Kampuchea from prehistoric times, although positive evidence of a continuous chronology has not been established. The form and decoration of the earliest unglazed wares were universally similar and showed little change through the centuries. They were sturdily potted hand-modelled earthenwares. The desired form was achieved by beating the clay with an implement, perhaps a wooden paddle. Incised repetitive patterns around the shoulder were added to give textural dimension.

A variety of unglazed utilitarian earthenwares and stonewares were produced in Kampuchea between the sixth and fourteenth centuries. Archaeological evidence is lacking because unglazed shards were discarded during excavations. Research in this area would assist in understanding the early development of Khmer ceramics.

Unglazed wares excavated in Kampuchea from the sixth century were primarily large storage vessels made in imitation of metal forms. They show strong Indian influence, which may have been transmitted to Kampuchea indirectly via Funan. Unglazed vessels from the seventh and eighth centuries were found at the first hydraulic city of the Angkorian period, which was formerly part of Funan.

The potting techniques that were used on these early wares were surprisingly highly developed. They were wheel thrown, made in two parts and joined together with a clay coil, and decorated with painted motifs. Production of this type of ware continued through the eighth century.[3]

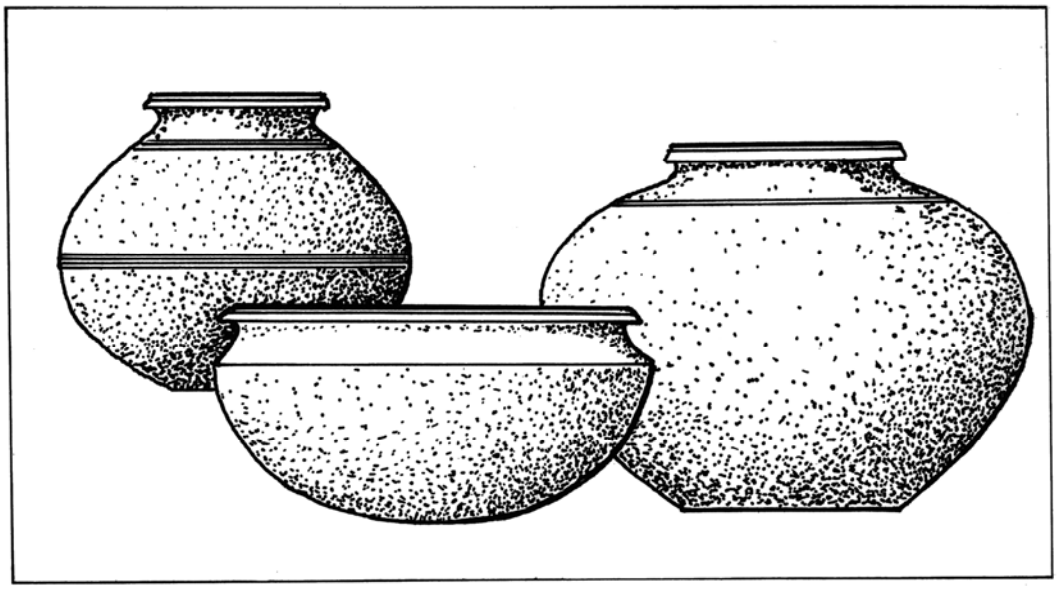
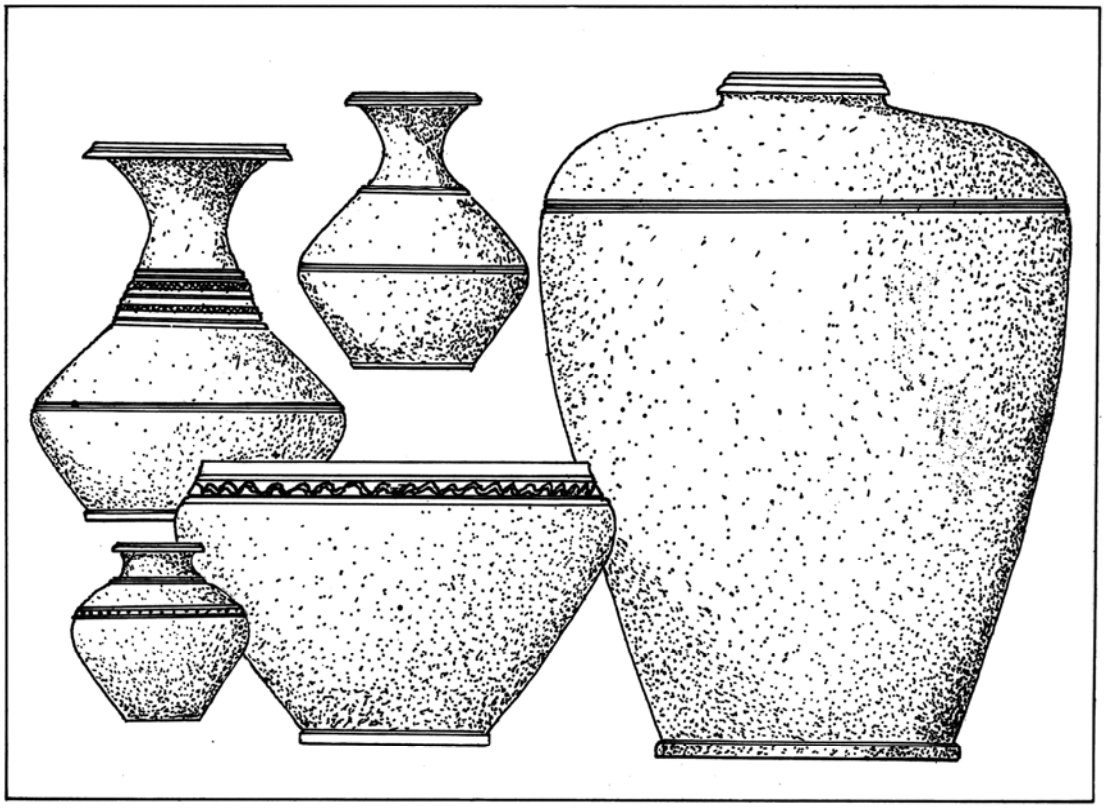


Fig. 1 Unglazed earthenware excavated at Ban Phluang Temple in North-eastern Thailand

Fig. 2 Unglazed stoneware excavated at Ban Phluang Temple in North-eastern Thailand



Although the quantity of production decreased after the glazed wares appeared at the end of the ninth century, unglazed earthenwares and stonewares continued to be made. Earthenware shards, with a wide variation in colour and composition, were found at the lowest excavated levels at Ban Phluang, a temple in North-eastern Thailand.[4] They represent strong and sturdy utilitarian shapes. Decoration was limited to incised horizontal bands around the neck and body. Large jars, which were probably used as containers for liquids, dominated the finds. Two other common shapes were a wide mouth basin, which probably served as a cooking vessel but may also have been used for sharpening metal tools, and a pot with a narrow mouth, which is suitable for carrying water (Fig. I). Unglazed stoneware shards were also found at Ban Phluang and the majority represented coil-built utilitarian vessels. The clay is grey or buff with visible impurities. The utilitarian shapes include a large jar suitable for storage of liquids, a basin, and a jar with a narrow neck and flaring mouth (Fig. 2; Plate 66). Surface finds of similar unglazed shards have been reported at Ban Kruat, a kiln site in North-eastern Thailand.

The forms of the unglazed wares that were produced during the Angkorian period are characterized by angular shapes, flaring mouths, and flat bases. They are primarily utilitarian storage jars and cooking vessels.

The wares were hand-modelled from a ball of clay, sometimes using coils. Clay from the rice fields in Kampuchea and North-eastern Thailand is ideal for low-fired earthenwares. Sand from the river may have been added to reduce the amount of shrinkage. The basic shape was beaten and smoothed with a flat implement, such as a stone or wooden paddle. Decoration consists of carved bands on the shoulder and mouth rim, and geometric motifs incised with a comb-like instrument. They were most likely fired in open pits built into the earth, heated with a wood fire, and covered with a layer of straw to distribute the heat. A natural ash glaze which occurred when wood or ash accidentally fell on to the clay body, was often found on the vessels nearest the fire.

LIE DE VIN WARES

In the last half of the tenth century a new group of unglazed stonewares appeared. Identical shards were found in Kampuchea and Thailand. These wares are classified by Bernard Groslier as *Lie de Vin* (‘dregs of wine’), which is a modern French term. The colour of the copper-brown surface of the wares resembles the colour of the residue left in old wine bottles, thus the name *Lie de Vin.* Production may have continued into the first half of the eleventh century. The *Lie de Vin* wares were the prototypes for the earliest brown monochromes and similarities can be seen in the decorative motifs and the method of application.

The *Lie de Vin* wares are primarily coil-made utilitarian jars and basins. The dark clay, which is coarsely ground, shows impurities that may be crushed shell or latérite. Gas bubbles which burst in firing are visible on the surface. Decoration is limited. It consists primarily of carved ridges around the mouth, at the base of the neck, and on the outer edge of the shoulder, and simple incised designs, which are geometric configurations that usually encircle the shoulder. The incised lines are uneven and look as if the potter was unsure of the technique and placement. The most typical incised motif is a band of ‘X’s’.

A thin slip, composed of iron oxide and perhaps wood ash, was painted on to the surface of the vessels before firing. It resulted in a thin glaze that gives a burnished appearance. Variations in colour and texture and a dark interior core in the clay indicate that the wares fired unevenly and that they were most likely fired in an open pit in a reducing atmosphere.

Clay

Khmer clays vary considerably in colour and texture depending on the content of iron and other natural impurities, the method of preparation, and the temperature and conditions of firing. Variations also occurred because the potters used natural materials that were readily available locally. Srisakra Vallibhotama,[*] who has conducted preliminary surveys at most of the Khmer centres in Thailand, has noted the variation in clay texture among wares found in different regions, which is perhaps an indication of local kilns.

The colour, texture, and quality of the clay used for ceramics that were produced after the twelfth century show great variety and may indicate that it was quarried from different areas. Perhaps the original source was a single large deposit. After it was depleted, the clay may have been collected from several small deposits spread over a wide area. Ceramics of the thirteenth and fourteenth centuries were heavily potted, probably to compensate for the lack of malleability in the inferior clay.

The colour of the fired clay is subdued and reflects the tones of natural rocks and minerals found in the earth which are buff, brown, grey, black, and pale red. Sometimes the clay, which is visible on the base, may include several colours ranging from buff to grey to pale red.

Sandstone is a primary material in most Khmer clays. It adds structural stability, which is desirable for coil-built wares. The texture of sandstone is gritty; it feels like running ones fingers across coarse sand. Although vast amounts of sandstone were used for constructing temples during the Angkorian period, the quarries were rarely conveniently located. The largest sandstone quarry in Kampuchea was Kulen, a suggested kiln site for green monochromes. It was the primary source of sandstone from the beginning of the eighth century until the quarries were depleted in the late twelfth century. Based on a comparison of stone samples, the Dangrek mountain region was a sandstone source, although the exact quarries have not been identified. The area could have supplied sandstone for both Kampuchea and Thailand. Hill-side sandstone quarries are located close to Preah Vihear, a Khmer temple situated on the present border between Kampuchea and Thailand.

Iron, a natural element commonly found in the earth, is present in most Khmer clays. It is sensitive to firing conditions and often produces unexpected results in colour and texture. Modern potters use it to create interesting and unique stoneware textures. The intensity of the colour of the fired clay is determined primarily by the iron content. The higher the percentage of iron, the darker the colour of the clay.

Quartz is another common ingredient in Khmer clays. It improves the texture and prevents warping in the drying process. It may have been obtained from granite, a composition of feldspar, mica, and quartz, which is found in abundance in North-eastern Thailand. Granite may also have been used as a glaze ingredient.

Laterite is a natural element in the soil of Kampuchea and North-eastern Thailand and would have been a readily available material for use in ceramic clays. It is a source of iron, quartz, and sandstone and is characterized by a porous texture and red colour. Latérite is soft in the ground but hardens when exposed to the air, which gives it a durable quality that resists deterioration from the tropical climate of South-East Asia. The iron content in latérite is sometimes sufficient for smelting, attested to by the large amounts of slag found in the region. Latérite was used extensively as a constructional material for foundations of the temples and other religious buildings as well as for the roads that extended from Angkor to Thailand. The technique of quarrying latérite was transmitted to South-East Asia from India. The influence of

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using laterite as a building material for temples probably travelled from India to South-East Asia indirectly via Sri Lanka, Sumatra, and Java.[5]

Kaolin deposits are sited on geological maps at Kompong Chnang ('pottery port'), a modern village in Kampuchea.[6] Kaolin is a clay ingredient used by the Chinese to achieve a white clay body. If kaolin was added to the Khmer clay mixture another element that contained iron was also present to produce a grey colour. A pure, iron-free white clay body was never produced by the Khmers.

A common characteristic of Khmer clays is the presence of dark flecks, particularly in the dark coloured clays. They are most likely small concentrations of iron combined with other minerals such as fired brick or crushed latérite, which fused during firing. Impurities melt when subjected to high firing temperatures.

Khmer clays can be divided into two general types. First, a grey-coloured clay that is coarse grained with visible impurities. The colour varies from light to dark grey, with black or pale red tones. It was used primarily on large brown monochromes. Second, a brown-coloured clay that is either smooth and fine or textured or gritty. The colour may be buff and light to medium brown or grey. It was used on green monochromes and most brown-glazed small wares (Table 1).

TABLE 1
Khmer Clay Types

	I	II
Colour	Grey	Brown
Composition	Sandstone Iron Quartz Granite Natural impurities Latérite	Sandstone Iron Quartz Granite
Texture	Coarse-grained Non-plastic	Fine-grained Plastic
End Product	Large wares	Small wares
Glaze Types	Brown	Brown Green

Potting Techniques

Coil construction was the fundamental method used for potting medium and large Khmer wares. Evidence is visible in the great number of asymmetrical shapes, uneven lips, and irregular ridges, which can be felt on the interior. Coil construction enabled flexibility in technique and variation in form. It was suitable for a small scale ceramic industry that produced wares for a domestic market. Coils were gradually built up from a thick circular flat disc and luted together to form the walls of the desired shape. Often, on medium wares with a broad base, the first coil encircled the perimeter of the disc, indicated by a distinct and sharp rim on the base. On larger pieces, such as pedestal urns and storage jars, the first coil usually encircled the top of the disc. The diameter of the coils increased in relation to the size of the piece. Coils of varying thicknesses on a single piece were common. On the earlier wares, the coils

were partially smoothed out on the exterior but generally left untouched on the interior.

The Khmer potters also used a turning device, as attested to by the thumb-print scars on the bases of the small wares which were a prolific output in the late eleventh and early twelfth centuries. The turning device was most likely round- or square-shaped, and may have been a pad of woven matting or a wooden slab. The wares may have been coil-built and then placed on a turning device for shaping and trimming the base, or they may have been thrown on a wheel, or both methods may have been used. By the twelfth century the ridges on the interior were fairly even, which may indicate the use of a wheel. One wheel was reportedly found at Kulen in Kampuchea, but archaeological information cannot be verified. Perhaps the wheels were constructed of wood and have disintegrated. According to L. Malleret, an inscription from the middle of the seventh century found at Preah Kuhea Luong, mentions a potter's wheel (*cakra*); but Boisselier believes that the word '*cakra*' in the context of this inscription is of religious connotation and does not specifically mean a "potter's wheel"'.[7]

Hand-modelling, the most basic and oldest method of manipulating clay, was skilfully used by the Khmer potters to produce a limited number of shapes in the round. The Khmers were familiar with sculpting and produced superb examples in wood and stone. The potters worked closely with natural materials and retained the texture of the clay. Typical examples of modelled forms are animals, such as the elephant and rabbit, and conches, which are excellent imitations of the metal forms.

Khmer moulds for ceramics have not been found, although certain shapes suggest their use. They were well known in China and used extensively throughout ceramic history. Groslier observed that the covered boxes are consistently uniform in size and that the heads of early elephants may have been moulded. Green glazed tiles show similarities to the moulded Chinese examples. Pottery moulds used for bronzes were among the most important products of the Shang ceramic kilns in China.

One side of a Khmer green glazed stoneware mould was found in North-eastern Thailand. It is small and rectangular shaped. The light-grey clay is dense and fine grained; the interior is unglazed and the exterior is covered with a thin transparent light green glaze (Plates 1, 2). The mould may have been used for casting bronze rings by fitting two identical sides together and pouring liquid metal into the mould through the small square hole at the top. This type of mould is reusable and suitable for casting complex items such as jewellery.

Potters' tools have not been found, probably because they were made from natural materials and have perished. Organic fibres, such as bamboo, palm leaves, coconut husks, rice straw, bark wood, animal hair, cotton, and jute, are readily available and can easily be adapted for use as potters' tools. Bamboo knives may have been used for trimming and shaping the clay; bamboo reeds twisted together for throwing and cutting and for measuring diameter and depth; wooden combs for incising; wooden paddles for smoothing out coils; and coarse-grained coconut or palm fibres made into brushes to apply a slip before glazing.

A flat base is a diagnostic characteristic of the Khmer wares. On medium and large pieces it is unglazed and roughly finished (Plate 3). The base on small wares is frequently a flat foot in the shape of a button with a potter's cutting mark that is a series of concentric circles in graduating sizes. It looks like a thumb print or shell pattern (Plate 4). A cord or perhaps a twisted reed, made from rice straw, with a small stick tied to one end, encircled the base of the vessel; then it was pulled underneath the base horizontally to separate it from the turning device.

Incised marks on bases of green monochromes are fairly common, but they rarely appear on brown glazed pieces. Usually marks are found only on wares without a foot and, often, the base is glazed. The marks are characterized by variation. Two marks

are rarely identical and they are not used consistently on the same shapes. A mark was nastily incised into the base before glazing. Configurations usually consist of one to eight lines, either parallel or crossed, or a geometric figure (Plate 5). The purpose of these marks is unknown but they may have served to identify individual potters' wares that were fired in a communal kiln; or, as indicated in the stone inscriptions, they may have represented the wares of a particular village that produced a specific type of ware. The marks also may have designated placement in the kiln for different settings. Similar marks were incised on Chinese wares of the Zhou period.

The vessels were dried before firing. Undoubtedly the tropical climate presented problems in the drying process. During the dry season the wares may have dried too quickly, causing them to crack. The high humidity during the wet season may have prevented thorough drying, especially on thickly potted pieces.

Specialization in types of wares, kilns, and potters may have existed. The modern village of Kompong Chnang in Kampuchea makes utilitarian red clay pots. The method of making them has been transmitted through the generations since ancient times. Inscriptions refer to groups of people, who specialized in specific crafts, living in communal villages.

Decoration

Decoration on glazed Khmer ceramics was used sparingly and never dominated the form. Incising and modelling were the primary methods used throughout the period of glazed ceramics. Incising is achieved by cutting a design into the surface of the clay with a pointed implement. The Khmer potters produced a broad range of textural effects with the same designs by using different tools to vary the width and depth of the incisions. For example, a horizontal band of small rectangles was lightly incised with a fine pointed implement, which outlined the entire design, or deeply carved with a broad flat implement, which caused the glaze to collect around the design. The rectangles look like they are raised above the surface of the clay. There is a tendency for the early incised motifs to form continuous bands whereas the later designs are often disconnected elements. Hand modelling was used for appendages that were applied to the basic form. Knobs on covers of vessels and animal-shaped features, such as ears, eyes, and tail, were modelled from small balls of clay. Then the forms were applied to the surface of a vessel and adhered with liquid clay. Incising was often added to the appendages for definition.

Simple incised geometric designs with a hesitant quality, continuous horizontal lines, carved ridges around the mouth, neck, or shoulder, and modelled knobs were the earliest forms of decoration, appearing in the late ninth and early tenth centuries. Early incised designs are characterized by a rigid and unsure feeling. They look as if they were pierced into the clay. Perhaps the vessel was dried too long before decorating, which caused the incising implement to stick in the clay. After the middle of the eleventh century the incising was more controlled and balanced. Incised decoration on Khmer ceramics reached its zenith between the last quarter of the eleventh and the first half of the twelfth century. The repertoire of motifs expanded, the use of detail increased, and the designs covered a larger area of the vessel. The quality of workmanship improved, which led towards stylization. The designs were carefully executed with an aura of confidence.

Modelling was used to form applied pieces such as knobs on lids of early covered jars. The method was used extensively in the last half of the eleventh century to form animal-shaped appendages that were applied to vessels. In the last half of the twelfth century, modelling was the prevailing form of decoration. Generally, the amount of decoration on a single piece decreased and the designs were simplified and

duplicated, which are indications that the ceramic art was declining. Carved and modelled mouth rims continued and the number of ridges increased. Appendages were larger. Modelled elephant heads applied to the chunky heavy bodies of pedestal urns were typical of the later period and dominated the decorative field.

TECHNIQUE: INCISING

Incised designs are primarily geometric configurations consisting of lines, curves, angles, circles, and points, which generally form borders. The elements of a design are often repeated in a continuous horizontal band that moves in one direction around the mouth, neck, shoulder, body, or pedestal base of a vessel. The designs are usually enclosed with lines and the bands are separated by intervals of space. Floral patterns are rare but occur on some forms such as the fish and conch. Designs covering the whole of a piece in Khmer ceramics are not common. Zhou Da-guan noted that only rulers were permitted to wear fabrics with all-over patterns.[8]

Method

After the unfired form was dry enough to be handled without distorting its shape, a design was cut into the surface with a pointed implement. Tools for incising were probably made of bamboo, which is a plentiful material in South-East Asia and used for incising modern pottery in Kampuchea.

Influences

Similarities to metal-work patterns from the Sassanian Empire (224-651), particularly on the fittings of horses and camels, are evident. Tang metal-work was strongly influenced by Sassanian silver. The trend towards incised designs on ceramics in China began with Yue wares. The influence of textiles is also visible in the textural richness of the designs. Chinese silks imported by the Khmers were a source of inspiration. Likenesses in geometric patterns can be seen between Khmer ceramics and the carved head-dresses on the stone figures of temple carvings from the Angkorian period.

The technique of incising and the earliest motifs on glazed ceramics most likely evolved from the *Lie de Vin* wares. Similarities in style and method of execution can be traced between the two types of wares. The designs that consist of a horizontal band of straight or curved lines made by a comb-like implement are widely known in Asian ceramics. The designs were common on Zhou and Han pottery in China.

Patterns

1 Continuous horizontal line, either one or more in a repetitive series; used to delineate sections of a vessel; parallel lines may have been made with a split bamboo stick. Alternative names: circular ring, banding.

2 Vertical line; a long solid line, either single or in groups, divides the body into sections; a short line forms a band around the neck, mouth, shoulder, pedestal, or lid (Fig. 3).

3 *Zigzag line,* which forms sharp angles in alternating directions; often comprises a horizontal band around the shoulder (Fig. 4). Alternative name: cross-hatch.

4 Wavy line, either one or more in a repetitive, parallel series; usually horizontal but sometimes vertical; width and depth of design varies in relation to the size of the vessel; frequently used on urns and large jars (Fig. 5).

5 *Horizontal band of crescent-shaped strokes* that look like a comma or a finger-nail impression; frequently used around the neck or shoulder (Fig. 6).

6 Dash (horizontal, vertical, or oblique); either single or several in groups; sometimes looks like a rope when used in a horizontal direction; broken oblique lines placed close together were frequently used to decorate the body of bird-shaped pots

7 *Band of rectangles,* which consists of two continuous horizontal lines that are parallel and divided into rectangles by vertical incisions; frequently encircles necks of bottles and pedestals; used as decoration on animals (Fig. 8).

Fig. 3 Incised pattern: horizontal band formed with short vertical lines

8 'V' design, which is triangular shaped and consists of three to eight solid or broken lines that converge at the point of the 'V': on the earlier wares, the 'V' was formed with a series of lightly incised dots; used to encircle the body of pots (Fig. 9). Alternative name: chevron.

9 'X' design, which frequently forms a horizontal band around the neck, shoulder, or upper body; density of design varies (Figs. 10, 11). Alternative name: cross-hatch.

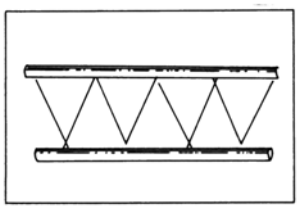

Fig. 4 Incised pattern: zigzag line

10 Arrow-head design; usually oriented to the right; looks like the tip of an arrow; impressed into the clay with a flat pointed implement; often forms horizontal band around shoulder (Fig. 12).

11 Star design, with three to six rows of lines in graduated sizes that form a concentric star-shaped circle; outline of design resembles the points of a star; it is suitable to the broad flattened shoulders that are characteristic of Khmer pots; design is well defined and carefully drawn (Fig. 13). Alternative name: wave.

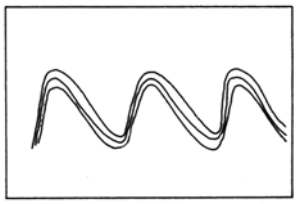

Fig. 5 Incised pattern: wavy line

12 Scallop design, which is a continuous series of connecting curves; either one or more in a parallel series; frequently used on vessels with broad shoulders and bodies of jars and pedestal urns (Fig. 14).

13 Loop design, which is a horizontal band of connected loops; elements are uniform in size within a band but two different sizes are often used on a single piece and sometimes the bands are in alternating directions; width and depth of design varies in relation to the size of the vessel; commonly used on large jars (Fig. 15). Alternative names: comb, undulating wave.

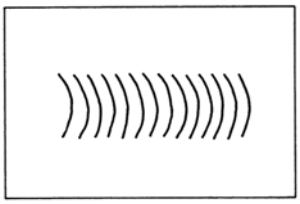

Fig. 6 Incised pattern: horizontal band of crescent-shaped strokes

14 Pictorial designs besides geometric arrangements are not common; motifs are primarily floral designs; used on the sloping shoulders of large jars and urns (Fig. 16).

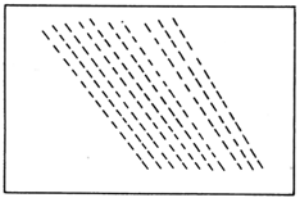

Fig. 7 Incised pattern: series of broken oblique lines

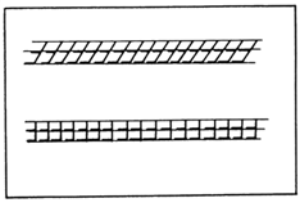

Fig. 8 Incised pattern: horizontal band of rectangles

TECHNIQUE: MODELLING

Modelling was used as a decorative technique to add surface texture by forming appendages that were applied to vessels. Examples include knobs on lids of vessels, and animal-shaped features, such as eyes, ears, and tails. Modelled clay forms are characterized by uneven thickness of the clay and irregularities on the surface.

Method

Starting with a small ball of clay, the hands and fingers are used to press, pinch, squeeze, and sculpt the clay until the desired shape is achieved. If it is to be applied to a vessel, the form is pressed on to the clay and adhered with liquid clay. Then incising may be used to add representational features to the form.

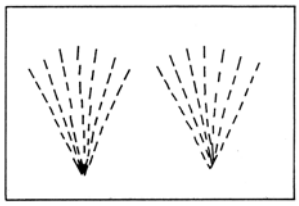

Fig. 9 Incised pattern: 'V' design

Knobs

Knobs on the centres of lids of Khmer vessels are rarely functional and most likely served a symbolic or aesthetic purpose. The most frequent shape resembles a lotus bud (sometimes called onion-shaped). The tip of the lotus bud is sharply pointed or gently rounded (Plates 78, 79).

The lotus was widely used as a decorative motif in India and China and it is an ancient, venerated flower that was known to the Egyptians, Greeks, and Persians. The lotus represents summer, and symbolizes divine presence, purity, and perpetual life.

A small number of modelled floral knobs are represented in the Khmer ceramic repertoire. The quality of workmanship is exceptionally fine and they adorn well-formed and carefully potted vessels (Plates 80, 81).

A short thin strip of clay modelled in the shape of a fruit stem is used as a knob on the lid of green glazed covered boxes in the shape of a lobed fruit such as a pumpkin or pomegranate. The lid is slightly concave with the stem, which is usually curved to emulate the natural form, in the centre.

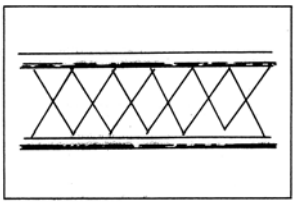

Fig. 10 Incised pattern: 'X' design

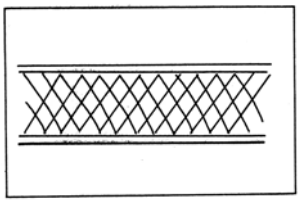

Fig. 11 Incised pattern: 'X' design

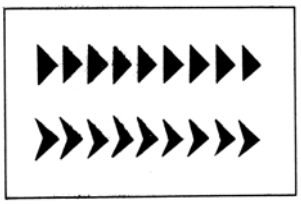

Fig. 12 Incised pattern: arrowhead

Handles

Functional handles and other appendages used to hang or lift vessels, such as jars and bottles, are uncommon in Khmer ceramics. Perhaps woven nets or baskets were secured to ridges around the mouth rims for lifting and hanging.

Small pieces of clay that resemble handles and look as if they have been pinched together between two fingers are sometimes placed at intervals around the shoulder of large storage jars. The most common number of handles per jar is three. The handle is non-functional as it is either a solid piece of clay or, if a hole was pierced, it is obscured by glaze (Plate 6).

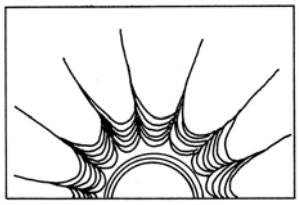

Fig. 13 Incised pattern: star

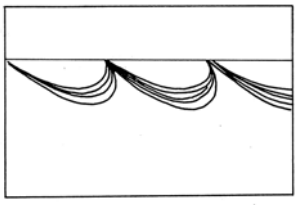

Fig 14 Incised pattern: scallop

Large brown-glazed jars have been found in North-eastern Thailand. They resemble Khmer ceramics in terms of clay, shape, glaze, and potting, but are identified as 'possibly Khmer' because they have strap-like handles placed horizontally on the shoulder.

A typical Khmer handle that is applied to the shoulder of a flattened globular vessel consists of a broad flat strip of clay with deeply carved lines; another appendage that looks like the head of a lizard often joins the handle; on the opposite end of the handle additional strips of clay are placed horizontally across the end and

incised to resemble the tail of a lizard. While the handle is functional, its placement and shape make it non-functional (Plates 87, 88).

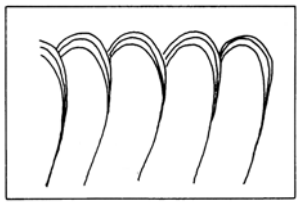

Fig. 15 Incised pattern: loop

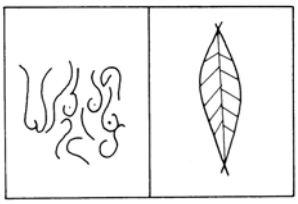

Fig. 16 Incised pattern: pictorial designs

Spouts

Only a few forms were made with spouts. The flattened globular jar with the lizard-shaped handle is joined by a spout in the form of an animal-shaped mouth or nose between two eyes. The short spout is a cylinder with short incised lines, perhaps to secure the spout to the vessel. Sometimes the glaze obscures the opening, making it a non-functional spout.

A few Khmer *kendis* with tubular spouts have been found (Fig. 27). Occasionally a short cylindrical spout is added to the shoulder of pedestal urns (Plates 105, 106).

Non-functional spouts were common in the Tang period, but since the wares were made for the tomb, their usefulness was not important.

Animal-Shaped Appendages

One of the most extensive uses of modelling as a decorative technique was to form animal-shaped appendages which were applied to vessels that contained lime for betel-chewing. Most of the vessels are small to medium sized and resemble a bird. Appendages in the form of eyes, beak or head, and tail were modelled from small pieces of clay and pressed on to the surface of a round vessel. After luting with liquid clay, incising was added to delineate features.

The same method was used for other animals such as the rabbit and elephant, and anthropomorphic features on bottles.

Two thick rectangular coils that look like lug handles are usually placed on each side of the opening on the back of elephant-shaped pots. They are in imitation of saddle fittings. A handle form is often used on the rabbit-shaped pots. A flattened rectangular slab of clay is looped to form a handle. It is placed on the back of the rabbit emulating a tail. It is usually incised and the most typical motif is a series of intersecting horizontal and vertical lines, which form a grid.

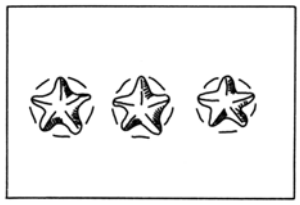

Fig. 17 Modelled pattern: circle with a raised star

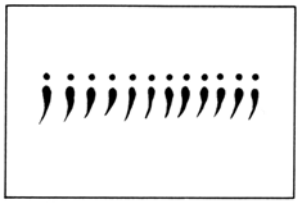

Fig. 18 Modelled pattern: comma with a dot above it

Patterns

The surface texture of vessels was varied by applying geometric designs in horizontal bands, usually on the shoulder of pedestal urns. Strips of clay were applied on to a vessel and adhered with liquid clay, then combined with incising. Sometimes a design, which was applied to a brown glazed vessel, was made with light-coloured clay and covered with a green glaze.

The applied elements are reminiscent of jewellery. The technique was most likely adapted from Persian metal-work.

A common modelled pattern consists of a band of small circles; each one is sectioned into five parts which form a raised star (Fig. 17). It is sometimes called a thunder motif, which is an ancient Chinese pattern. The name was derived from archaic representations of thunder that were used on metal-work. Because rain and

thunder were vital elements to the agrarian Khmers, it seems likely that these would have been interpreted in their ceramic art. It is also called the rosette pattern.

Another design consists of two geometric elements that look like a comma and a dot, or a semicolon. A small point is placed above a vertical curve (Fig. 18). This motif is frequently found on shoulders of pedestal urns.

Glazes

A glaze was applied to the vessel after decorating to improve the appearance and impermeability. It was a mixture of water and minerals, which were ground to a powder. The glaze became glassy after firing and changed the surface colour and texture. Glazes were known in many parts of the world as early as prehistoric times. China was the first Asian country to acquire glaze technology, which was most likely transmitted from Egypt before the Christian era. China rapidly achieved a high degree of skill in kiln construction, firing conditions, and glaze chemistry. It is probable that the Khmers learned the secrets of glazing from the Chinese.

The Khmers produced only two coloured glazes: green and brown. However the range of hues is wide and varied. The Khmer potters may have lacked suitable raw materials or the expertise to expand their repertoire of glaze colours. Or, if potting was a part-time occupation of farmers, perhaps they lacked the stimulus to develop new glazes, especially if the production was sufficient to meet the demands of the domestic market. Or, since a large number of forms were for religious rather than decorative purposes, perhaps the subdued colours were more suitable with the lustre of the images and the vivid tones of the altar accessories such as flowers, incense, and offerings of fruits. Also religious objects were sacred and the forms remained consistent over a long period of time.

The Khmer glazes may have been an indigenous discovery resulting from chance since they were a simple composition of natural materials readily available in the earth. Colour was achieved primarily by varying the percentages of the iron content. Irregularities in the colour and texture of the early glazes suggest that the potters worked by experimentation. They are characterized by thinness, flaking, unevenness, and crazing. These elements were minimized as technology improved. The wares made between the last quarter of the eleventh and the middle of the twelfth century, when the Khmer ceramic industry reached a peak of perfection, show marked improvement. The glaze colours of this period are homogeneous, with depth, lustre, and a high degree of tactile quality.

A relationship most likely exists between the Khmer glazes and the wide range of stonewares that were produced in southern China between the third and the tenth centuries. The closest link was probably with the Yue wares, made in Zhejiang Province. The finest products were early celadons, which were widely exported to the Philippines, Indonesia, India, and Persia during the last half of the Tang period.

TECHNIQUE: GLAZE

A high-fired stoneware glaze is composed of silica, flux, and alumina. Most of the necessary glaze ingredients can be obtained from common rocks and minerals. More than one raw material may be used to achieve a desirable formula for each of the ingredients. A single raw material may contain more than one element. For example, clay is a source of alumina and silica. Silica, which is found in flint and quartz, is the glass forming ingredient. It is the basic substance of a glaze and the only material that is indispensable. It constitutes between 50 to 70 per cent of the glaze content. Flux can be supplied by lead oxide, lime, magnesia, potash, and zinc oxide. It

is the melting agent that causes silica to liquify. Alumina, supplied mainly by feldspar and clay, is the refractory element. It binds the materials together and increases the hardness of the glaze to prevent it from running off the clay body. A glaze is prepared by grinding the ingredients to a powder and mixing them with enough water to achieve a creamy consistency (Table 2).

Colour in glazes results from the inherent oxides present in the materials used or from the addition of metallic oxides, which are resistant to heat. The fired colour of a glaze is determined by the type and quantity of the metallic oxide, the clay, and the firing conditions. The Khmers relied primarily on iron oxide as a colouring agent and achieved a variety of results with limited materials. Varying amounts of iron produced colours that ranged from straw to yellowish light green, olive, caramel, dark brown, and black (Table 3).

The amount of control the Khmer potters had over the final product is uncertain. Variations of colour on a single piece and the apparent absence of clearly defined olive and black glaze

TABLE 2
Khmer Glazes

Components	*Per cent*	*Raw Materials*	*Function*
Silica	70	flint quartz	glass-former
Flux	15	lead oxide lime magnesia potash zinc oxide	melting agent
Alumina	15	feldspar clay	refractory element

categories indicate that the control was limited. These two colour variations could occur from the flame in the kiln flashing on to the sides of the vessels. Iron oxide characteristically produces a variety of hues because it is sensitive to changes in glaze composition and the kiln atmosphere.

The glaze on the exterior of small and medium wares was applied by dipping the vessel into the glaze solution. It was rotated in different directions, shaken to remove the excess glaze, and placed in an upright position to dry. The dipping method requires a large amount of glaze but is economical because waste is minimal. The glaze usually extends from the mouth to the upper portion of the lower body. Often the glaze on the lower body dripped during drying and formed an uneven glaze line. Since it did not reach the base there was no danger of the glaze sticking to the floor of the kiln.

The glaze was most likely poured on to the bodies of large vessels, starting at the mouth. Usually it covered the upper two-thirds of the body and occasionally extended to the base. Only brown glaze was used for large vessels and it is characterized by flaking and thick and irregular trickles that sparsely cover the surface.

Sometimes interiors were glazed, particularly on small wares. Frequently the glaze, or sometimes slip, was applied scantily and unevenly, indicating that the impermeable function of the glaze was not significant. The interior was probably glazed before the exterior. The glaze was poured inside the vessel, perhaps through a funnel made of reeds, and rotated until the surface was covered; then the excess glaze was poured out.

TABLE 3
Iron Oxide Content In Glazes

Per cent	Kiln Atmosphere	Colour
I/2-I	Oxidizing	Yellow
I/2-I	Reducing	Light-green
1-2	Reducing	Medium/D ark-green
over 2	Reducing	Olive
3-4	Oxidizing	Medium brown
5	Oxidizing	Dark brown
over 6	Reducing	Black
	Oxidizing	Black

TECHNIQUE: SLIP

A slip, or thin layer of coloured liquid clay, was sometimes applied to the wares before the glaze. It was used to change the surface colour or texture of the clay body. A slip can mask imperfections in the clay and prevent the iron content from discolouring the surface. The typical texture of a slip looks like thick cream and is made by diluting the ingredients of the clay body with water. By adding more water, a slip is used to lute modelled appendages to vessels. The closer the composition of the slip is to the clay, the better it will adhere. A slip resembles the fired clay and shows the range of natural clay colours produced by iron.

A slip that turned grey during firing was used on early brown-glazed urns in the middle of the eleventh century. It was applied with broad strokes, perhaps using a brush made from coconut fibre. The dark clay body is rough and grainy with black spots and the slip has a coarse mat finish. It seems likely that the grey slip and olive glaze used on early urns belong to an experimental period, since both elements disappear by the last quarter of the eleventh century.

Brown-glazed wares were sometimes completely covered with a slip that fired red with orange or dark red tinges. It was only used in the last quarter of the eleventh century.

A slip that fired light-grey was used on brown glazed pedestal urns in the last half of the eleventh century. It was evenly applied on a tan clay body that fired dark grey and usually covered the entire vessel, except for the base. The glaze characteristically flaked, revealing the light-grey slip.

A slip that fired brown and had a shiny finish was applied on small and medium pieces during the last quarter of the eleventh and the first half of the twelfth century. It was applied over the entire body and base, which were buff to light-grey. Because of improved technology the clay colour was fairly consistent and the texture was smooth with relatively few impurities. The slip was probably used to tone down the light-coloured clay and to provide a dark background to enhance the richness and depth of the brown glaze. One of the most frequently found forms with a brown slip is a flattened globular pot with a broad shoulder and base.

TYPES OF GLAZES:

Ash Glaze

The earliest type of ash glaze occurred accidentally on high-fired wares. Wood or vegetable ashes from the fire were blown by a draft through a pit in the earth where the wares were fired. When the ashes randomly fell on to the surface of the wares, a natural glaze formed. It usually covered the shoulders of vessels that faced the top of

the pit or were nearest the fire. The natural ash glaze occurred when silica and other minerals in the ash fused with the materials in the clay body. Through the improvement of kilns, higher firing temperatures, and glaze knowledge, the natural ash glaze was incorporated into a glaze that was applied to the surface of a vessel. Ash from trees, straw, or leaves was mixed with clay to produce a glaze solution. Ash glazed wares were fired in an oxidizing atmosphere. The colour of the ash glaze is highly dependent upon the body clay it is applied over. For example, an ash glaze that covers light-coloured clay produces a straw to light green colour; applied over dark-coloured clay, an ash glaze results in a brown to black colour.

Lime Glaze

A simple, yet satisfactory, stoneware glaze can easily be achieved by mixing an iron-rich clay and lime, which are common materials found in the earth. Clay contains alumina, silica, and flux in the form of potassium and sodium, and lime in the form of limestone. The Khmers most likely used a similar combination. A lime glaze, fired in an oxidizing atmosphere at a kiln temperature of 1200 degrees centigrade, produces either a light yellow or a brownish black glaze, depending on the ash and lime content and the thickness of the application. If the lime crystallized during cooling, a dull, mat finish resulted.

COLOURED GLAZES

Green Glaze

Examination of shards found at Ban Kruat show that the Khmers used two different glaze compositions (a lime and a celadon glaze) to achieve the green colour. Both types were probably used simultaneously throughout the production of green monochromes, although celadon seems to have accounted for at least 75 per cent of the green colour. The two glazes are similar in chemical composition but different in proportions. They both have a high flux content, either lime or potash. The lime glaze varies from a straw to light-yellow to light-green colour and lacks lustre; the celadon glaze is a straw or ligh-green colour with a glassy texture. Sometimes it appears colourless with streaks of green. In China the lime glaze was the early prototype of the unctuous Song celadons. The Khmer celadon glaze was a primitive one. Although it did not evolve to a quality comparable to the Chinese celadons, it was similar to wares that were produced at the same time in southern China.

Celadon is a modern term for a green-coloured glaze that has an iron oxide content and was fired in a reducing kiln atmosphere.

The straw colour of some celadons was probably a result of the inability to maintain a reducing atmosphere during firing. Air may have been admitted before the glaze reached maturity, causing the green colour to disappear leaving a straw colour where the vessel was oxidized.

The earliest green glaze, in the last quarter of the ninth century, varies from creamy white to straw or a light-green colour. It is thin and translucent.

The colour continued into the last half of the tenth century, but the glaze is thinner with a fine dark line crazing, perhaps caused from daily use or from chemicals in the soil during burial.

Three types of green glazes dominated in the first half of the eleventh century. First, a thick and translucent glaze that is a light-green colour (Plate 7). Second, a yellowish-green glaze that adheres well to the body (Plate 8). Third, a straw-coloured glaze with a sugary texture and no crazing, but with a strong tendency to flake.

In the last half of the eleventh century, the use of the green glaze was restricted primarily to covered jars. The colour is straw to light-green. It is thin and flakes easily.

In the last half of the twelfth century the green glaze was only used on urns. It is straw colour, with crazing and flaking.

Brown Glaze

The brown glaze was the most prolific of the Khmer kilns. The colour varies from a light caramel to olive, brown, or a brownish-black colour. The brown hue was dependent upon the iron oxide content and the firing conditions. The higher the percentage of iron, the darker the colour. A black glaze with a high percent of iron can be achieved in either a reducing or oxidizing kiln atmosphere.

The brown and black Khmer glazes have been classified as Temmokus. Originally the term was used by the Japanese to identify a group of dark-glazed tea-bowls made in Fujian Province, southern China, in the Song period. The use of the term has been expanded to include all brown or black wares with a high-fired glaze that contains between 4 and 10 per cent iron oxide. If fired in an oxidizing atmosphere at a temperature of 1250 degrees centigrade the temmoku glazes produce a medium to dark-brown colour. However, the use of the term temmoku in reference to Khmer ceramics is useful only as a general classification for the wares with brown glazes. Since the Khmer glaze range was limited to two monochrome colours, which are not likely to be confused, it is preferable to classify the glazes by colour and await further research for specific names based on kiln site excavations.

The earliest brown glaze is characterized by thickness, unevenness, and mottling. Poor sieving of raw glaze materials or falling ash deposits on the molten glaze surface may have caused the mottling. Sometimes brush strokes are visible. The colour is either olive or dark brown (Plate 9).

In the last half of the eleventh century the olive glaze developed the following characteristics: thick, silky, smooth, and homogeneous.

It is uncertain whether or not the olive glaze was an intentional or accidental effort. However, it was not used consistently on the same sizes and shapes which indicates it was an uncontrolled and random glaze. The fluctuations in colour and texture may have been due to the iron content and the firing conditions.

A distinctive brown glaze used for a short period in the middle of the eleventh century is characterized by oil spots, which occurred during the oxidizing firing. Silver spots were caused by an excess of iron oxide on the surface of the glaze. The glaze is thin with excessive flaking. The medium brown colour sometimes has an olive tone.

A brittle dark-brown glaze that was used only in the last quarter of the eleventh century is characterized by a rust-coloured stain where the glaze has flaked off from a grey to buff body (Plate 10).

A medium to dark-brown glaze with light-coloured opaque specks appeared in the late eleventh and continued into the early twelfth century. The combination of the glaze and specks that are buff- to rust-coloured gives a powdered effect, which is caused by gas bubbles or fly ash. The evenly applied glaze is relatively thick and has a fine network of crazing, and minimal flaking, indicating a compatible combination of body and glaze.

The brown glaze was thinner by the end of the eleventh century. It is light-brown to caramel colour and, because of its thinness, darkens in colour where the glaze collected in thick globules.

The ideal brown glaze was achieved in the first half of the twelfth century. It is a caramel to medium to dark-brown colour, thick, homogeneous, and evenly applied,

often over a slip that fired to a brown or violet colour. This glaze was used on flattened globular jars with a broad base and narrow mouth, which are some of the finest products of the Khmer kilns.

Another brown glaze used in the first half of the twelfth century is thin, transparent, and caramel-coloured.

In the last half of the twelfth century two types of brown glazes were predominant. One is a thin evenly applied brownish-black colour which covers most of the vessel and has a charred appearance. The other glaze has a trickly texture, was unevenly applied, and collected in thick flowing dribbles. The colour varies from a caramel to dark-brown colour. This glaze continued to be used through the thirteenth century. The apparent loss of control over the glaze was undoubtedly abetted by the increased output of large and thickly-potted vessels, particularly jars with an average height of fifty-seven centimetres. For thorough firing they would have required kilns with high temperatures that could be sustained over a long period of time.

GLAZE TEXTURES

The four distinct textures that characterize the Khmer glazes are:

Clear. The clay body is visible through the glaze.

Opaque. The glaze surface is dull because the light is impenetrable; it looks like frosted glass.

Translucent. The glaze transmits a diffused light; poor visibility.

Transparent. If a glaze was fired to maturity and the oxides fused, a transparent glaze resulted; good visibility; it is the most desirable glaze texture.

GLAZE DEFECTS

Because of the experimental and primitive nature of the Khmer glazes, unintentional and uncontrollable defects or faults occurred. Sometimes they became positive features, such as a richly-mottled glaze, and enhanced the natural beauty of the vessels; other times the defects, such as flaking, became diagnostic characteristics of Khmer ceramics. Glaze defects occurred because of an incorrect glaze composition, an incom patible clay body, faulty application of the glaze, or poor firing conditions.

The most frequent Khmer glaze defects are:

Crawling

A separation of the glaze from the clay body during firing. It may be caused by the application of a glaze that is too thick or by too rapid a firing in the early stages when the ware was still damp from glaze immersion (Plate 92).

Crazing

An unintentional network of fine line cracks in the surface of the glaze. It occurs in the cooling phase of the firing cycle. It is caused by the glaze contracting at a greater rate than the body. It is sometimes called crackle, which produces the same effect but is an intentional and controlled effort used for decorative purposes (Plate 38).

Flaking

An uneven flaking of the glaze that exposes the surface of the clay body. Flaking is a hallmark of the Khmer glazes. It occurs when the glaze contracts at a slower rate

than the body, which forces it to separate. This condition is also called shivering (Plate 102).

Irregular glaze texture

A frequent characteristic of Khmer glazes is a runny, uneven, mottled texture that thickens where the glaze collects and forms a pattern of thick streaks on a thinner background. On green glazed bowls this defect was compensated for by carving a horizontal line around the lower body to collect the flowing glaze. This texture is common in glazes with a high lime and low silica content (Plate 76).

Pin-holes

Small pits that occur at random in the surface of the glaze; they are also called ‘palm eyes’. When a vessel is immersed into a glaze solution, pin-holes appear in the glaze coating if air is trapped between the body and glaze. The pin-holes will remain if the vessel is slightly under-fired (Plate 89).

Streaking

Light-coloured vertical streaks and flecks with tinges of olive, rust, orange, or violet, occur frequently in brown glazes. As the glaze matures, the chemical reaction forces the lime, iron, and other natural impurities to the surface, where they appear as vertical streaks. They may be caused by poor sieving of the raw materials, which are not necessarily homogeneous (Plate 67).

Kilns

Evidence of kilns has been found in Kampuchea and North- eastern Thailand. The ceramic discards surrounding the areas indicate that the kilns and the methods of firing were primitive and often experimental. Certainly firing must have been limited to the dry season. The humidity and dampness that characterize South-East Asia would have precluded kiln-firing between May and October. The kilns would have filled with water, making them unusable. This period coincides with a seasonal break in the rice-growing cycle.

The rice is planted in June or July and harvest begins in late November or early December. The interlude occurs between August and October when the farmers have time to tend to other tasks related to farming or to pursue cottage industry handicrafts. Perhaps the Khmer farmers produced ceramics during this period when they were not needed in the rice fields. Then the firing of the wares would be taken over by other craftsmen during the dry season, which is between November and April. Ceramic production was limited to the dry season in Burma at Martaban and Pegu.

Today nearly all villagers with handicraft skills in North eastern Thailand are part-time farmers who produce crafts during the dry season. The fact that Khmer ceramics show little variation in terms of potting techniques, shapes, or glazes over the 500 year production period, supports the hypothesis that ceramic production was not a continuous, full-scale industry.

KAMPUCHEA

All the natural ingredients necessary for making ceramics, such as clay, sand, rocks, water, and wood, are on the Kulen plateau, forty kilometres north-east of Angkor, in Kampuchea. The site was first reported in the late nineteenth century by Etienne Aymonier, a French naturalist. Mounds of shards and wasters, or kiln discards, are

prevalent in the area. The evidence seems sufficient to support the presence of kilns. However the area has not been excavated and a specific kiln site has not been positively identified. Surface finds produced straw-coloured to light-green glazed stoneware shards from the middle of the eleventh to the thirteenth century. Shapes included covered jars, bowls, covers, roof tiles, bottles, and architectural ornaments. Brown glazed shards were not found at Kulen.

Bernard Groslier reported evidence of other kilns in Kam puchea at Sambor Prei Kuk (tenth century) and Preah Khan de Kompong Svay (twelfth century).[9]

THAILAND

A kiln was discovered at Ban Kruat, Buri Ram Province, in North-eastern Thailand. It is located 20 kilometres north of the present border between Kampuchea and North-eastern Thai land and is 140 kilometres north-west of Angkor. It was excavated by the Fine Arts Department in 1975 and subsequently levelled by farmers to use the soil for rice growing. A large area around Ban Kruat was covered with shards, wasters, and kiln debris. Brown glazed shards comprised 75 per cent of the finds and the remaining 25 per cent were green-glazed shards. They date between the middle of the eleventh and the early twelfth centuries.

The kiln was reportedly made of fired clay and relatively small with four chambers, the diameter of each chamber was seventy-five metres. The walls of the kiln were formed with blocks. Flat irregular clay slabs found in the kiln area may have been used to construct the kilns. The clay composition included sandstone and latérite and was probably a mixture similar to the clay used for making ceramics. The blocks of the kiln walls were fired in place. Successive firings produced a glassy fly ash coating which bonded the blocks firmly together and increased the strength of the walls, which may have been insulated on the outside with mud, dirt, or clay.

An abundance of charcoal ash and 500 green glazed bowls were found inside the kiln. The number of bowls gives an idea of the size of the kiln and the singular glaze and shape indicate that specialization may have existed.

Besides the excavated kiln, several mounds have been identified in North-eastern Thailand. A preliminary survey conducted by the Archaeology Department of Silpakorn University shows that Khmer ceramics were produced primar ily in four provinces: Buri Ram, Maha Sarakham, Si Sa Ket, and Surin.

Firing Techniques

The large number of wasters found in kiln areas indicates the technical difficulties encountered by the Khmer potter. Pieces fused together and collapsed wares are evidence of the problems in firing ceramics.

The construction of a primitive clay kiln, such as the one found at Ban Kruat, evolved from a shallow pit with an open fire. The clay kiln was a technical improvement over the pit and enabled more rapid firing and higher temperatures that could be sustained for a longer period of time. The most difficult problem of primitive kilns was to distribute the heat evenly. The nature of some of the wares indicates that the kiln temperature was 1000-1200 degrees centigrade. The Khmer potters used both oxidizing and reducing atmospheres in the kiln. Wood was used as fuel and was probably supplied through small openings around the base of the kiln. Dried bamboo may have been added after a certain temperature of wood fire was attained. The flames from the wood travelled upwards in a natural movement and formed a cylinder around the cooler air in the chimney and escaped through the opening. The level on which the kilns were built has not been determined but they were most likely

constructed above the ground to avoid problems of dampness. Modern day kilns in Laos are dug out of termite hills or into a river bank.

OXIDIZING ATMOSPHERE

The small size of the Khmer kiln was suitable for an oxidizing atmosphere because it could be fired rapidly without the temperature becoming too uneven. A wood fuel heats a kiln by burning, which is a chemical reaction between carbon and oxygen. An oxidizing atmosphere is achieved when sufficient or excessive oxygen is available to burn the wood. The union of the two elements produces heat, carbon dioxide, and ash residue. To maintain the atmosphere it is essential to keep a sufficient amount of oxygen present in the kiln to consume the carbon.

In an oxidizing atmosphere the colour of the clay tends to be buff or grey. The colour of a fired shard in cross-section is uniform and consistent throughout the clay body. The colour of the glaze depends upon the type and quantity of metallic oxides used. Iron oxide was the colouring agent most frequent ly used by the Khmers. Wares fired in an oxidizing atmosphere included most of the brown monochromes and some of the green monochromes and the two colour wares. Kiln wasters show that all three types of wares were fired in the same kiln.

REDUCING ATMOSPHERE

A reducing atmosphere is almost a natural condition for a primitive wood-burning kiln. It is quite simple to achieve but the amount of reduction is difficult to control and accounts for variations in colour. A reducing atmosphere is particularly sensitive to the weather and the Khmer potters may have found it difficult to control this variable factor. If too much carbon or insufficient oxygen is produced during the burning process, a reducing, or smoky and cloudy, atmosphere results. Carbon is freed in the form of black smoke and carbon-monoxide consumes the oxygen. The colour is affected by reducing the amount of oxygen in the metallic oxide. The atmosphere is controlled by over stoking the kiln or by limiting the amount of air that enters the kiln. At the beginning of reduction firing, the atmosphere is kept oxidizing until a temperature of 800 degrees centigrade is reached, then reduction is begun, and the heat is raised until the maximum temperature for firing stoneware is achieved.

The clay colour of wares fired in a reducing atmosphere tends towards grey or medium-brown. Both colours are often tinged with pale red. The colours of the exposed and unexposed clay differ.

Iron added to a celadon glaze fires green in a reducing atmosphere. It was used for some green monochromes and some two colour wares.

TWO FIRINGS

Evidence has been found to indicate that some of the wares were fired twice: once after the potted vessel was dried, which is known as biscuit-firing, and again after the glaze was applied. Modern Thai celadon is biscuit-fired before the glaze applica tion. One example of an unglazed globular Khmer jar with bird-shaped appendages and incised wings on the body is known. It is identical to the brown and green glazed forms. Unglazed shards of conical bowls were found at Ban Kruat. Two unglazed boxes were found in Kampuchea.[10] Perhaps this technique was used temporarily on early wares during a period of experimentation when the potters were trying to achieve an ideal balance between the clay and the glaze.

FIRING SUPPORTS

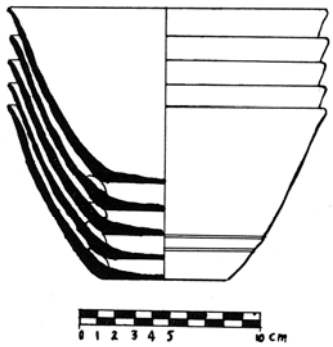

Fig. 34 Method used for stacking and firing green glazed bowls; each piece is separated by clay balls

Small.sandy clay balls, about the size of a marble, have been found in abundance around the kiln areas in North-eastern Thailand. They are a mixture of sand and lime. The texture is friable (Plate 11). Wasters, composed of green glazed bowls, identify how the balls were used for firing. The bowls were stacked upright and separated by a ring of evenly-spaced balls, which varied in number from five to nine. The balls were placed around the interior central well of each bowl in a stack, except for the top piece (Plate 12; Fig. 34). After firing, the bowls were separated, and when the balls were removed, a circular band of unglazed oval scars on the interior and exterior resulted. The balls that have been found around the kilns are irregularly shaped and they collapsed slightly under the weight of the bowls. Similar firing supports were used in southern China during the Han and Tang periods and in Vietnam in the eleventh and twelfth centuries. The method was probably used by the Khmers for mass production to meet the domestic needs of the local population.

Occasionally similar scars are seen on other shapes such as the tops of lids, the shoulders of brown glazed pots of flattened globular form, miniature pots, and the lips of brown glazed bowls.

1. Watt, op. cit., p. 3.
2. Groslier, Bernard, 'Introduction to the Ceramic Wares of Angkor', *Khmer Ceramics*, Singapore, Southeast Asian Ceramic Society, 1981, p. 26.
3. Ibid., pp. 14-15.
4. Brown, Roxanna, 'Khmer Ceramics of the Korat Plateau: Unravelling the Mysteries', *Khmer Ceramics*, Singapore Southeast Asian Ceramic Society, 1981, p. 45.
5. Pendleton, Robert L., 'Latérite and Its Structural Uses in Thailand and Cambodia', *Geographical Review*, 31, no. 2, April 1941, pp. 177-202.
6. Groslier, op. cit., p. 22.
7. Boisselier, J., *Manuel d'Archéologie d'Extrême-Orient*, vol. i, *Le Cambodge*, Paris, Editions A. & J. Picard, 1966, pp. 367-8, fn. 3.
8. Chou Ta-kuan, *Customs of Cambodia*, trans. J.Gilman d'Arcy Paul, Bangkok, Social Science Association Press, 1967, p. 23.
9. Groslier, op. cit., p. 17.
10. Ibid., p. 18.

4 Shapes

GLAZED Khmer ceramics fall into three categories in terms of shape (1) classical, (2) naturalistic, and (3) utilitarian. The same categories occur in ceramics of the Tang period.

Covered jars and urns are typical classical shapes. The angular lines, the architectural appearance, and the broad flat base are characteristically Khmer. These features combine to exude an aura of grandeur and nobility. The wares were used primarily for religious purposes, such as containers for flowers placed on altars or for storage of ritual objects. Classical shapes were predominant during the earliest and latest periods of production. They continued to be made in the middle years, parallelling the introduction of a variety of other shapes.

Animal-style vessels are the most representative example of the naturalistic category. Real and mythical animals were modelled with imagination and sensitive potting. Naturalistic shapes are some of the most attractive products of the Khmer kilns. They served as containers that were primarily used for lime, a necessary ingredient for chewing betel, and for objects associated with religious ceremonies. Naturalistic shapes first appeared in the middle of the eleventh century and continued into the fourteenth century.

The utilitarian category includes a variety of shapes that range from medium-sized bowls to large storage jars. The forms are well proportioned and look as if they were meant to be used. Almost all of them were for containers of either foods or liquids, except for the architectural fixtures such as roof tiles. Wares in the utilitarian category were made throughout the ceramic period but the same shapes were not made continu ously. For example, the green monochrome bowls endured for a long time and the form remained unchanged; others, such as the brown monochrome storage jars, were only made during the last quarter of the ceramic period.

The absence of a continuous development in shape may have been due to the distances between kiln centres, the irregular importation of Chinese ceramics, or the probability that the ceramic industry was seasonal.

The earliest glazed shape was a roof tile, dating from the late ninth century. The ceramic kilns may have been set up to meet the demand for the large amounts of architectural fixtures that were required for the construction of temples. The tiles were possibly the longest lasting shape, and may have continued to be made until the sixteenth century.[1] The flattened globular covered box was a typical shape of the tenth century or possibly earlier. An important and long-lasting shape, which appeared in the tenth century, was a cylindrical covered jar. During the first half of the eleventh century the repertoire of new shapes expanded to include large vessels, such as urns, and, perhaps, animal-style wares.[2] Shapes from the previous period continued in the last half of the eleventh century. Shapes in the classic period, the last quarter of the eleventh and the first half of the twelfth century, were primarily a continuation of the earlier ones. Generally it was a period of refinement and consolidation. Small bottles, jars, and pots were a hallmark of Khmer ceramic production in the first half of the twelfth century. Wares were thinly potted and thoroughly fired, which resulted in minimal glaze flaking. The majority of pieces were brown-glazed although green-glazed small wares are known. A few shapes, such as the flattened globular pots and elephant-shaped vessels, survived into the last half of the twelfth century, whereas other shapes, such as the small wares, disappeared. The shapes of the thirteenth century are characterized by largeness and crude potting. They were primarily vessels used for storing water.[3]

Terminology

Ceramic terminology is difficult because forms and colours are perceived differently and shapes are variable. The colour of clay and slip refer to the colour after firing. Buff colour identifies clay that is fired to a dull whitish yellow. The term 'flat' is not used when describing the bases of pieces, since all Khmer bases are flat. 'Green glaze' is a ceramic classification used for all Khmer wares with a greenish glaze, the tones varying from cream to olive.

The individual parts of a vessel are: lip, mouth, neck, ears, shoulder, body, foot, and base. Khmer ceramic shapes can be classified and defined as follows:

Architectural fixture

A form, such as a tile or finial, that presumably served a structural or decorative purpose on Khmer buildings.

Basin. An open round vessel with a wide mouth; used as a container for liquids (Fig. 19).

Bottle. A vessel with a round body, tubular neck, and narrow mouth (Fig. 20).

Bowl. A hemispherical form; the height is less than the diameter of the mouth (Fig. 21).

Box (covered). A round form that is often flattened; the cover and body form a continuous line and are almost equal in height (Fig. 22).

Conch. A modelled form made in imitation of a conch shell; presumably used as an accessory for ritual ceremonies (Fig. 23).

Jar. An oval, round, or cylindrical vessel without a handle or spout; often with a sloping shoulder and flaring mouth rim; a constricted neck (Fig. 24).

Jar (covered). A cylindrical vessel; the cover and body usually form a continuous line (Fig. 25).

Jar (storage). A large heavily potted oval or spherical-shaped vessel with a thick

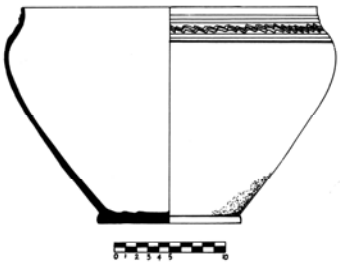

Fig. 19 Basin

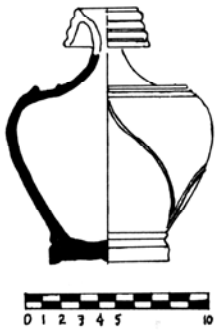

Fig. 20 Bottle

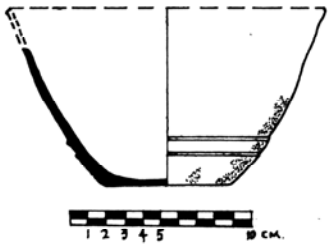

Fig. 21 Bowl

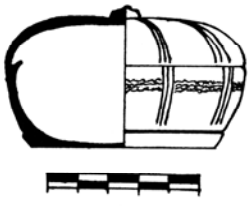

Fig. 22 Box (covered)

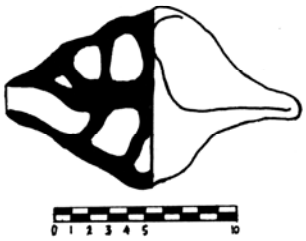

Fig. 23 Conch

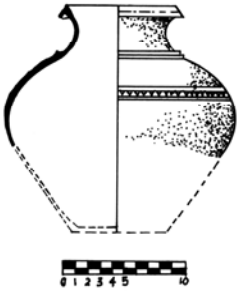

Fig. 24 Jar

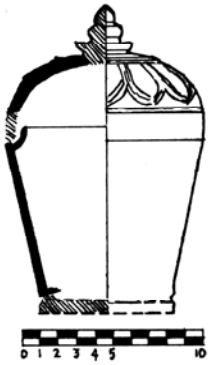

Fig. 25 Jar (covered)

mouth rim; often with a broad sloping shoulder; neck is usually absent; presumably used as a con tainer for storage of liquids (Fig. 26).

Kendi. A round vessel with an opening at the neck and a spout on the side (Fig. 27).

Pot. A round vessel with a narrow opening at the top; used as a container (Fig. 28).

Urn. A round or oval vessel; usually with a flaring mouth, a pedestal, and a circular base (Fig. 29).

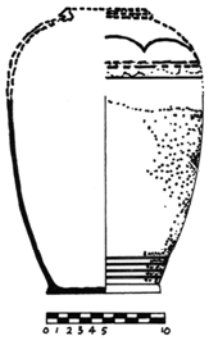

Fig. 26 Jar (storage)

Animal-Style Wares

A captivating and masterly group of animal-style wares appeared in the middle of the eleventh century. Bird-like vessels, sometimes whimsically portrayed, and commanding capari soned elephants in green monochromes were the earliest crea tions, but, in the last half of the eleventh century, they were joined by rabbits, turtles, horses, mythical creatures, and other less frequently depicted animals. The new expression was in extreme contrast to the previous shapes, such as roof tiles and covered jars. Such wares remained a vital and refreshing part of the ceramic repertoire for approximately 150 years, until the thirteenth century.

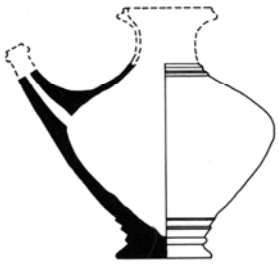

Fig. 27 *Kendi*

The potters worked freely within the range of Khmer glazes and used green and brown separately and together. The animal-style vessels are one of the few shapes that have been found in both colours of glaze as well as in the two colours on a single piece. The earliest animal-style wares were green mono chromes. But they were soon surpassed by the brown mono chromes, which compose the majority of the animal-style wares. The ratio of green to brown is approximately one to three, the same as the overall output.

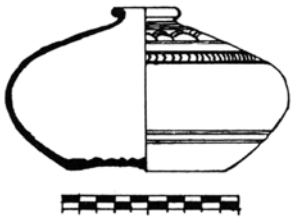

Fig. 28 Pot

The close Khmer relationship with nature is obvious in their ceramic interpretations of realistic and mythical animals, which exude human warmth and earthiness. The Khmers had an instinctive feeling for animals, which evoked naturalism in the ceramic examples. Khmer potters combined familiar subjects and basic materials to produce animal-style wares with a distinct ethnic character, portrayed with spontaneity and vital ity. Most of the animals represented in ceramics were not common in other art forms, except for the elephant and *naga,* which were depicted in bronze and stone. The majority of the wares are small and medium-sized. The few large examples that have been found exhibit excellent potting and must have required considerable skill to complete.

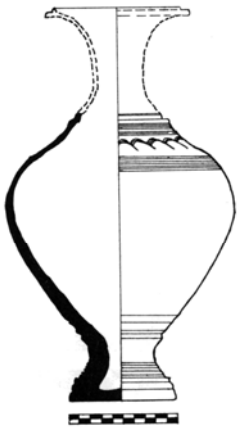

Fig. 29 Urn

Although animal-style wares have been found at Angkor, the quantity and variety are minimal compared to the finds in hailand. Almost all of the Angkorian wares are green mono chromes, although sometimes an olive to brown colour was used to define animal-like features. The majority of the pieces had a top opening and were

functional containers. Several animals, such as the ant-eater, elephant, fish, frog, and horse were modelled in the round. The bird, chicken, and elephant are the most common forms represented at Angkor, although the rabbit, frog, and turtle have also been found.

A large and varied group of animal-style wares was produced in Thailand. The primary animals were the bird, elephant, and rabbit and they correspond to their Angkorian counterparts. Additionally there were the ant-eater, boar, cat, duck, frog, horse, rat, squirrel, and turtle as well as an impressive array of mythical creatures.

USES

Animal-style wares were most likely made to fulfil the essential needs of everyday living and they undoubtedly were associated with the symbolic and spiritual beliefs that have characterized the civilizations of South-East Asia since prehistoric times. The earliest known animal-forms were connected with burial rites and later acquired a cult-worship meaning. They provided a solid and lasting base that enabled animal worship to exist harmoniously with outside religions. Today in Kampuchea and Thailand animal shrines and Buddhist temples are to be found in the same compound and various deities co-exist without conflict.

Traces of lime, ground to a fine white or pink powder, have been found in a large number of animal-style vessels and provide positive evidence of their use as lime containers, presumably for betel-chewing.

INFLUENCES

Evidence of direct influence has not been found and identical wares in other cultures are unknown. However, a general evolution of the animal style can be traced, and indirect outside influences can be cited.

The animal style in painted pottery was known universally in prehistoric civilizations. The method of modelling animals by hand probably originated in the ancient Near East; then the influence travelled simultaneously east to the Mongolian region of China, and west to Europe before the beginning of the Christian era. The animal style flourished in Medieval Europe. Viking art, which developed in Sweden and Norway, is an outstanding example of the animal style.

Animal shapes combined with geometric elements were made in bronze in China as early as the Shang dynasty. Bronze animals in the round appeared in the Zhou period. The concept of applying modelled bird-shaped parts on to a utilitarian form was used in China to produce chicken-head ewers as early as the fourth century. Most of the animals depicted in ceramics during the Tang period were domesticated, such as the cock, duck, goose, hen, and horse, and they have corresponding forms in Khmer wares. Undoubtedly the individuality of the Khmer potters was expressed in the new animal-style wares.

A recently discovered Chinese covered box in the shape of a bird shows striking resemblances to the Khmer form in terms of glaze, applied features, and incised motifs. It is possibly Chao-an ware from southern China, made between the tenth and eleventh centuries.

Most of the Khmer animals belong to the Chinese zodiac and reflect Buddhist symbolism.

TECHNIQUE

The technique of modelling animals from a ball of clay has shown little change since its early beginnings in prehistoric times and a similar procedure is followed today.

Using the fingers, gentle pressure is applied by squeezing and pinching the clay to produce expressive forms.

Two methods were used to make animal-style wares. First, pieces were sculpted in the round. The form is completely developed and free standing. It usually has a hollow interior and a circular opening that is at least one centimetre in diameter on the back or top. The hollow interior and opening made the vessel functional and allowed moisture and gases to escape during firing, which prevented the mass of clay from exploding. The animals most frequently depicted using this method are the ant-eater, boar, cat, duck, elephant, fish, frog, rat, squirrel, and turtle. Although it is easier to model a form in separate hollow parts and join them together, there is no evidence that the Khmer potters used this technique.

Sculpted forms without a functional opening, which are prominent in the Sawankhalok wares of Thailand, are not common in Khmer wares. Perhaps the potters were not familiar with the firing technique of a single mass of clay or perhaps they preferred functional forms that could be used as con tainers.

In the second method of producing animal-style wares modelled animal-like parts were applied on to the main body of a vessel as decorative appendages. First, a clay ball was placed on a turning device; a globular or round pot was built from coils; then animal-like appendages, such as ears, eyes, tail, head, or feet, were modelled and applied to the pot with liquid clay; incised details, such as facial features or wings which defined the appendage, were incised to secure them to the pot; and, finally, the completed piece was separated from the turning device. A potter's cutting mark is visible on the base. The most typical animals made by this method were the bird, elephant, goose, horse, rabbit, and mythical creatures.

NATURALISTIC ANIMALS

Bird-Shaped wares

The fertile jungles and tropical climate of South-East Asia provide a natural habitation for birds. Their lively shapes and vivid colours were frequently expressed in Khmer art. The ceramic forms are naturalistic renditions that combined the creativity and artistry of the potter. Although it has been found in abundance in Thailand, the bird-shaped form is less common in Kampuchea. It is one of the few identical shapes in green and brown glazes; but the majority of pieces are brown-glazed.

Symbolically birds are richly endowed. Hindu mythology elevated them to celestial beings because of their ability to fly and related them to Man because of their migratory souls. The ancient Persians considered birds an auspicious symbol of glory and good fortune. In Greek mythology, the bird was sacred to Athena, the Goddess of Wisdom.

Bird-shaped features modelled into eyes, a beak, and a tail were applied to a round, or spherical pot with a narrow mouth and an unglazed base with graduated concentric rings. Most of the bird-shaped pots are medium-sized but the form was also made in miniature and large sizes. Often the diameter of the foot is equal to the diameter of the mouth. The miniature pots are well formed, skilfully decorated, and exhibit a high degree of workmanship.

The clay is light-coloured—either buff, grey, or pale red—and the texture is compact and relatively free of impurities. The colour and texture of the glaze followed the general develop ment of all Khmer glazes. It extended to the upper portion of the lower body. The configuration of the glaze line varies. It usually ran and pooled, resulting in an uneven line that is darker in colour than the rest of the glaze; sometimes the glaze line is even. The interior of the pot is usually at least partially

glazed. An uneven line around the shoulder on the interior is a common characteristic and indicates that a small amount of glaze was poured in and swirled around; then the pot was inverted to release any remaining glaze. Often a deeply-incised line encircles the lower body on the exterior, near the foot. On other Khmer shapes a similar line was used, presumably to collect excess glaze. But on this shape the glaze rarely reaches the line, so it must have served some other purpose.

The decoration is either a realistic interpretation of the depicted animal, or a geometric configuration. The mouth is usually encircled by one to four deeply-incised lines. Often the glaze collected between the lines and practically obscured the incising. Sometimes the body is undecorated except for the lines around the mouth. Wings are incised with a series of dots or dashes on each side of the body. Often they are enclosed by a continuous incised line in the shape of a wing. An alternate wing formation is an abstract representation consisting of a series of oblique lines, either solid or broken, sometimes deeply incised, on each side of the body. This motif was especially popular in the last quarter of the eleventh century. Sometimes the body is divided into two parts by a single vertical line or two lines that form a 'V'. The division starts under the beak and continues to the lower body.

The most typical geometric configuration is a series of vertical lines that divide the body into panels. Either one line or groups of two or three parallel lines placed closely together are evenly spaced at intervals around the body and separated by rectangular or square undecorated areas.

A band of small rectangles often encircles the lines near the mouth. It is made with short vertical dashes, evenly spaced between two continuous horizontal lines.

Appendages are decorated with incising, which adds to the realistic representation of the bird. In some cases, the append ages project beyond the body at sharp angles and it seems likely that the incising may have had an additional function of securing the appendage to the body.

The modelled and applied crescent-shaped tail is characteris tically uniform. The underside is pushed upwards to join the top and form a distinct ridge that represents the tip of the tail. Tail feathers are added by incised short vertical lines across the top and underside. If the tail was thick a small hole was made underneath, presumably to release gases and prevent the vessel from exploding in the kiln.

The most familiar bird-shaped form is usually called an owl or a chicken. However since both birds are clearly depicted in other forms, the shape is, most likely, a general representation of the numerous bird species in the Khmer kingdom. Zhou Da-guan reported many kinds of birds at Angkor. Among them were the peafowl, kingfisher, parrot, vulture, crow, egret, sparrow, cormorant, stork, crane, wild duck, and canary.[4]

A triangular and somewhat round beak fits slightly below the mouth of the vessel. It looks as if it was pinched between the fingers to form the vertical ridge. The underside is pushed upwards to join the top and form a blunt tip. The conical beak is divided on each side by a short line, which separates the bill into an upper and lower part, indicating that it was used for picking up and crushing seeds. Modelled circular eyes, usually surrounded by an incised line, are placed on each side of the beak near the mouth. Sometimes two circles of graduating sizes, which create a raised centre, are used; or, a series of dashes, which resemble a sunburst motif, radiate around the centre (Plates 13, 14, 15, 16).

A less common bird-shaped pot is similar to the previous form except that the eyes and beak are attached to a head, which is modelled separately and attached onto the vessel slightly below the mouth. The head is narrow with a long neck, a slightly hooked beak, and two round eyes. The body of this type of bird is usually decorated

with geometric configurations consisting of vertical lines. It is almost always brown glazed. It is most likely a jungle-fowl (Plate 17).

The third type of bird-shaped pot looks like an owl. Most interpretations of the owl in other mediums depict the owl in a sitting position, but the Khmer ceramic version looks as if the owl is in flight, indicated by the horizontal position, rounded wings, and large head. A thickly-modelled heart-shaped face is applied on to the upper body of the pot. The point of the heart forms the beak and the face is divided in half by a vertical ridge. Two large round eyes decorated with a sunburst motif fill most of the face. Clearly-defined naturalistic wings are often mo delled and applied horizontally on each side of the body. Feathers are created by incised horizontal lines intersected by wavy lines (Plate 18).

Today owls are common inhabitants in South-East Asia and tend to reside near temple compounds. According to Chinese legend, the owl was sacrificed to the Yellow Emperor in ancient times. Owls were depicted in Chinese art in stone in the Shang dynasty and in bronze in the Zhou period.[5] In Indian mythol ogy the owl was the guardian of Lakshmi, Goddess of Fortune.

An appealing duck-shaped pot is skilfully formed with the well-appointed use of two colours. The round green pot is decorated with an applied duck-shaped head and a feathered tail in the shape of a fan (Plate 19).

Shards of other recognizable bird species have been found and attest to the variety of forms. Generally they represent common birds which inhabited the villages and jungles of South-East Asia. Identifiable birds include a chicken with a divided and sharply pointed beak, a long graceful neck, a distinct comb, and a ruff of feathers around the neck; a peacock with a long neck and head turned sideways looks as if it was startled by a noise; and a fluid interpretation of a duck, which may have been a knob on a lid (Plates 20, 21).

The chicken is indigenous to South-East Asia and descended from the jungle-fowl. The cock, which is one of the Twelve Zodiac signs, represents warmth and the life of the universe. According to Chinese mythology, the comb on a cock's head symbolizes a literary spirit and the spurred feet indicate a warlike disposition. In addition the cock is courageous because he fights his enemies, benevolent because he clucks for his hens when he finds grain, and faithful because he never loses time. Cock fighting was a popular pastime for both royalty and villagers in the Khmer kingdom, as it was in many parts of South-East Asia and Southern China.

Shards of a few masterfully-large bird beaks have been found. The form is thickly modelled, triangular, and culminates in a, round and slightly hooked beak. Indentations divide the beak vertically and incising is added for definition. The vessels that these giant beaks were attached to must have been enormous (Plate 22).

One urn shard with a pedestal base is majestically adorned with strong, well-defined talons applied between the base and lower body (Plate 23).

One vigorous interpretation of a bird's head is a very large and weighty brown-glazed form. It is a solid piece of clay with no visible aeration holes. Three clearly defined ridges project from the top of the head representing a comb. This imposing bird is an excellent example of the artistic ability of the Khmer potter. It seems likely that the size, shape, and weight of this piece prohibit its use as an appendage on a vessel. Perhaps it was an architectural fixture used for ornamentation (Plate 24).

This form resembles a parrot, which is a common inhabitant of South-East Asia. It favours nesting in bamboo and feeds on nuts, fruits, and seeds, using its feet to handle food. The parrot sends out a noisy vocal signal when snakes are near by. It is a confidant of young lovers and also possesses curative powers over certain diseases such as jaundice. Characteristics of a parrot are a large head and a giant hooked bill; both features are clearly represented in Khmer ceramic forms.

The Elephant

The elephant played an important part in the daily lives of the Khmers and penetrated their religion and mythology. The King of Funan sent trained elephants as tribute to China in the fourth century AD.[6] Jayavarman III, who reigned in the last half of the ninth century, was called the 'Elephant-Loving King', because the inscriptions during his reign contain more references to elephants than at any other time.

The elephant was a revered and symbolic animal. In India it was considered a royal beast and only kings could own them. Throughout Asia, the elephant is an aristocratic symbol of divine wisdom and is known for qualities of patience, endur ance, self-restraint, longevity, and strength.

The elephant participates in all areas of Hindu and Buddhist iconography. Traditionally it is identified in Buddhism along with the horse, deer, and *naga*. The elephant was depicted in cave paintings and rock carvings in prehistoric times. One of the earliest representations in Buddhist art is a stone carving of the Goddess Lotus (seated between two elephants).[7] Sometimes it is the mount of Buddha. The elephant is the national emblem of the Thais, who believe that it is the incarnation of a future Buddha. In Indian mythology, Buddha entered his mother in the form of a white elephant. A Jataka tale depicting the elephant and Vessantara, the Charitable Prince, is represented in eleventh century stone carvings at Ta Nei and Preah Khan temples at Angkor.[8]

The elephant appears in a Hindu context on prehistoric Mohenjo-Daro seals, which belong some of the earliest art of Man. A cloud gave birth to the elephant in Hindu mythology. Ganesha, a Hindu god who was the son of Shiva, had the body of a beast and the head of an elephant. He was the patron of intellectuals. He was a favourite of the Khmers and often depicted in their stone carvings.

The white elephant is the most esteemed of all animals. Its origin is associated with the celebrated Hindu legend 'Churning of the Sea', which offers hope and meaning to all farmers. The setting is the Sea of Milk and the purpose is to churn the sea and recover the essence of elements such as beauty, immortality and abundance. Vishnu, incarnated as a turtle, offers his shell as a base for Mandara, the mountain. The movement of the mountain, which is initiated by twisting a serpent's body around it, agitates the sea and churns up the water. After a struggle between demons and gods that lasts thousands of years, several precious elements are recovered. They include a white elephant, who becomes the mount of Indra, and Amrita, the physician of the gods, who carries an elixir of immortality in a white bowl. Since the white elephant is an ancestor of the Universal Milk, it is given a special mention.[9] To be classified as a 'white elephant' in Thailand, the species must meet twenty-nine criteria. Colour is of primary importance and must be light grey, which represents a royal and holy origin.

Admiration for the elephant was not limited to Asian civiliza tion. Alexander the Great regarded the elephant as a symbol of strength. The Romans used elephants for battles. The ultimate challenge for a gladiator was to conquer an elephant single-handed in combat. Throughout the Middle Ages the elephant was a symbol of triumph and power. In a fable of Diodorus, the elephant symbolized Christ.

The Khmer ceramic form usually depicts a caparisoned elephant. Almost all of the forms were for containers with an opening on the elephant's back. The shape has been found in Kampuchea as well as in Thailand. The earliest elephant-forms were green monochromes but, later brown monochromes pre vailed. Two-colour elephants were also produced. Both green-and brown-glazed elephants with high lights in the opposite colour are known. Generally the green monochrome and two colour examples exhibit fine quality workmanship and highly-skilled potting. Perhaps they represent the venerated white elephant.

Traces of lime have been found inside many of the elephant vessels, indicating that they were lime containers and probably used for betel-chewing. Some of the more elaborate elephant forms may have been containers for betel-quids.

The real elephant played an important part in religious ceremonies and rituals associated with the propitiation of spirits, and the ceramic elephant may have been used for these purposes. The hole on the back of the elephant may have served as a container for a candle or incense. It could also have been a reliquary container, like the Sawankhalok elephants. A relic could have been placed in the hole and covered with a stopper.

A typical elephant has a, round or spherical body, often supported on four, short unglazed legs, a circular opening with a rolled mouth-rim on the back, and modelled and applied head, tail, saddle fittings, and, often, tusks. Two thick rectangu lar coils that look like lug handles are attached to the body on each side of the mouth opening. The clay is a buff to pale grey colour.

An exceptionally fine elephant is predominately green in colour with brown accents. The four short legs are unglazed. The detail on the caparison is well executed and blends harmoniously with the total form (Plate 25). A rider-shaped stopper was found buried in the ground with the elephant.

Saddles for elephants are elaborately carved and held in place by straps that extend around the elephant's chest and backside. An incised motif used exclusively on Khmer ceramic elephants imitates a saddle strap. It is a vertical band, sometimes formed with parallel lines or rows of dots. The band extends from the base of the handle to the waist of the body. An incised circle at the end of the strap imitates a bell. The diameter of the bell equals the width of the band. Usually two straps are placed on each side of the elephant. Often the elephant is wearing a bridle, which is represented by horizontally-incised bands across the trunk, face, and forehead.

Some examples have an incised or applied circle, which is usually surrounded by small dots or dashes on the forehead between the eyes and ears. The mark may represent an abbre viated form of the Buddhist Wheel of Law. Because the circle is located in the same position as the elephant's brain, it may be an *urna*, which represents the third eye of Buddha and symbolizes intuitive wisdom. It may have been used as identification for royal elephants, just as similar marks were placed on the forehead and temples of women who worked in the palace and allowed them entrance.

Ceramic elephants are often found with lids or stoppers. However it is difficult to know if they are original. One type of stopper is brown-glazed, human-shaped, and supported by an unglazed knob. Perhaps these pieces were riders for the el ephants and served a dual function as lids.

Another peculiar stopper is brown-glazed in the form of a small cup. It may have been placed in the opening on the elephant's back and served as a reliquary receptacle (Plate 83).

A less frequent type of elephant is sculpted in the round with a circular opening on the back. The thick heavy shape is roughly modelled, sometimes in exaggerated proportions, with minimal decoration and undefined features. The clay is usually dark grey and covered with mottled and variegated brown to black glaze that adheres poorly and unevenly. Sometimes it was applied over a white slip. The crude workmanship, inferior materials, and limited decoration indicate a date when ceramic production was declining, perhaps between the late twelfth and fourteenth centuries (Plate 26). The form has been found in Thailand but is unknown in Kampuchea. Bernard Groslier identified this type of elephant as a precursor to Sawankhalok wares, which were produced in Thailand between the last half of the thirteenth and the middle of the fifteenth centuries.[10]

Elephant heads were modelled and applied to vessels, usually urns with a flaring mouth, oval body, and flat base. A typical head is large and brown-glazed. These heads have a fairly consistent characteristic: the width across the ears is nearly equal to the height from the base of the trunk to the top of the head.

The elephant was important in the lives of the Khmers because of its size, strength, and religious connotations. It lived in the plains of South-East Asia. Remains of stockades used for herding wild elephants after they had been hunted and captured have been discovered. The elephant was used domestically to assist in the daily tasks of an agrarian household, such as lifting and carrying weighty objects. Addi tionally it provided the work force for the building and maintenance of the city. It was also used for regional domestic and military transport. Travellers rode elephants over long distances and warriors used them as mounts in battle. The elephant was invaluable in war where battles between neigh bouring countries were fought on the backs of elephants. The strength of an army was measured by the number of elephants in the field. According to Chinese records of the Tang period, the Khmers had 5,000 war elephants.[11] Conflicts between Thailand and Burma have been recorded over the possession of elephants, particularly over the white elephant. During festivals elephant fights were held for entertainment.

Bronze, considered a precious metal, was used for making elephant-fittings. Elaborately decorated shields protected the heads and sides of elephants in battle. Swords were tied to their trunks and poisoned daggers to their tusks. Bronze fittings from saddles have been found near Korat, in North-eastern Thailand. Similarities in decorative motifs can be seen between Khmer bronze pieces and ceramics.

For processional occasions the king's elephant probably wore a sumptuous carpet on its back held in place by girths, clusters of jewels that simulated ear-rings, a bridle studded with stone, and, perhaps a gold tiara on the head, a giant necklace, ankle bracelets studded with precious metals, and bells tied to the ends of saddle straps.

The Fish

The fish is a mainstay of life in South-East Asia. Because of its importance as a food the fish is a respected animal and the object of numerous symbolisms. It is a prominent theme in all media of Chinese art. In Khmer civilization it was undoubtedly an emblem of abundance and wealth because of its abundance in the Tonlé Sap, and in the streams and marshes in North-eastern Thailand. The fish is associated with reproduction and regene ration. It also signifies freedom and perserverance.

Two ceramic fish forms are known. A small green-glazed, flat fish has been excavated at the Royal Palace at Angkor Thorn. The same shape has been found in Thailand. The form has a hole pierced in the dorsal fin. Perhaps it was used as a sinker, or weight, for fishing (Plate 27).

The second fish form is unknown at Angkor but several examples have been found in Thailand. It varies in size but is fairly consistent in form. All examples are brown mono chromes, modelled in the round, and naturalistic in design. The mouth is almost always open; sometimes an additional opening was made near the tail. Perhaps the hollow interior of the fish was filled with lustral water, and it served as a sprinkler. The body is oval and relatively thick. The caudal fin is well developed and often fan-shaped. Almost all specimens have a dorsal fin on the back and two modelled, round eyes applied on the head. Usually the head and tail are clearly delineated sections, created by incising a fairly wide band of geometric motifs around the head and carved ridges around the tail. Sometimes scales are represented by incised curved lines. The tail is often defined with a series of horizontal lines.

A variation of the conch is modelled with a fish tail (Plate 63). This form is known in brown and green monochromes.

The Frog

The frog favours a moist warm climate and is a common inhabitant of South-East Asia, especially in the rice-fields. A frog is differentiated from a toad by having a smooth skin and dwelling chiefly in water. A toad has rough, warty skin and is primarily a land-dwelling animal. However, because the dis tinction between the two animals is based on popular opinion rather than scientific fact, the generic name of 'frog' is pre ferred.

The frog is mainly used for eating and medicinal purposes. Extracted juice is taken for heart remedy.

Symbolically the frog is associated with longevity because of its long life span, which is thirty to forty years.

Ceramic frogs in green and brown monochromes have been found in Kampuchea and Thailand. A typical form is a con tainer modelled in the round with an opening on the back. Two front legs and two large hind legs are clearly defined. The mouth is formed by two deeply carved horizontal lines filled in with short vertical gouges. Applied details include eyes and bands of circles around the front, middle, and back of the body. The circles are usually filled with small lumps of clay, which give an uneven texture.

The Horse

The horse was used for transport throughout the Khmer Empire. Zhou Da-guan reported that the horses were very small, and he also referred to a specific 'mountain horse' that was unknown in China.[12] Even though the horses were small, they were tough and sure-footed, which made them especially adept in the hills and jungles. But the Khmers preferred to use elephants in the plains.

The horse was a common theme in Sassanian silver. In China the horse symbolizes status and rank and is associated with royalty and nobility. In Hindu mythology Vishnu incarnated himself in the form of a horse. According to Buddhist mythol ogy, Balaha, a horse, helped rescue 500 merchants from drow ning by inviting them to climb on his back and hang on to his mane. Thus, the horse became a symbol of protection for the Khmers. Today wooden stairways leading to the doors of Khmer houses are often carved with a horse head, symbolizing protection. The largest Khmer statue in existence is a stone horse. It was found at Neak Pean, an Angkorian temple built in the late twelfth century.

The ceramic horse is the least naturalistic of all the familiar animals. It is usually formed from buff-coloured clay with a sandy texture and covered with a medium-brown glaze, although a green-glazed horse has been found at Angkor. Most examples appear to be modelled from a solid piece of clay with two small holes pierced for aeration. The holes are placed in a realistic feature of the horse, such as the nose or ears. The head of the horse often seems out of proportion and is slightly elongated. Modelled ridges, in imitation of a bridle, occur on the face and neck of most examples. The horse was sometimes used as an applied appendage on the shoulder of a vessel.

The Rabbit

The rabbit was frequently depicted, and is surpassed only by the bird and the elephant in quantity. Sometimes the form is called a hare. The physical differences between the two animals, such as the length of the ears and legs, and methods of movement are difficult to compare in ceramic forms. The hare is the older of the two animals and has often been portrayed in European art. There are distinct differences in form and social status between the two animals in the art of the Middle Ages. Nevertheless the 'rabbit' seems to have been the most recog nized term for ceramic reference.

The rabbit has been a popular subject for art media since the beginning of civilization. It was depicted in China in jade in the Shang or Zhou period.[13] It is richly endowed with symbolism and renowned universally for its association with longevity, fertility, and the lunar cycle. According to Buddhist mythol ogy, the rabbit offered itself as a sacrifice when Buddha was hungry. The Chinese believe that the rabbit derived its origin from the moon. As an attribute of the moon goddess, the rabbit symbolizes rebirth and fecundity. A Taoist legend describes using the rabbit for mixing the elixir of immortality, and associates the rabbit with aphrodisiac powers.

Almost all of the Khmer rabbit vessels have traces of lime inside, attesting to their use as lime containers, presumably for betel-chewing. Today the contents of the betel-tray are shared, except for the lime which is stored in a separate container because of its association with aphrodisiac powers. Perhaps the Khmers had knowledge of the related symbolism between the rabbit and lime.

The ceramic rabbit was made in green and brown mono chromes and two-colour wares. On all forms a light-coloured clay, either buff or grey, was used. A pale red tinge, indicating iron, is often present.

The rabbit is one of the most endearing of the Khmer ceramic animal forms. It is depicted in a capricious manner with vitality and fluidity. The most familiar form is round, representing the rabbit in a crouching position. Other rabbits are standing on four short legs. Some examples are modelled in the round and others are actual pots with modelled and applied parts. Almost all of the shapes have a circular opening on the back. Ceramic rabbits have been found in Kampuchea and Thailand.

The crouched rabbit is characterized by skilful workmanship, a glaze that adheres well and extends to the flat unglazed base, a finely-modelled face and ears, and, sometimes, a handle in the form of a tail. The junctures of the appendages are carefully blended into the body, giving a smooth feeling. The face is separated from the body by a continuous band, which starts and ends behind the ears. It consists of short, vertical dashes enclosed by two parallel lines. The same design is used to delineate parts of the face. An elongated version of the motif defines the legs. The round, applied eyes are encircled with either an incised line or a series of short radiating dashes. The mouth is formed by a deeply incised line in the shape of a ‘V’ or a curved line that looks like an upside-down camel’s hump. The ears start at a centre base between the eyes and project away from the body at a slanted angle. Generally the ears are skilfully sculpted into two parts. Sometimes they form a single unit divided by incising. The absence of two modelled and clearly-defined ears may indicate a later date.

The crouching rabbit usually has a handle in the form of a tail. A typical handle is formed from a flat rectangular slab of clay. Often it is applied so close to the body that it becomes non-functional. The handle is sometimes incised with a geomet ric configuration, such as vertical and horizontal lines intersec ting to form a grid, or chequered pattern (Plate 28).

Another type of rabbit was formed with a pot and applied parts. It is either globular or rectangular shaped. It is an appealing form that suggests a well-fed and contented animal. Applied parts include four short legs, a tail, divided ears, and round eyes. Incising in simple geometric motifs defines the nose and mouth and horizontally divides the body. This type of rabbit is often covered with a dark red, iron-rich slip and a brown glaze applied over buff-coloured clay (Plate 29).

The Turtle

The turtle, sometimes called a tortoise, is uncommon in Khmer ceramic art, but the few known examples are well potted and realistically depicted. The turtle is a reptile

that is characterized by a shell enclosing its body and a tortoise is a turtle that lives on land.

The turtle is known to live the longest of any animal. Because of its slow life process, it is a symbol of longevity, strength, and endurance. For a Buddhist, feeding a turtle is an act of making merit. The Khmers considered the turtle an object of good luck. Gold-leaf turtle charms have been found in excavations in Thailand. A superb stone turtle carved in the round has been found at the twelfth/thirteenth century temple of Angkor Thorn.[14]

The shell and entrails are used for medicinal purposes. Various parts of the turtle mixed into a powder or paste can aid the healing of sprains and arthritis, and cure diseases of the kidneys.

The turtle represents the universe in both Chinese and Hindu mythology. The dome-shaped back signifies the sky and the belly denotes the earth. The most familiar legend in Indian art that includes the turtle is the 'Churning of the Sea', which is also represented in Khmer sculpture and architecture. Vishnu, a Hindu god, descends to earth in the form of a turtle and provides a base for Mandara, the mountain, at the bottom of the Sea of Milk.

The known ceramic examples of the Khmer turtle are brown-glazed and modelled in the round with a circular opening on the back of a dome-shaped shell. Modelled parts include a whimsi cal head with eyes, four feet, and a tail. The parts seem to have been pulled from the clay that formed the base rather than applied. The mouth is made by a short, incised line and two dots represent a nose. Bands containing short oblique lines appear around the opening on the back and edge of the shell. Two vertical bands of the same design are used to divide the shell in half. The shell is defined with radiating incised lines that begin at the opening on the back and extend to the edge of the shell.

Buff clay with pale red tinges is covered with a brown slip, which is visible on the base. A thin medium-brown glaze covers the shell. Traces appear on the underside of the shell and the appendages. It is a dark brown colour where the glaze has collected in the incised lines (Plate 30).

OTHER NATURALISTIC ANIMALS

Other animals that are known but rare in Khmer ceramics are the ant-eater, cat, deer, and pig. All examples have been found in Thailand but the shapes are unknown in Kampuchea. The animals are containers and are modelled in the round and all are brown monochromes except for the cat, which occurs in green monochrome and two colours. Zhou Da-guan identified the deer, pig, rat, and rhinoceros at Angkor.[15]

The Ant-Eater

The ceramic ant-eater most likely depicts a pangolin, which is a type of ant-eater that is characterized by horny scales. It is a fairly common inhabitant of South-East Asia and feeds on nests of ants and termites. The ceramic form depicts the pangolin rolled up in a ball with its tail wrapped around the body, which is a typical position of protection. A band of rectangles encircles the head, and the scaly body is represented by deeply-incised curves and dashes, which extend across the body. There is an opening on the top of the back (Plate 31).

The Cat

The cat was most frequently associated with animistic rites in Khmer civilization. The cat symbolizes fertility and, according to legend, if a pregnant cat jumps over a dead body, the departed spirit returns momentarily. A pregnant cat participates in the

ceremony for consecrating a new house and joins the procession around the property. A tomcat takes part in the 'Entering the Cradle' ceremony for a new-born baby.

In Hindu mythology the cat is an emblem of Lakshmi, the Goddess of Plenty.

At least two cats are kept in Buddhist temples to protect the manuscripts from being eaten by mice.

Since the beginning of civilization, the cat has been depicted in the art of the Egyptians, Hindus, Chinese, Japanese, and Incas.

A typical Khmer ceramic cat sits upright with an opening at the top of the head. Paws are defined with deep, short incisions. Modelled and applied ears, eyes, and nose are realistic interpre tations. A deeply-incised line forms a mouth. The front and hind legs are round; the fluid lines add dimension to the form. A collar is almost always present. It is made by a continuous horizontal band that is intersected by short, vertical lines.

The clay is buff in colour. The body of the cat is usually green-glazed; the collar and facial features are brown-glazed. A less typical form is in a reclining position and green-glazed.

The Deer

The deer is traditionally associated with Buddhism. In China the deer represents longevity because of its long life-span. The Chinese believe it is the only animal capable of finding the sacred fungus of immortality, central to Taoist belief.

A typical ceramic deer is a brown monochrome modelled body supported by four short legs with an opening on the back. The chunky body and stubby legs do not display the graceful ness of a deer but the shape of the head, markings on the body, and short tail indicate that it is one. The sculpted head is turned back towards the body. Realistic colour markings are created by incised horizontal bands filled in with circles.

The ceramic form probably emulates either a barking deer (muntjac), or a mouse-deer (chevrotain). Both species are indigenous to South-East Asia and inhabit the jungles.

The Pig

The ceramic representation may be a boar, or wild pig. Zhou Da-guan recorded that wild boars were abundant at Angkor.[16] Boars prefer to inhabit woody, hilly areas and symbolize the wealth of the forest. The boar is most likely the ancestor of the domestic pig.

A chunky body stands on four short legs. The flat snout is clearly defined. The eyes and ears are modelled and applied. A sharp ridge runs between the opening on the back and the snout. Decoration is minimal. Incising defines the legs, eyes, snout, and ridge.

MYTHICAL ANIMALS

Mythical animals in Khmer ceramics are not very common. A few examples of the *naga*, or snake, are known. Other forms that figure prominently in stone sculpture, such as the lion and *garuda,* which is the king of birds, are absent from the ceramic repertoire. Perhaps the Khmers did not think that the mythical theme was a suitable combination with the functional uses of the ceramics.

The origin of the Khmer Empire is believed to be related to the '*Naga* Legend'. In the seventh century a Brahmin married the daughter of the serpent king, who was most likely a princess of Funan or Chenla. Subsequently the Brahmin became the king of Funan, perhaps by seizing the throne. This act marked the founding of the first

Khmer state and elevated the *naga* to the status of a deity. The *naga* became the protector of all Khmer religious buildings.

The *naga* serves as a symbolic link between the spiritual and living worlds. It is a semi-divine being because it is mortal and can be captured by man, yet it can make itself invisible. The *naga* lives beneath the earth and near water. As the guardian of the energy of life and mineral resources it controls the soil and rain, which are essential to farmers.

Knowledge of the powerful *naga* extends beyond Asia. Greek soldiers, during the time of Alexander the Great, were impressed by the strength of the *naga*, whom they feared and respected.

The *naga* is synonymous with Khmer art and was a major decorative motif. It is majestically portrayed and a key element in stone sculptures on Angkorian temples. However, it is rare in ceramics.

One known ceramic example of the *naga* is a brown-glazed shard that may have been used as an appendage on a vase or as a non-functional handle. The head of the *naga* is undecorated and the shape is similar to the stone *naga* heads at Preah Vihear, a Khmer temple in Si Sa Ket Province in North-eastern Thailand, built in the first half of the eleventh century.[17]

Shards of a spout reveal a mythical creature modelled with great finesse. The form combines the trunk of an elephant with the comb and almond-shaped eyes of a bird. It is hollow with slits, representing a mouth, on each side of the face. The trunk turns under and looks as if the creature is putting food into its mouth. Three parallel modelled ridges on top of the head project upwards depicting a spiny crest and give a regal air to the form. Geometric incising adds definition. It is covered with a thick, lustrous and evenly applied caramel-coloured glaze.

One example has a long extended neck which indicates that it was used as a spout. The eroded glaze reveals a graceful form. Traces of a dark-brown glaze remain with rust-coloured pat ches on light-grey clay, attesting to a late eleventh century date. It was probably applied on to the shoulder of an urn, as the same form appears on a stone relief in the National Museum in Phnom Penh. It may have been a lustral water-sprinkler. Water could be poured into the urn and released through the two holes on the sides of the head (Plate 32).

The mythical animal is probably a *kotchasi*, which has a lion’s body and the head of an elephant with a cock's comb that stands straight up in a triangle.

The mythical influence is most likely Indian, although the application technique was undoubtedly transmitted by the Chinese. Spouts in animal-head shapes were a popular ceramic product of the Tang period.

Architectural Fixtures

One of the earliest uses of Khmer ceramics was the production of architectural fixtures that were required for the vast number of temples and related structures that were built during the Angkorian period. The needs of such large-scale building programmes must have been enormous. Identical green-glazed roof-tiles have been found in Kampuchea and Thailand. Jud ging from the large quantities of shards in those areas, tiles were probably the most prolific output in the architectural fixtures category. Based on ceramic evidence at several temple sites in Kampuchea, Dumarçay has suggested that kilns producing tiles and bricks existed in close proximity to the construction worksites.[18] Green-glazed finials were also produced. A few brown-glazed modelled pieces in real and mythical animal shapes are large, thickly-potted, and weighty. They may have been architectural fixtures.

TILES

The earliest tiles have been found at Roluos, an ancient capital of the Angkorian period, which dates from the last quarter of the ninth century. The tile form reached an artistic and technical peak in the last half of the tenth century when the body and glaze blended to perfection. The tiles of that period were graceful, well-formed, and covered with a homogeneous glaze.

Evidence of the use of roof-tiles by the Khmers was given by Zhou Da-guan in the late thirteenth century when he lived at Angkor. He noted that parts of the palace were covered with yellow pottery tiles and that only princes and those who held high office were allowed to use tiles on their homes.[19]

Unglazed tiles dating from the end of the seventh or the beginning of the eighth to the ninth century have been found in Kampuchea. Evidence from this period is scarce, perhaps because the unglazed shards were discarded during temple excavations, or because they were low-fired and porous, and succumbed to the natural elements of a tropical climate and burial. The shape is either flat and rectangular or square with a ribbed edge and a knob for affixing the tile to the structure.[20] A well-defined unglazed example with deep car ving is a rectangular and rounded tile with a triangular-shaped pictorial motif placed on the end at a right angle to the tile. The seated figure in the centre is surrounded by an arched ribbing, which forms the base for a leaf border (Plate 37). One green-glazed tile in similar shape to the unglazed model is known and adds support to an evolution of style theory. These forms were derived from Indian prototypes and attest to the presence of Indian influence in Khmer ceramics during the early period. Terracotta tiles have been found at Muang Singh, a Khmer temple in western Thailand, from the late twelfth to early thirteenth centuries.[21] This discovery may indicate that wooden structures existed in the temple area.

At the end of the ninth century a distinctly different type of roof-tile appeared. It is green-glazed, rectangular and modelled to form a convex curve with an irregularly-formed knob attached to the underside on the upper third of the tile. It was used to join the tiles together and affix them to the basic structure. The size of the tiles is fairly consistent; the width of the base is approximately one-third wider than the top of the tile. Ridges of varying sizes are evident on the underside, uneven clay thickness is visible on the edge, and each tile varies in the degree of curve. These factors indicate that the tiles were constructed with coils. Perhaps long coils were laid out to form a flat sheet; then, a slab of coiled clay the size of a tile was cut off; finally, when the clay was dry enough to hold its shape but wet enough to be modelled, it was gently sculpted to form a convex curve.

The clay is buff to light-grey in colour, with a dense and compact texture. The transparent glaze is straw to light-green colour, with a thin watery texture and a fine network of crazing. The glaze adheres to the body well. It covers all of the upper side and sometimes the underside (Plate 38).

A gutteral tile was a new form used in the last quarter of the ninth century. It is rectangular with a flat glazed tile canal and edges raised at right angles to the canal. A knob is affixed to the upper third of the unglazed underside (Plate 39).

The shape, glaze, firing, and clay on these tiles were new innovations from the unglazed tiles and undoubtedly reflect different sources of inspiration. Chinese influence was evident in Khmer architecture at the end of the ninth century, which is the same time that the tiles appeared. It is possible that the influence was transmitted to ceramic roof-tiles which were made in China as early as the Zhou period. The shape of the Khmer tiles suggests that they were laid on a roof in the same manner as the tiles in China. The glaze is similar in colour and texture to the glaze used on Chinese Yue wares produced between the third and tenth centuries.

Another possible source of influence is Burma. Lead-glazed roof-tiles were used on temples in Burma.[22] Chinese records refer to a green-glazed brick wall that surrounded the capital of the early ninth century kingdom of P'iao.[23]

FINIALS

Green-glazed finials were probably used as ornaments and placed at the apex on the roofs of royal buildings. A row of stone finials, identical to the ceramic shape, is fitted along the centre ridge of the barrel roof at Banteay Samre, a temple near Angkor which was built in the third quarter of the twelfth century.[24] The shape is also found in the stone boundary-markers used to delineate borders at Pre Rup in Angkor, third quarter of the tenth century.[25] The finials may be adaptations of wooden blocks that were used to secure roof-thatching.

The tall finial has a bulbous body that tapers to a graceful point; the lower section of the finial is constricted in a slightly concave and elongated shape. Carved bands divide the finial into horizontal zones. Light-grey, dense and compact clay is covered with a light-green glaze with crazing. The glaze colour darkens around the carved ridges where it thickens (Plate 40).

The exhibited example was excavated in North-eastern Thai land. It was broken and the parts were buried in two different locations. When the finial was reassembled it left no doubt that the pieces originally belonged together. There are variations in colour and texture between the main portion of the finial and the broken segment caused by chemicals in the soil. The exposed clay of the shard changed from a light-grey to a ginger colour, probably due to the red soil; the exposed glaze changed from a light-green to a dull greenish-yellow. This chemical transformation in clay and glaze has been observed in several pieces that were excavated at Ban Phluang and should serve as a cautionary guide-line in the identification and dating of such pieces.

Domestic Artefacts

BASINS

The basin shape is usually unglazed, although a brown mono chrome example is known. The low broad form is characterized by a wide mouth with a thickened rim, slightly round walls, a deep well, and a thick base. Sometimes an incised band of oblique lines, or other small geometric design, encircles the mouth rim.

The form has been found at Ban Phluang in Thailand and excavations indicate that it could have been used for clay settling, for sharpening chisels and knives, as well as for preparing and cooking food. The basin may also have been used as a tub for washing clothes or as a vat for dyeing fibres. A similar modern vessel is used in Burma for dyes in making lacquer-ware.

BOTTLES

A variety of bottles have been found in Kampuchea and Thailand. They were made in green and brown monochromes and two-colour ware. The main characteristics of a bottle are a round body with a tubular neck and a narrow mouth.

One of the earliest bottles is a simple shape that exudes strength and vigour. It is green-glazed with a bulbous body, narrow neck, and flanged mouth rim. Carved tiers around the protruding mouth and upper shoulder are typical. Decoration is limited. The most common motif is a series of deeply incised vertical lines, either single or in

groups of two or three, evenly spaced around the body. The lines almost always start at the outside edge of a carved tier on the shoulder and often stop in the middle of the body. The pattern divides the body into sections. The clay is buff or grey with a dense and compact texture. In many examples the glaze is eroded and only faint traces of green remain. Often a fabrication mark is incised on the base. This shape was made between the tenth and the middle of the eleventh centuries (Plate 41).

The Chinese influence in this shape is strong enough to indicate that the Khmer bottle is a direct imitation of the Chinese form. The profile is divided into definite horizontal zones and the changes in direction are sudden. The characteris tics of the shape, including the carved tiers around the mouth, are reminiscent of ceramics from the Tang period. It was also produced in bronze. The shape was known in China as early as the fifth century.[26] The clay, glaze, and potting show striking similarities to wares from the Xicun kilns in China, which are five kilometres from Guangzhou in Guangdong Province. Wares from these kilns were exported to South-East Asia from the beginning in the Song period.

The shape evolved to a brown monochrome bottle with a less rigid profile. The abrupt directional changes and carved shoul der tiers were replaced by a flowing round body without a distinct shoulder. The protruding mouth was retained but the number of carved tiers diminished. The modified form is aesthetically pleasing with balanced proportions (Plate 42).

By the middle of the eleventh century the form was produced in two-colour ware. A characteristic example is a spherical body covered with a brown glaze with olive tinges, and a short narrow neck and protruding mouth covered with a light-green glaze. The line between the two colours is uneven and the green flows freely on to the brown glaze. Although flaking is present on both colours, it is more prominent on the green. The brown glaze tends to pool on the lower body and near the base. The colour darkens in places where the glaze thickens. A carved line near the base may have been made to collect the glaze. The overall appearance of the brown glaze is mottled. Minute crazing characterizes both colours of glaze. The base is often roughly finished. The clay is light in colour, either buff or grey. It seems likely that this bottle shape was potted with one type of clay and fired in an oxidizing atmosphere since the colour of the clay is identical on the unglazed base, which was exposed in the kiln, and in unexposed places where the green and brown glazes have flaked (Plate 43).

Another interpretation of the bottle is a superbly potted small vessel with a round body, a very short and narrow neck, a protruding mouth, and a roughly finished base. The profile looks like an inflated balloon. The only decoration is a single incised line on the broad shoulder. Light grey and compact clay is covered with a straw-coloured glaze. Flaking is prevalent (Plate 44). Although certain elements of this bottle, such as a protruding mouth and horizontal emphasis in the profile, suggest an early date, the clay and glaze types, the limited decoration, and the round form indicate that it was potted in the last half of the eleventh century.

The gourd-shaped bottle is most likely in imitation of the natural gourd, which is dried and used as a container in modern South-East Asia. In China and Japan a gourd bottle was used for carrying rice wine when travelling. A cord was tied around the mid-section and it was secured to a belt. The gourd symbolizes longevity and immortality. It may have contained liquids or incense for ceremonial rituals and often the gourd-shaped bottles have traces of lime inside.

Similar forms were produced in both green and brown monochromes and two-colour ware. The general shape is a bulbous lower body that is larger than the upper portion, with a broad unglazed base; and a smaller upper portion with a narrow neck and mouth. Decoration is minimal and usually consists of simple geometric incised

designs. Rings are often used to define the sections of the bottle, such as the body and the neck.

The gourd-shaped bottle is suitable for two colours and allows the green on the upper portion to flow freely on to the brown-glazed lower section. The two colours integrate with fluidity and spontaneity.

A brown monochrome gourd-shaped bottle that is similar to the two-colour ware examples is probably a transitional piece between the earlier slightly less proportionate wares and the later pieces when the form is fully developed. The transitional piece is characterized by a bulbous lower body that is slightly depressed, a round upper portion, a short narrow neck, and a slightly flaring mouth rim. The broad base is roughly finished. Iron-rich pale-red clay shows through a light-grey slip. The thickly applied brown glaze tends to form globules around the base. A fine-line crazing is present. Rust opaque patches are visible in the glaze. The spots were most likely caused by an excess of iron oxide on the surface of the glaze.

Small gourd-shaped bottles were a frequent product in the first half of the twelfth century. All examples are brown-glazed and characterized by thin potting, balanced proportions, clearly defined sections, precise incising, and a homogeneous glaze that adheres well to the body. Often the shape has a somewhat tall, narrow neck, a round mouth rim that turns outward, a deeply-incised line on the lower body, and a button-shaped foot with concentric rings. The body is frequently divided into panels by incised vertical lines. The colour of the clay varies from light-grey to buff to an iron-rich pale-red colour. The texture of the clay is dense, compact, and relatively free of impurities (Plate 46).

An exceptionally well-formed gourd-shaped bottle is a miniature vessel covered with a homogeneous and lustrous caramel brown glaze. The clay is buff in colour and has a grainy texture. Incised rings separate the upper and lower sections; the lower body is divided into sections by incised vertical lines. The base is unglazed with a distinct ridge around the perimeter.

Gourd-shaped anthropomorphic bottles have been found. Green and brown monochromes and two-colour pieces are known. They were probably produced from the last quarter of the eleventh through the first half of the twelfth century. One example was found in the funerary grounds of Sras Srang, which is substantial evidence that the shape served a funerary purpose.[27] The remaining pieces have been found in Thailand.

A typical example of a gourd-shaped bottle with human-like features has an oval body which constitutes the largest portion of the bottle. The upper part is usually round, although sometimes it looks like a bulging cylinder. The neck is long and narrow, terminating in a rolled mouth rim slightly turned outward. Modelled parts that look like a human face are applied on the upper portion, which resembles a head. The eyes are often almond shaped. Two large ears are placed on the sides. Addi tional human-like appendages that are sometimes present in clude a goatee, or beard on the chin, and hands and arms, which are held close to the body with the palms together and the finger tips pointing towards the chin, and bushy eyebrows made with deeply-incised oblique lines (Plate 47). In Thailand this position of the hands is an action of respect and a significant gesture that defines the social structure in Thai society. It is also used to pay respect to sacred places and images.

Another gourd-shaped bottle has appealing monkey-like features with the arms folded across the body (Plate 48).

A distinct bottle form is large-sized and frequently brown-glazed. All examples have been found in Thailand. A spherical or round body is supported by a broad flat base. The body gives way to a wide sloping shoulder and a tall tubular neck with a rolled mouth rim which sometimes is slightly turned outward. Decoration on the

shoulder and neck juncture is common. Popular incised motifs include a series of continuous rings, and a star or scallop design. Sometimes the body is divided into sections by vertical lines in groups of two to four. The clay is buff to grey in colour with tinges of pale-red and the texture is sandy. The glaze is dark brown in colour and adheres well to the clay. The potting, clay, and glaze indicate an early twelfth century date (Plate 49).

Small monochrome bottles were a popular form in the first half of the twelfth century. A typical shape is a bulbous body with a tubular neck, a rolled mouth rim and a button-shaped foot with concentric rings. The incised decoration is fairly consistent. It appears at the neck juncture and on the body. Two continuous, horizontal, and parallel lines are divided into rectangles by vertical incisions, and encircle the base of the neck. The body is divided into panels by sets of vertical lines, which are either parallel or 'V'-shaped. Sometimes modelled bird-shaped appendages are applied on the shoulders of the bottle. The clay is buff, dense, compact, and relatively free of impurities. Often a brown slip was applied. The uniform brown glaze frequently has caramel tones (Plate 50).

BOWLS

The Khmers made two primary types of bowls. The earlier, longest enduring, and most common shape is green-glazed with conical walls that give an angular appearance. A salient characteristic is the absence of decoration except for a deeply-carved ring around the lower section on the exterior, which may have been cut to collect the thin watery glaze that tended to run. Sometimes the groove is so deep that it gives the appearance of a protruding lower section. A similar technique was used by the Chinese in the Tang period. Round or oval unglazed firing scars encircling the interior (near the centre) and the exterior (around the base) are also characteristic of this type of bowl. Uneven ridges on the interior and a sharp rim on the perimeter of the base indicate that the coil method of construc tion was probably used. The first coil started around the exterior, creating a sharp rim. The base is almost always glazed, and often has an incised mark. The buff clay is fine-grained and dense. The glaze varies from a light green to a yellow or straw colour. It is characterized by dark-veined crazing, a thin, watery texture, and pooling, which often occurs in the centre and in the groove on the exterior. The glaze collections indicate that the bowl was inverted and dipped into a liquid glaze mixture; then it was placed upright to dry (Plate 51). It appears to be a utilitarian shape and may have been used as a container for rice or soup. Alternatively it could have been filled with water and used as a mirror. The broad centre provides a large area for a surface reflection.

Over 500 bowls of this type have been found in a kiln at Ban Kruat. Among the bowls were a large number of wasters which provide evidence of the method used for stacking the wares in the kiln. The bowls were placed upright, one inside the other, and separated by balls of clay, which left unglazed scars after firing (Plate 12).

Identical forms have been found in Kampuchea and Thailand. The shape shows no sign of evolution. It was produced over a long time period from the beginning of the eleventh through the middle of the twelfth century.

An uncommon but known form of green-glazed bowl has slightly inverted walls and a rolled mouth rim (Plate 52). All examples of this form have a hole in the central well that looks as if it may have been deliberately made.

Another type of bowl is brown-glazed. Generally it is smaller, with thinner walls and more carefully potted than the green-glazed examples. The production period seems to have been limited to the first half of the twelfth century. A represen tative example of this type of bowl is lotus shape, resembling a lotus seed (Fig. 35). The

Chinese-influenced form has a graceful profile with walls gently curving upwards from a small button-shaped foot with concentric rings. A brown slip was sometimes applied over buff clay. The glaze is usually a lustrous dark brown, homogeneous, and adheres well to the body. Glaze globules near the base are a common feature.

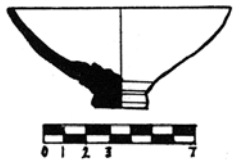

Fig. 35 Brown glazed bowl; lotus shape

Two bowls have been found that may be transitional pieces. One is a green-glazed bowl with slightly curved walls and a glazed button-shaped foot with concentric rings. A light-grey clay and pale green glaze that extends over the base are reminiscent of the earliest form whereas the small size and slightly curved walls are characteristics of the type of brown-glazed bowls that were produced in the first half of the twelfth century.

The second piece that may be transitional is a brown-glazed bowl with conical walls and a semi-glazed foot with concentric rings. Coil ridges can be felt on the interior; they emanate from the centre in a graduated spiral that moves in an anti-clockwise direction. A series of rough unglazed firing scars encircle the lip of the bowl. Clay balls placed around the lip were most likely used to separate and stack the bowls in the kiln. The scars are uneven in size and shape. The clay is buff in colour and fine in grain. The glaze is dark brown, pitted, and thickens around the lip, which indicates that the bowl was inverted after the glaze was applied. The shape resembles the earlier green glazed form, but the potting, foot treatment, method of firing, and size align this piece with the early twelfth century wares.

One of the most common shapes found in Thailand is a bowl with a raised glazed disc in the centre, which looks like a flattened mushroom. The shape has not been found in Kampu chea. It is most frequently brown-glazed, although green monochrome examples are known. The bowl has slightly curving walls with a fairly deep well. The average diameter of the disc is three centimetres. The lip of the bowl is either rolled, pastry-shaped, or indented at even intervals. Two types of foot treatment were used on this bowl. Some examples have a button-shaped foot with concentric rings; other pieces have a hollow pedestal foot attached to the base. A cord cut foot is visible through the centre of the pedestal. The base of the pedestal is thick and rolled; carved rings often encircle it. Large irregular firing scars are visible around the disc. The medium-grey clay is often covered with a brown slip and usually a lustrous, homogeneous caramel to dark brown glaze (Plate 53; Fig. 31).

It may have served as an oil lamp and been the precursor of a similar shape produced at the kilns in Northern Thailand, which is a more highly developed form.[28] Burning liquid could be placed in the well with a wick wrapped around the base of the disc and the end lying on the centre of the disc. Perhaps a bamboo pole was inserted in the hollow base and driven into the ground to provide elevated lighting, possibly for dancers performing at ritual ceremonies.

Alternatively it may have served a functional purpose as a cover for protecting storage jars from dust and insects. The bowl could be placed in the mouth of the jar. The average diameter of the bowl is the same size as the average mouth on the large storage jars. The disc on the interior of the bowl could have been used as a handle.

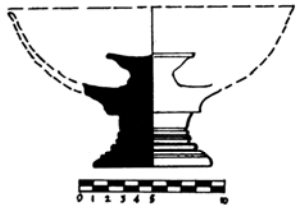

Fig. 31 Stem bowl with raised disk on interior

The bowl may have been used for heating foods or liquids. Hot water could be placed in the centre; then another vessel containing the food or liquid to be heated could be placed on the disc.

It is described as a 'holy water bowl' by antique dealers in Bangkok, which may give an insight into the most feasible purpose for this shape. Perhaps it was a container and presenta tion bowl for the conch shell. Today the conch is used in ceremonies as a lustral water sprinkler and a metal pedestal bowl, similar to the ceramic form, is used to present the conch shell. The diameter of the bowl shows minimal variation and ceramic conches fit easily and securely into the bowl. Often the conch is so round that it is difficult to balance on a flat surface. The disc in the ceramic bowl can be used to steady and secure the conch.

The lustral water pouring ceremony is a major event at a Thai wedding. It is a Hindu custom for relatives and friends to pour water over the hands of the bridal couple to wish them lifelong happiness.

One of the most unique container forms in Khmer ceramics is a stem bowl with an angular profile, a pedestal foot, and usually a cover. The shape indicates a strong metal influence. The conical walls of the bowl may be slightly curved. They are usually undecorated. The wide mouth almost always has a flange on the lip, which is bevelled, rolled, or decorated with pastry-shaped indentations. The pedestal is often decorated with carved rings. Many examples are made in two parts with an additional upper section joined on to the flanged lip. This section is usually composed of a band of 'X' motif near the lip, a deep ridge, and an undecorated cylindrical section made with curved lines that form a waist near the top. The total profile shows strong horizontal direction.

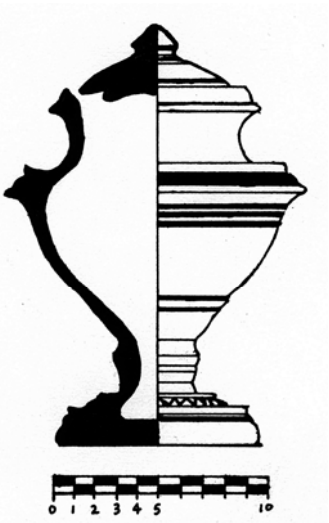

Fig. 32 Stem bowl with cover

The most common cover is conical-shaped and tiered. The profile is tall steep and sharp. The height is characteristically at least equal to two-thirds of the lower section. A lotus bud knob is usually placed at the apex of the cover. The angularity and decorative theme of this cover complement the similar profile of the lower section. It seems likely that this form is the original cover (Fig. 32).

It was made in green and brown monochromes. Crazing is typically present in the green glaze. The brown monochromes usually have olive tones. The potting, shape, and decoration are relatively consistent on all examples. The base on the smaller pieces has concentric rings.

The stem bowl may have been used as a wine vessel. A similar shape is depicted in stone carvings at Borobudur, where a kneeling figure holds the vessel and drinks through a reed.

A recently discovered stem bowl is one of the most beautiful and graceful forms produced by the Khmers. The green-glazed bowl with slightly curved walls is supported by a brown-glazed pedestal foot. The flanged mouth rim is an unusual bowl treatment in Khmer ceramics and is reminiscent of Tang style. The pedestal is hollow and was affixed separately to the base of the bowl. It is decorated with carved rings. Eight unglazed firing scars encircle the central well of the bowl. Several examples of the form have been found in Thailand (Plate 54).

An unusual bowl is bell-shaped and looks like a modern jardinière. It was most likely influenced by a basket form. A green monochrome example was excavated at Sras Srang in Kampuchea and a brown monochrome bowl was found in Thailand. The purpose is unknown. Sometimes the base is supported by four short triangular feet that may be in imitation of kneeling animals. The walls of the bowl gradually extend to a wide trumpet-mouth that corresponds to the base of a bell. The lip is bevelled and flanged. A horizontal ring containing incised oblique dashes encircles the mouth. The

same motif is repeated on four vertical ridges that are evenly spaced around the body. The clay is buff in colour (Plate 55).

One of the most unique Khmer ceramic bowl-shapes looks like a halved coconut shell. The wide mouth has steep sides that converge to a pointed, slightly round bottom with an opening in the centre. The diameter of the hole is 1.5 centimetres. Three modelled ridges divide the body vertically into panels. Oval unglazed patches, which were most likely firing scars, reveal buff clay and encircle the opening. An olive mat glaze covers the entire piece; the colour is lighter on the ridges where the glaze is thinner (Plate 56).

The form is Indian influenced and looks like a *patra,* or begging bowl, which was one of three articles carried by itinerant Buddhist monks when they travelled to China. The form was rapidly assimilated into the ceramic repertoire of the Chinese potter. Today a vessel in the shape of a halved coconut is carried by Buddhist monks.

This shape may have been used as a sieve or perhaps as a bell for religious ceremonies. Alternatively the form may have served as a water clock. In rural Thailand a coconut shell with the top cut off, the juice and pulp removed, and a hole in the base is placed in a container of water. It will float on the surface of the water for exactly one hour before sinking. It is used as a signal to beat an hourly gong or chime. A metal water-clock was used in royal palaces and wealthy private homes in ancient India. At the end of the cycle, drums were struck and conches were blown. This form of clock was preferred to a sun-dial because it was not affected by the weather.

BOXES (COVERED)

The covered box is one of the earliest forms found in Kampu chea. It appeared about the same time as the glazed tiles, in the late ninth or early tenth centuries. The body and cover form a continuous line and make a round shape. A flange near the rim on the interior secures the cover. There is a slight depression in the centre of the cover and the base. A potter’s mark is often incised on the base. The clay is grey and compact and the thin glaze is almost colourless; only in places where the glaze has pooled is a greenish tinge visible (Plate 58).

An uncommon covered box with the same glaze texture and colour as the previous example is cylindrical-shaped. The cover is secured by a flange on the interior of the body. Incised rings around the base and on a protruding rim on the cover are the only decoration (Plate 59).

The most common type of covered box appeared in the last half of the eleventh century. A similar form was made in both green and brown monochromes. A typical box is a round flattened shape that is supported by a broad, unglazed base. The body and cover are approximately equal in height. They compose a single unit and form a continuous line; neither section functions independently. A flange near the rim on the interior of the body secures the cover. Incised rings usually encircle the depressed centre and the lower portion of the lid. The clay is buff in colour and is covered with a thin light-green glaze. The colour darkens in areas where the glaze thickens and pools. The interior of the cover is usually unglazed but the interior of the lower section is often scantily covered with the same glaze as the exterior or, sometimes, a brown slip (Plate 60).

Nine boxes of this type have been found at Ban Kruat with the body and cover fused together. A small perforation in the cover was made, presumably to allow air to escape during firing. This discovery indicates that the box and cover were fired as a single unit and separated after firing by cutting through the glaze.

The green-glazed box is either undecorated except for incised rings on the outer edge of the shoulder and on the lower body, or it is in the shape of a fruit, perhaps a

pumpkin. This form is in imitation of a metal shape. Deeply-incised lines radiate from a horizontal line around the centre of the cover to the lo wer body and divide the form into lobes. The centre of the cover is slightly depressed and contains a modelled and applied rectangular piece of clay that looks like the stem of a pumpkin.

The box was a prominent shape in Chinese ceramics and undoubtedly provided the source of influence for the Khmer shape. Direct influence may have come from the white glazed Qingbai box, which was made in southern China and exported to South-East Asia, shards of which have been found in Kampuchea and Thailand, or the influence may have come from the Yue celadon box, which was made in southern China at the beginning of the tenth century.

The brown monochrome box is of the same general form with slight variations. The centre of the upper section usually lacks the depression and is replaced by a knob, sometimes in the shape of a small lotus bud. In India the lotus bud knob on boxes indicates its use for ritual or wedding ceremonies.

If incised decoration was used it was similar on both green and brown monochrome boxes. Generally the brown-glazed examples employ more incising than green-glazed pieces and they are rarely fruit-shaped. Typical patterns used on boxes include incised rings around the knob on the cover followed by a band of rectangles, which are formed by two continuous parallel and horizontal lines divided into rectangles by vertical incisions, and panelling on the cover and sometimes the body created by incised vertical lines or a 'V' pattern. It is not uncommon for the incised decoration to form a continuous line over the cover and body. A deeply-incised ring is almost always present on the lower body, near the base.

A green monochrome box found in Thailand may be transi tional between the Khmer and Sawankhalok wares. The shape is more round than the previous examples and the cover is dome-shaped with a lotus bud handle. Although the base is flat with concentric rings, a definite splayed foot exists. Three uneven incised lines on the base compose a mark. The buff clay is grainy. The green glaze is badly eroded on all examples and only traces of it remain (Fig. 30).

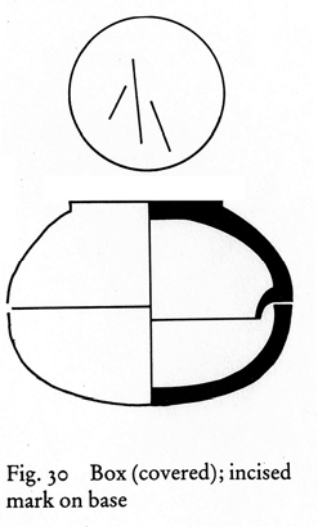

Fig. 30 Box (covered); incised mark on base

The Khmer box may have been a prototype for the Sawan khalok form that was produced in abundance during the second half of the fifteenth century. Similarities between the two types of boxes can be seen in the splayed foot, as well as concentric rings on the unglazed base, in the lotus bud handle, in the use of groups of vertical lines to divide the body into sections, and in the band of rectangles.

CONCHES

Numerous examples of conches have surfaced in Thailand in recent years, revealing a form that combines tactile and aesthetic appeal. The conch is potted with sensitivity and skill. The masterful form, modelled in the round, is made in imitation of a conch shell. It is heavy and conveys an aura of strength. The profile is curved and fluid, in sharp contrast to the typical angular lines of many other Khmer ceramic forms. Sometimes the conch is so round that it is difficult to balance it on a flat surface. Each conch is slightly different and collectively the form expresses more individuality and variation than any other shape.

Unglazed examples are known in addition to green and brown monochromes. The ceramic conch must have been used throughout the Khmer Empire, since

examples have been found in Kampuchea and Thailand. The glaze usually covers the interior and exterior except for the round base. Grit adhered to the glaze around the base and indicates that the conch was placed on the sandy floor of the kiln for firing. Characteristi cally the glaze on the conches has a tendency to flake. Undoub tedly the thickness of the shape would have made thorough firing difficult.

The conch was most likely used exclusively for ritualistic and religious purposes. The original conch shell would have been expensive and difficult to obtain for a civilization that was situated inland. The Indian-influenced form was well known in bronze and is depicted on stone carvings at Angkor. The bronze form was supported on a footed tripod. The conch is identified with Hindu mythology. Symbolically it is associated with Vishnu, who was the creator and preserver of the universe. A similar form was used in India to annoint the images of gods. Lop Buri, one of the Khmer centres in Thailand, attributes its origins to a conch shell. An inscription at Angkor refers to conch shells that were used as payment for the purchase of a paddy field.[29]

The conch may have been stored in a glazed ceramic stem bowl with a raised disc in the centre. This would have been suitable for using the conch in ritualistic ceremonies where lustral water was required. Additionally it would have served as a protective storage container for the conch.

Two types of ceramic conches were produced. First, a sculpted form with an aperture at one end, which is a direct imitation of a conch shell (Plates 61, 62). It may have been used as an instrument. A resonant sound can be produced by blowing through the hole. A reed may have been inserted in the hole to facilitate playing the instrument. A conch shell was used for communication between fishing boats. At Angkor Brah mins probably announced the arrival of the king, summoned the people, or provided music for rituals with a ceramic conch, or the conch tone may have had a symbolic significance such as deflecting unwanted spirits. In China a trumpet made from a conch shell was used in Buddhist worship. The conch shape was produced in Chinese ceramics in three-colour ware during the Tang period and in Ding ware in the Song period.[30] This form is frequently found unglazed, perhaps for a higher quality of resonance.

A few examples of exceptionally beautiful conch variations exist. One piece conforms to type one in all respects except that one end looks like the caudal tail of a fish. The tail is divided and the profile imitates the letter 'W'. Often the upper and lower surfaces of the tail are decorated with an incised floral motif, which is one of the rare uses of pictorial designs in Khmer ceramics. The glaze is usually a rich brown colour and homogeneous (Plate 63).

Another unique and extraordinary example of a conch is a green monochrome. It is modelled in the form of a conch shell with a gracefully curved border and a dimensional floral motif at one end. The buff clay is covered with a green glaze. The dark line crazing adds texture and balance to the thickly-potted form (Plate 64).

Surely these two unusual conch interpretations had a special significance and were intended for a specific and esteemed religious service.

The second form looks like a halved conch shell with a groove at one end (Plate 65). It was most likely used for pouring lustral water, perhaps in a similar way that it is used today in Thai wedding ceremonies when friends and relatives sprinkle water on the hands of the bride and groom. The conch can be held with two hands in a horizontal position and moved gently back and forth to enable water to flow out of the narrow groove. Brown and green-glazed examples of this type of ceramic conch are known.

JARS

A unique Khmer ceramic form is a cylindrical jar with a middle section that is compressed vertically, a broad shoulder, and a protruding lower section. The profile suggests that the jar has a waist-line. This shape is sometimes called drum shape because of its resemblance to the Dong-son-type bronze drums. A moderately stepped lid with a pointed lotus bud knob probably belongs to this shape. The broad flattened shoulder is a suitable surface for incised decoration. Sometimes it is filled in with carefully drawn geometric designs such as a series of horizontal rings, a band of rectangles, or a star design. It is usually brown-glazed both on the exterior and interior. The clay is buff in colour and, sometimes it is dotted with pale red tinges. On later examples a brown slip is visible (Plate 67; Fig. 33). The form was excavated at Sras Srang in Kampuchea and is fre quently found in Thailand.

Fig. 33 Jar with lid

This shape appeared in the middle of the eleventh century. The earlier examples are identified by a mottled glaze that often has olive tones and forms an even line around the edge of the protruding lower section. The entire base is unglazed. The profile of the earlier example is less extreme in the lower section and a definite flat foot is present. It is usually roughly finished. On later pieces the small foot is absent and gives way to a broader flat base. Also the glaze usually covers a portion of the base and forms an uneven line, giving the appearance of hasty or careless application. The glaze is dark-brown, almost black.

Because the broad decorated shoulder is the focal point of this shape, it seems that it was intended to be placed below eye level. Perhaps it served a utilitarian purpose such as a cosmetic container for a woman’s dressing-table, which was a low structure made of carved wood. Contents of the jar may have been perfume, which was made from dried flowers, sugar cane, or musk oil, used by both men and women, or beeswax for the hair.

An example of unusually sensitive workmanship is a green monochrome jar. The body is a round flattened shape with gently curving walls, a broad sloping shoulder, wide mouth, and pedestal. The base is hollow, indicating that the pedestal ring was applied separately. Carved rings are used generously around the shoulder, mouth, and pedestal. A ring of incised jab-marks fits between the carved rings on the shoulder. Short vertical carved lines in groups of three divide the body into sections. A 'V' motif composed of dots fills each section. The decoration has a hesitant and unsure appearance, which is indicative of an early date, approximately the middle of the eleventh century. The clay is buff in colour and covered with a crazed yellow glaze that shows a bluish tinge where pooling occurs (Plate 68).

A typical jar found in North-eastern Thailand is tall in proportion to the diameter of the thick base. The walls of the oval shape swell gradually and culminate in a broad shoulder. The short, constricted neck supports a wide mouth with a thick rolled rim. Decoration includes incised rings around the mouth, outer shoulder, and base as well as two bands of wave motif on the shoulder. The buff clay is covered with a distinctive brown glaze. It is characterized by light-coloured dots, which give it a speckled or powdered appearance. This effect is probably the result of escaping gas bubbles that ruptured (Plate 69).

A strong and robust jar is short and oval-shaped. The walls begin from a narrow base and expand to a broad shoulder, a short, constricted neck, and a wide mouth with a thick rolled rim. Evidence of a coil-built piece is visible on the base where a coil begins on the outside perimeter of the base and on the interior where uneven ridges can be felt. Carved rings encircle the neck and lower body. The shoulder is decorated

with a band of wave motif and horizontal rings. The body is divided into sections by vertical lines in groups of six, which were probably made with a comb-like tool. The grey clay is covered with a brown glaze that has olive tinges and flakes easily (Plate 70).

JARS (COVERED)

The cylindrical covered jar is a hallmark of Khmer ceramics. Similar pieces have been found in Kampuchea and Thailand with only slight variations in shape. It was made in green and brown monochromes. The covered jar was a long enduring and popular form. It was one of the earliest glazed shapes and appeared in the late ninth century and continued to be pro duced up till and including the twelfth century.

The purpose of the form is unknown. Undoubtedly the examples with finely-modelled covers and knobs were in tended for a special purpose, probably as a ritualistic container. Groslier has suggested that the plainer version may have served a utilitarian function such as a container for betel-leaves, or, as indicated on reliefs at Bayon, for soups and meats.[31]

The general profile of the jar is cylindrical with a dome-shaped cover, which is approximately one-third the size of the entire jar. The cover is secured by a ridge on the interior of the body. The two parts form a continuous line. The walls of the jars found in Kampuchea are slightly conical whereas they are cylindrical on the pieces found in Thailand. The foot was finished by two different methods. The Kampuchean shape usually has a distinct slightly-splayed foot; on the Thai form the foot is absent and is replaced by a flat base that may be concave and is equal to the size of the lower walls. The body and cover were fused together on a waster found in North-eastern Thailand, which indicates that the shape was fired as one piece and separated after firing.

The brown glaze usually covers the entire vessel except for the base whereas the base on green-glazed examples is fre quently covered, and an incised mark may be present. Often the body and cover are partially glazed on the interior.

Decoration on the covered jar is limited and usually consists of horizontal rings, sometimes deeply incised, around the knob and lower rim on the cover, the shoulder, and lower body. The cover usually has a non-functional knob and the most typical form is either tiered or in the shape of a lotus bud (Plate 71).

On a few exceptionally fine pieces the decoration on the cover is developed. A typical cover design is a radiating band of deeply carved vertical lines. Sometimes the lines terminate in a ‘V’ on the outside edge of the cover and look like petals. The knob is sometimes modelled to resemble a lotus petal with a stem. The workmanship and detail on the floral knobs is unusually fine. Often there is a small aeration hole on the cover (Fig. 36).

An uncommon cover is green-glazed with a distinct handle in the centre. The band of short oblique lines that surrounds the base of the handle is broken by a small aeration hole. The cream-coloured clay is compact and the pale green glaze is lustrous and translucent (Plate 72).

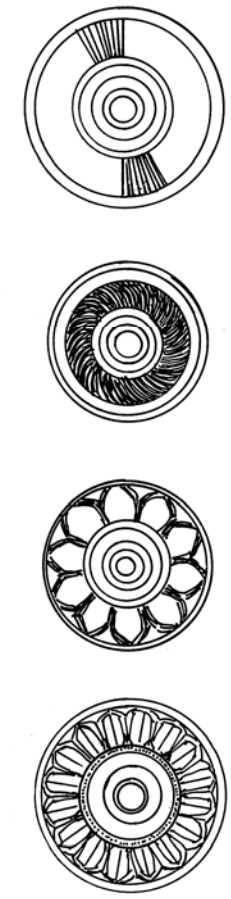

Fig. 36 Examples of cover decoration on jars

A representative covered jar from Angkor is green

glazed. The cylindrical body has slightly conical walls, a characteristic of the covered jars found in Kampuchea. The tiered cover is topped with a lotus bud knob. Decoration includes two flanges around the base of the knob, a band of deeply carved short vertical lines which are enclosed by horizontal rings. The buff clay is visible through the eroded green glaze (Plate 73).

JARS (STORAGE)

Large heavily potted jars, presumably used for storage, were a major product of the Khmer kilns, particularly in the middle of the twelfth century. Strong and robust shapes and bold geo metric incising are hallmarks of the large storage jars, which have vitality and character.

Further investigation of these large storage jars may provide a clearer and more complete understanding of the chronology and dating of Khmer ceramics. Very few ceramics have been found that can be dated between the time these jars were produced in the middle of the twelfth century and the capture of Angkor by the Thais in the first half of the fifteenth century.

Almost all examples are brown monochromes and have been found in Thailand. The typical form is an oval body with a sloping shoulder, a very short neck, and a narrow mouth with a splayed or thick, rolled mouth rim. The form is generally tall in proportion to the width of the base (Plates 74, 75).

It is potted with thick coils that fire a grey colour. The massive coils, which can be felt on the interior, begin from the outside perimeter of the flat base. The oval shape reached an average height of fifty-five centimetres. Impurities in the form of dark specks are often visible in the grey clay. The texture is coarse. The brown glaze varies considerably. It ranges from a light caramel to a dark brown that is almost black. If a thin layer of glaze was applied, flaking is prevalent, probably because the potters were unable to achieve and sustain a kiln temperature that was sufficiently hot to fire the thickly-potted storage jars. A thick layer of glaze coagulated into uneven dribbles on the body.

Functional handles are uncommon on Khmer jars of this size. However, small pieces of clay that resemble handles and look as if they have been pinched together between two fingers are typical. They are evenly spaced around the shoulder of the jar. Often they are aligned with a horizontally-incised ring, which may have served as a guide-line for placement. The handle is non-functional as it is either a solid piece of clay or, if a hole was pierced, it is obscured by glaze (Plate 6).

Decoration almost always includes carved horizontal rings in sets of three to eight on the lower body, and often incised geometric motifs on the shoulder and body. The designs are frequently separated by a series of horizontal rings. The loop motif is the most common design, probably because of its flexibility in size and suitability as a horizontal or vertical motif. It is freely executed in a bold and appealing manner. A variation that was popular on the storage jars consists of two bands of parallel loops in alternating directions.

The jars were probably used for storage of rice, water, oil, wine, or for preserved foods such as pepper, citron, or mango. Water storage was a priority in North-eastern Thailand because even today, although plentiful, it has never been equally distributed. The climate alternates throughout the year between the extremes of flood and drought. As a result, devices to conserve and store water during the dry season are vital, and these jars would have served the purpose ideally. The shape is depicted on reliefs at Borobudur in the ninth century.

A smaller version of this shape may have been used for fermenting or drinking wine (Plate 76). A relief at Bayon depicts men drinking through a reed from a similar jar.

Caution should be used in the identification of a group of unglazed Khmer-style jars that have been found in the Philip pines and Thailand. The form has a baluster body with a flaring mouth, a flat base, and lug handles placed around the shoulder. Decoration usually consists of geometric motifs, which are carved or impressed on the shoulder of the jar. The shape and decoration closely resemble Khmer brown-glazed jars.

KENDI

A *kendi* is a vessel used for drinking. The main elements are a round body with an opening at the mouth and a spout on the side. Liquid is poured in through the mouth and flows out through the spout.

The earliest known spouted vessel has been found in western India and dates to the second millennium BC.[32] The form was excavated in South-East Asia at Ban Koh Moh in southern Thailand, a site dated between the sixth and seventh centuries AD.[33] The *kendi* was produced in bronze in Burma between the tenth and twelfth centuries.[34] White-glazed *kendis* have been found in south-western Celebes and in the southern part of central Java, dated thirteenth to fourteenth century. The *kendi* was produced in Guangdong Province in China in the Tang period.[35] The shape was known among Xicun wares produced in southern China in the Song period. Later the form was a prolific export product of the Chinese kilns.

'*Kendi*' is a Tamil derivation of '*kundika*', a Sanskrit word meaning 'pitcher' or 'water-pot'. The form was most likely introduced by travellers from India who came to South-East Asia in the early centuries of the Christian era.

The main characteristic of a *kundika* is a cup-shaped spout on the shoulder used for filling the vessel, whereas the principal element of the *kendi* is a spout in the form of a nipple. The Khmer vessel has neither of these features but can be classified as a *kendi* because it is a container for liquids with an opening at the neck for filling and a spout on the side for pouring. It is identified by a round body, sometimes an elongated neck, a broad shoulder, and a tubular spout. The narrow neck was used for holding the vessel. On larger examples the base is usually flat, whereas smaller pieces may have a pedestal foot. All known examples are brown-glazed (Fig. 27).

Stylistically the Khmer *kendi* dates to the last half of the eleventh century. The form is similar to the unglazed Sukhothai vessels of the fourteenth century and may have been the prototype. Only a few Khmer *kendis* have been found and because most of them are wasters it was most likely an experimental form.

Since the *kendi* is associated with liquids, it may have served a ritualistic as well as a functional purpose and would have been suitable for offering water to idols.

LIDS

Lids in green and brown monochromes have been found in abundance in Kampuchea and Thailand. Two-colour lids are rarer but not uncommon. Undoubtedly they were made for the large quantity of small and medium utilitarian vessels that were produced. The lids are characterized by variety in size, shape, clay, glaze, and decoration. It is very difficult and highly speculative, except in a few instances, to know which lid belongs to which vessel. Even lids and vessels that have been excavated together present problems. For example, a brown-glazed turtle was dug up with a stopper in the form of a human-being, but the clay and glaze of the two pieces are distinctly different. Both are in good condition and show little deteriora tion from

burial in the earth. Undoubtedly lids would have been necessary for vessels that contained lime. Without a lid, the lime would dry out. Since the mouth rims of almost all the vessels are glazed, it is assumed that they were fired separately without lids. Perhaps the manufacture of lids was a specialized industry, which would account for the clay and glaze dif ferences.

A common characteristic of all Khmer lids is that the diameter of the base is usually equal to the diameter of the mouth of the vessel. Generally a lid does not extend beyond the mouth.

A typical lid is conical and brown-glazed. It consists of a series of tiers that start from a broad base and end with a knob. The tiers are created by deeply-incised rings. The glaze charac teristically collects in the recessed areas where it darkens in colour and thickens in texture. Sometimes simple geometric designs, such as a band of rectangles, 'X's', or scallops, are incised between the rings. The knob is rarely functional. The lid is precisely made with clearly-defined ridges. It was probably influenced by Persian metal ware. It is also reminiscent of a woodworking technique. The shape may be in imitation of Mount Meru, the mythical mountain of the Hindus situated at the centre of the earth, which helps to create harmony, thus ensuring the continuity of the life cycle. The Meru symbolism is used in both Hinduism and Buddhism (Plates 77, 78).

Three different methods were used to finish the interior of the lids. Sometimes the base is an unglazed disc, which is usually roughly finished. The disc may be slightly concave on the base. The base, or broadest tier, extends beyond the disc, which fits into the mouth of the vessel. Other times the base of the tiered lid is in the shape of an unglazed stopper. The base is often roughly finished. On other examples the outer edge is sharply bevelled with a hollow interior that may be scantily covered with glaze.

The knob is usually in the form of a lotus bud. A few large and elaborate lids have a double lotus bud knob. The shape of the lotus varies from a round upright style to a flat form to a slightly round point. The lotus bud knob was a common feature of Chinese ceramics throughout history and most likely in fluenced the Khmer form.

One extraordinary variation of the conical lid with a lotus bud knob is brown-glazed and has a handle that looks like a leather strap which is placed horizontally across the apex of the interior. This is one of the rare uses of a handle in Khmer ceramics.

A few elaborately modelled lids that depict a floral theme have been found. Generally the workmanship is carefully executed and the lid is covered with a homogeneous glaze that adheres well to the body. A knob applied to various lids is shaped like an open lotus flower and is brown-glazed. Delicate petals that are sensitively modelled form the edge and are surrounded by a circle of stamens; a pistil protrudes from the centre. Examples of this knob are so similar they were probably modelled separately and applied to a variety of lids. One example is a flat brown monochrome lid with finger indenta tions around the edge that create a petal look (Plate 80). Another lid with the same brown monochrome floral knob is modelled from fine grain light-grey clay and covered with a green glaze (Plate 81). Floral representations of modelled lids were typical of Yue wares, produced in southern China in the ninth and tenth centuries.

A distinct lid made in green and brown monochromes is characterized by a raised outside rim and a recessed centre. The base is usually glazed and round with a convex profile, which causes the lid to rest unevenly on a flat surface. On larger examples the knob is often a flat lotus bud on a glazed base. On smaller pieces the knob usually resembles a small round button (Plate 82).

A unique lid that looks like a human is brown-glazed and modelled in the round. The shape is characterized by primitive modelling and disproportionate features. The lid usually depicts the upper body of a human. Ears and arms are modelled and applied. The ears are often rectangular and exceedingly long. The arms are folded together across the front of the body and frequently hold an object, perhaps a weapon. Incising is used to define details on the body, the hair, nose, and mouth (Plates 35, 36). The shape of the base indicates it was used as a stopper. The human-shaped stoppers may have been used as riders on the animal-shaped vessels, such as elephants. Bronze human figures modelled in the round were used as knobs on lids in China as early as the Zhou period.

Another rare use of a lid as a stopper is a brown-glazed disc topped with a modelled handle that is applied horizontally. It looks like a leather strap.

An unusual form is cup-shaped. The round body has a wide mouth and an unglazed lower portion with straight sides and concentric rings on the base. The buff clay is covered with a brown glaze on the exterior and interior. This cup may have been used as a stopper and container for ritualistic purposes.

Another stopper looks like a pestle with an unglazed stopper base. The top is decorated with rings and a small lotus bud knob. The buff clay is covered with a lustrous, homogeneous brown glaze.

POTS

A brown-glazed flattened globular pot is one of the most common forms found in Thailand. The shape is uniquely Khmer. It may have been a local innovation as it is an alien shape in other South-East Asian ceramics, a prototype is unknown, and the form has not been found at Angkor. It appeared in the last half of the eleventh century and a stylistic evolution can be traced to the middle of the twelfth century. A broad shoulder and base support the flattened globular form, which has a narrow mouth and a rolled lip.

It may have been used as an oil lamp that contained oil in the well with a wick on the shoulder, or perhaps it was used as a storage jar for oil. Candles were used extensively at religious ceremonies. Elaborate candelabra provided overhead lighting, rows of candles lit the entrances to the temples, and candles were placed on altars and shrines. It is possible that ceramic oil lamps may have been used to supplement the requirements for candles. Today a metal form that is similar to the Khmer ceramic flattened globular pot is filled with kerosene and used as a lamp in rural Thailand.

The earliest flattened globular pot is characterized by its large size and slightly-sloping shoulder. The incised decoration is limited and usually consists of horizontal rings around the shoulders. A thin brown glaze covers buff clay. Flaking of the glaze is common, particularly on the earlier pieces, caused by different rates and degrees of shrinkage and an incompatibility between the chemical composition and the clay and glaze. The colour and texture of the glaze are mottled. The colour varies between caramel and dark-brown. The glaze was unevenly applied and collected in globules, which are a dark-brown colour due to the thickness.

As the form developed the amount of incised decoration increased and new geometric patterns were used. A well-defined concentric star motif, which looks like a spider's web, often fills the broad shoulder (Plate 84). A similar design was used on a Chinese Yue ware dish in the Han period.[36]

The use of horizontal rings increased in quantity and place ment, surrounding the mouth and lower body in addition to the shoulder. Rings were also used to enclose other designs.

By the twelfth century the glaze was controlled and evenly applied. It was a dark-brown colour. The texture was homoge neous and lustrous. The twelfth century glaze was technically superior and flaking was less frequent, probably because the wares were more thinly potted and thorough firing could be achieved. A deeply-carved line around the lower third of the body helped control the glaze and produced an even glaze line, which improved the balance and proportion of the form (Plates 85, 86).

In the twelfth century a brown slip was applied to the body before glazing, probably to intensify the glaze colour. Some times the slip extended over the base.

As the form evolved the shoulder widened and produced a flatter surface, which seems to have encouraged the potter to employ a variety of incised geometric motifs that became increasingly stylized.

A popular outer shoulder design was a well-drawn band of arrow-heads. When it was deeply incised the glaze collected around the pattern producing a raised motif in a deep caramel-brown colour (Plate 84).

At a point when the potters were familiar with the form, vertical decoration was added to the body. It consisted of groups of vertical lines placed closely together to divide the body into rectangular panels, perhaps a precursor to the dec oration on the Sawankhalok covered boxes. Sometimes the vertical lines formed a 'V'.

By the middle of the twelfth century the form reached its apogee and shapes produced after this period show signs of deterioration: the size increased and sacrificed proportion and balance, the potting and decoration were carelessly executed, the glaze did not adhere well, it extended to the base and was applied without control, and the foot was roughly finished, often with bits of sand attached.

A variation of the basic shape has applied animal-shaped appendages on each side of the shoulder. They are usually in the form of a broad handle with a reptile- or bird-like head on one side and two eyes and a small spout that looks like a mouth on the opposite side. A set of incised horizontal rings encircle the outer rim of the shoulder (Plate 87). The form has been called a honey-pot based on the function of a similar modern shape used in rural Kampuchea. However, because it is weighty, awkward to hold, and difficult to fill and empty, it does not seem suitable as a container for honey. Perhaps it served a special purpose in religious ceremonies.

An exemplary pot with animal-shaped appendages is brown glazed with a broad shoulder and body which are filled with a variety of geometric designs. A particularly appealing one is the wave motif on the body. Even though the decoration is extensive and elaborate it is not excessive. The depth and variety add balance to the naturally cumbersome form. The clay is buff in colour and the glaze is brown (Plate 88).

A simple and appealing pot is brown-glazed with a globular body, a broad base, and a narrow mouth. A deeply-incised line encircles the lower body. Decoration often consists of a series of incised rings around the neck and vertical lines in groups that start at the mouth and extend to the mid-section. A brown slip was applied over a buff clay. The colour of the glaze varies from caramel- to dark-brown. Crazing and flaking are often present (Plate 89).

A similarly shaped pot has added aesthetic appeal because of a lobed body. A scallop motif and horizontal rings decorate the shoulder. The clay is buff in colour with a thin brown glaze (Plate 90).

An example of exceptional workmanship and fine potting is an angular pot with slightly straight sides, a sloping shoulder, a narrow and constricted neck and mouth, and a broad base. Horizontal rings encircle the mouth. The body is decorated with a design of parallel rings intersected by deeply-incised narrow vertical lines, which look like panels. The design is scantily carried over on to the shoulder. The decorative focal point centres around two rows of modelled spikes on the lower and upper shoulder. Two broadly-incised dashes decorate the base of each spike, which is placed

at the apex of the vertical panels. A grey clay body with visible black impurities is covered with a thin dark-brown glaze that thickens and darkens in colour around the base line and in recessed areas. It was probably made in the late eleventh century (Plate 91). The form is derived from a metal shape, which was known at Angkor.

Precursors of the classic twelfth century small pots include a vessel with a globular body, a narrow mouth, and a broad base. A band of short vertical lines is contained within two horizontal bands around the neck. The grey clay is scantily covered with a trickly caramel-brown glaze. The pot was clearly a product of experimentation. Its appeal lies in the freedom of expression (Plate 92).

A similar form with a slightly flattened body is covered with a mottled olive glaze (Plate 93).

Progressive improvement in the quality of materials, potting, decoration, and glaze can be seen in the third example of the precursor to the twelfth century small pots. The broad base has not yet given way to the more delicate button-shaped foot but the form is smaller and symmetrical, the amount of incising is greater and more controlled, and the glaze is evenly distributed on the pot, even though it is mottled (Plate 94).

Small wares were a hallmark of Khmer ceramic production in the first half of the twelfth century. The wares were thinly potted and thoroughly fired, which resulted in minimal glaze flaking. The majority of pieces were brown-glazed although green-glazed small wares are known. The general form of a small twelfth century pot is a round or bulbous body with a short neck, narrow mouth, and an unglazed button-shaped foot with concentric rings. A deeply-incised ring on the lower body, which gives the appearance of a protruding lower section, is a common characteristic of the small pots of this period. Decora tion includes horizontal bands on the shoulder, neck, or mouth and vertical, oblique, or dotted lines in varying configurations on the body. Another popular motif was a series of short vertical lines contained within two horizontal rings, which look like a band of small rectangles.

The small pots of this period were almost always potted with light-coloured clay that is compact and relatively free of visible impurities. The pieces were often covered with a brown slip and a brown glaze that is lustrous, homogeneous, and evenly applied. Improved technology is the primary character istic of the small pots produced in the first half of the twelfth century.

Typical shapes include a brown monochrome pot with a globular body that tapers to a small button-shaped foot. The body is decorated with a series of parallel vertical lines, which are formed with dashes, and horizontal rings encircle the mouth (Plate 95). An attractive variation of this form is decorated with a well-defined 'X' motif that extends across the body (Plate 96).

In addition to the small pots of the twelfth century, a number of miniature, or very small, pieces have been found. The only shape that is a small representation of a larger piece is a pot with applied bird-shaped appendages. The miniatures were made with light-coloured clay and covered with an evenly applied brown glaze (Plates 97, 98, 99).

URNS

The brown-glazed urn was one of the most prolific products of the Khmer kilns in Thailand. The classic shape is a tall vessel with a round body, a tubular neck, and an everted mouth with a flange. On earlier forms the base is flat; later examples have a pedestal. The unglazed base is usually roughly finished. Dense grey clay, which varies from medium to dark, was covered with a brown glaze that frequently extends to the base. Often impurities are visible in the clay. The colour of the glaze varies

from light to dark brown and is usually crazed. The first coil begins around the top edge of the base. Geometric motifs decorate the shoulder and carved flanges encircle the mouth rim, and sometimes the neck and shoulder. The shape is characterized by architectural features, which are also seen in Khmer temples. The religious buildings at Angkor follow a geometrically conceived plan. The symmetry and balanced proportions of the urn shape illustrate the skill of the Khmer potter. The individual parts of the urn combine to produce a unified form that gives a dynamic visual effect, resembling Grecian urns (Plates 102, 103).

In Thailand the majority of the urns have been found in close proximity to temples, which indicates that they may have served a religious purpose. Perhaps they were used as contain ers for flowers and placed on altars, shrines, or at the entrance steps of temples. Alternatively they may have been used as storage vessels for ritual objects.

A similar shape is depicted on Indian reliefs from the seventh century and later at Borobudur in central Java in the ninth century. It is possible that the influence travelled from India to Java and was transferred to the Khmers when Jayavarman II returned to inaugurate the Angkorian period. The shape is also known in Burmese paintings. Later the shape is depicted on reliefs at Angkor Thorn in the late thirteenth and fourteenth centuries.

The flanges at junctures between the upper and lower parts of the body reflect a metal derivation as the form is similar to a metal prototype. Perhaps the form used at Angkor was made of copper, brass, or silver, whereas a glazed stoneware form was used in Thailand.

The urns found at Ban Phluang in Thailand have a peculiar characteristic: the height from the base to the widest part of the shoulder equals the diameter of the shoulder, giving the urn a squat appearance. The concept of exact measurements and regular proportions is also found in Greek vases of the third century.

The earliest urns were produced between the middle and the third quarter of the eleventh century. They are oval-shaped with a short neck, a wide mouth with a flange around the rim and modelled ridges, and a flat base. Flanges were also used to accentuate the shoulder, near the juncture at the neck, and the lower body. The decoration is limited to a zigzag motif around the shoulder. The incising has a scratchy and unsure quality that disappears on later wares. The glaze is olive with a mottled texture. A slip was applied to early urns, which improved the texture of the clay body and made it impervious to liquids before the glaze was applied. A greyish-white slip is visible where the glaze has eroded. Broad roughly-drawn brush strokes indicate that it was summarily applied, probably with a brush of coarse coconut fibre. The colour and texture of the clay vary considerably (Plates 100, 101).

A peculiar characteristic that seems to occur only on the urns that were produced in the last quarter of the eleventh century is rust patches. They frequently appeared on a light-coloured clay body where the glaze had eroded and were probably caused by insufficiently ground iron (Plate 102). By the beginning of the twelfth century the rust patches disappeared.

An example of the high degree of excellence that the urn form achieved is a large urn with a round body, tubular neck, flaring mouth, flanged rim, and pedestal. Carved rings delineate sec tions of the urn and help to accentuate the well-appointed incising. Flanges at the neck and shoulder are skilfully incised with an arrow-head motif. The versatility of the scallop design is shown on the shoulder of the urn with narrow and wide bands. Vertical lines placed close together surround the mid-section. An animal-shaped head is applied between the flanges around the shoulder and upper body. The triangular face with two pointed antlers resembles a deer. The combination of fine quality incising and applied decoration is uncommon. This urn is a unique product of

superb Khmer workmanship. The grey clay is covered with a caramel-brown glaze (Plate 104).

Occasionally the form was altered slightly to include a small spout on one side of the shoulder. The shape is well propor tioned and displays strong yet careful potting (Plate 105).

One of the most carefully potted urn-type vessels is a variation in the shape of a ewer with a spout and a handle. The shape is uncommon in Khmer ceramics and shows strong Chinese influence from the Tang period. It is a robust form that looks as if it was meant to be used. The buff clay is covered with a homogeneous and lustrous caramel-brown glaze (Plate 106).

Another variation of the urn included the absence of a neck and flaring mouth. Instead the vessel terminates at the shoulder except for a narrow opening that runs vertically through the centre of the vessel from the mouth to the foot. It almost looks like a firing fault except that at least four pieces are known with the same feature. Additionally, in all cases, it seems too perfectly formed to have been an accident (Plate 107). Perhaps it was used for fermenting wine, although the flow of liquids must have been impeded by the heavy and cumbersome nature of the urn. Urns produced from the middle of the twelfth century onwards were heavy in potting and appearance and the ex tended use of moulded flanges produced unbalanced forms.

Fakes

Khmer fakes, or imitations with the intent to deceive, are not common. The few on the market are readily recognizable and rarely present a problem for the collector. A typical shape is a celadon elephant. Characteristics of fakes are:

Clay
- orange colour
- no visible impurities

Shape
- combination of Sawankhalok and Khmer features
- size often excessive Glaze
- excessively shiny
- homogeneous
- lacks flaking
- celadon glaze thicker and more lustrous

Potting
- no evidence of coils
- even glaze line

Decoration
- elaborate patterns (floral or scrolls)
- motif covers entire body

Copies are imitations that are not intended to deceive. Attractive modern copies of ancient Khmer brown mono chrome pots with bird-shaped appendages frequently appear on the market. Similarities between the two wares are limited to shape and colour. The modern products are attractive and practical, just as the original forms were nearly a thousand years ago, but, in no way, do the modern vessels pretend to be facsimiles of the ancient forms.

Recomposed wares, which are two or more genuine pieces combined to form a single piece, pose a greater problem for the collector. Fibre-glass, or other material, is used to join together genuine pieces to produce an overly complex and exaggerated

shape that looks out of proportion. Sometimes modelled animal parts, such as a head, are applied to the body of large urns.

Two-colour wares have frequently fallen prey to recomposi tion. For example, a brown-glazed body is combined with a green-glazed upper section but the two parts did not belong together originally. The juncture on the two-colour wares is precisely made and carefully concealed; it is barely visible to the eye.

One should be wary of Khmer lids, which have been found in abundance. Because of their size, weight, and shape they have survived in good condition. Excavations have not been very helpful in identifying the original vessels for which the lids were intended. The problem is intensified through pieces that appear on the market with mismatched lids. The overall guidelines of Khmer shapes should be used to tell whether or not a lid fits a vessel. If the parameters of the total form violate any one of the guidelines, then the lid is most likely not suited to the vessel.

One or more of the following characteristics usually applies to the Khmer form: a simple profile, tasteful and restrained decoration that generally consists of incised geometric motifs or applied animal-like appendages, a utilitarian rather than a decorative shape, and a flat base.

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3. Ibid., pp. 24-31.
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23. Coedès, *Indianized States of Southeast Asia,* op. cit., p. 104.
24. Cohen, Joan Lebold, *Angkor,* London, Thames & Hudson, 1975, plate 81.
25. Boisselier, op. cit., fig. 500.
26. Medley, op. cit., p. 28.
27. Groslier, op. cit., p. 29.
28. See Shaw, J. C., *Northern Thai Ceramics,* Kuala Lumpur, Oxford University Press, 1981, plates C35, 163, 168.
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34. Auboyer, *et. al.*, op. cit., p. 158.

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5 Uses

KHMER ceramics were produced to meet the ritualistic and utilitarian needs of the local population. Many vessels probably served a dual function, as religious beliefs and animistic wor ships were integrally woven into the social structure, daily lives, and culture of the Khmers. The whole pattern of life was determined by religion. The ceramics reflect the functions for which they were made and the materials that were available.

Insight into the probable uses of ceramics is gained from an examination of stone carvings on Khmer temples and monu ments in other parallel South-East Asian cultures. Chinese historical records of visiting envoys aid the search by giving accounts of the daily lives of the Khmers. Although the inscriptions are primarily concerned with royalty and the court, they supply the names of plants, animals, products, and terms of measurement that existed at Angkor. This documented source assists in discerning the uses of ceramics. A comparison of the Khmer wares with contemporary examples in Kam puchea and Thailand augments the reconstruction of uses. Today the two countries share similarities in handicraft technology, religious customs, dress, music, dancing, and language. Undoubtedly there are likenesses between the ancient and contemporary wares in terms of environment, types of food, and methods of storing and preserving food. But the modern comparison is used cautiously and, if possible, refer ence is made to archaeological, historical, and geographical evidence.

One of the difficulties in determining the uses of ceramics is that they are portable and, in most cases, have been removed from their original place of manufacture or use.

Although the number of green monochromes produced was smaller than the brown monochromes, the ratio of religious and utilitarian vessels seems to have been relatively equal within both glaze groups, as well as for two-colour wares. Almost all unglazed wares were made for utilitarian purposes.

Trade ceramics, or export wares, which were produced in abundance in China and other South-East Asian countries, do not seem to have been produced by the Khmers. The small number of Khmer ceramics that has been reportedly excavated outside the boundaries of the former empire indicates that they were not made for export. They may have been transported by migrant Khmers, who presented them as gifts, where they were regarded as symbols of status and wealth and became heirloom pieces. Also it seems likely that these wares were used as barter for other goods of value. Additionally the magical associations with ceramics that prevailed in the South-East Asian archipel ago during the Song and Yuan periods seem to have been absent in the Khmer wares.

Small ceramic pieces may have had a talismanic usage. Flat green monochrome fish could have been charms that were used to ward off evil spirits (Plate 27).

The practice of placing valuables in ceramic containers and burying them in the earth for safe-keeping seems to have been rare among the Khmers.

The cultural heritage of the Khmers is reflected in their observance of religious and national holidays throughout the year. The dates vary as they are based on the lunar calendar and usually coincide with a full moon. These colourful celebrations are happy and joyous events, which temporarily ease the monotony and confinement of everyday life. Music, dancing, and drama are an integral part of village festivities and denote the close relationship that exists between religion and the performing arts.

The ceremonies are an amalgamation of Hindu, Buddhist, and animistic beliefs. The dominant elements, which are almost always present, regardless of the type of

ceremony, are flowers, candles, incense, music, dancing, drama, water, food and, often, a white cord. Containers and offertory vessels are mandatory accessories for the presentation of items at such ceremonies. The Khmer stonewares, with their useful shapes, appealing yet subdued glazes, and sturdy potting, would have been suitable vessels for these purposes.

Flowers, candles, and incense sticks are symbolic of the Triple Gem: Buddha, his teaching, and monks. The three representative elements are present at all Buddhist ceremonies. Khmer ceramic pedestal urns may have been used to hold flowers and incense sticks, which were placed on altars.

Lighting played a dominant part in all the ceremonies and festivals, which were held throughout the year in the Khmer Empire. Candles were used extensively, even in daylight. Elaborate candelabra provided overhead lighting, rows of candles lit the entrances to the temples, and candles were placed on altars and shrines. Candles surrounded the images that accompanied the king when he left the palace. An inscription describing a religious ceremony refers to 300 palace women with lighted tapers. Elevated lighting must have been needed for dancers who performed at the ceremonies.

Candles may have been placed in the many Khmer pots and bottles with narrow necks. Additionally oil lamps may have been substituted, or used as a supplement for candles. A typical ceramic shape that may have been an oil lamp is a brown monochrome pot. The body has a flattened globular shape with a broad shoulder, and a narrow mouth with a rolled rim. The base is flat or slightly concave. Sometimes a brown slip, visible on the base, was applied over buff clay, particularly on pieces made in the first half of the twelfth century. Often geometric motifs are incised on the shoulder and body. The vessel could have been filled with oil through the mouth and a wick placed on the shoulder (Plates 84, 85, 86).

Burning incense sticks, a Hindu custom, is a necessary component of ceremonies. The numerous Khmer pots and bottles with narrow mouths could have been used as containers for incense sticks.

Music was an important part of the elaborate religious ceremonies that were held in the temples as well as the festivals and holidays that filled the lives of the agrarian Khmers. Musical instruments that may have been used were drums, trumpets, cymbals, gongs, bells, conches, and reed flutes. Musicians, singers, and dancers accompanied the priests during the ceremonies. Brahmins announced the arrival of the king by blowing through a conch. People prostrated themselves on the ground while the king passed, and raised their bodies only after the music of the conches ceased. Musical instruments were used for funeral corteges and stately regal processions filled with pomp and ceremony. When the king left the palace he was preceded by an orchestra with bellowing conches. Reliefs depict soldiers accompanied by bands of musicians.

Music was well known at Funan. Chinese historical records refer to a group of musicians that were given as a gift to the ruler of China by the first embassy from Funan.[1] Many instruments used in South-East Asia probably originated in India and travelled east with merchants, traders, and religious leaders.

Khmer drama most likely depicted scenes from the *Ramayana*, a heroic epic of Hindu mythology that relates the tory of Rama, his wife Sita, and the villainous Ravana. Parts are played by three categories of characters: humans, gods, and monkeys.

Lustral water is a requisite at most religious and spiritual rites. It is used at Hindu, Buddhist, and animistic ceremonies. In India one of the most common and simple objects of daily worship is a jar or pitcher filled with water, representing the presence

of the divinity and symbolizing a sacred image. In Thailand a ceremony is usually held to bless the water before it is used.

Examples of ceremonies using lustral water include those associated with birth, when the mother is given lustral water to drink; marriage, when water is poured over the hands of the bridal couple as a wish for lifelong happiness; and death, when relatives and close friends sprinkle water on the dead person to purify the body and to ask forgiveness for past quarrels.

The origin of the use of the sacred white cord is Hindu although it is present at many Buddhist ceremonies such as birth, marriage, ordination, and the blessing a new home. The cord encircles the focal point of the ceremony and serves as a boundary marker. Everything inside the cord is assured of protection and receives the blessings of the monks, gods, and spirits.

MERIT

Making merit is a primary concept of Buddhism. It is believed that a good action will affect one's future. Merit is gained by giving food to the monks, releasing live animals such as turtles, sparrows, or eels, contributing to the building, restoration, or repair of a temple, presenting a gift to the temple such as a valued ceramic vessel, mango or palm groves, or land, or participating in a merit-making festival.

SPIRITS

Animism, or spirit worship, was an integral part of Khmer civilization. Spirits may be good or bad and the primary types are spirits for prosperity, spirits for protection and fertility, and ancestral spirits. The dominant rituals include recalling escaped spirits, the cult of the guardian deities, the propitiation of spirits, and rites associated with water gods.

Ancestral spirits live in specific places, such as inside stones. Buddhists believe that when a person dies his soul is reincar nated and that his spirit becomes a free agent. The soul of the departed possesses supernatural powers and it is mandatory to worship, feed, and entertain these spirits. Rites are frequently held at night because it is believed that spirits descend from the heavens during that time. Candles, torches, or oil lamps are obligatory accessories.

Mediums, who have powers of communicating with the dead, often hold rites to exorcise evil spirits. Spirit doctors are often requested to use their magical powers for curative and restorative purposes.

In animistic ritual, when a house is built, it is imperative to provide lodging for the spirits that reside in the earth. A spirit house will appease the spirit and ensure that it is good and friendly. The location of the house is important. It must be in a corner of the land where a shadow of the sun will not be cast upon it. The house usually stands on a pedestal and is surrounded by a terrace. Daily offerings of fruit, flowers, incense, and small ceramic or wooden figures of animals or humans align the terrace.

Water is essential to life and the Khmers believed that the supply of water was controlled by nature and that water spirits could be nutured and pacified through rituals. The farmer depended so strongly on the monsoons that he considered it auspicious to construct his house facing the approaching rains.

Cosmology and astrology were integrated into the spiritual and religious worship of the Khmers. Today astrologers are consulted for the selection of auspicious months, days, and hours of almost all important events. The Khmers believed that the world and the universe existed in opposition to each other and were engaged in a continuous struggle for supremacy. The theme of a dual cosmology was common. Harmony is assured if cosmic laws are followed.

The four directions are assigned astrological values. East, the direction of the rising sun, is auspicious and represents life. Sexually, it symbolizes the creative prowess of the male. Most Khmer temples were built with the entrance facing east. In opposition, west is inauspicious, representing death, impurity, the setting sun, and, sexually the female. The north is auspicious and associated with the elephant because of its strength. South is a neutral value.

ANNUAL FESTIVALS

The beginning of the Buddhist year is marked by the celebration of a water festival. It takes place on the day of the first full moon in April, which is an interim period in the cycle of rice cultivation. It is the time when the sun enters the sign of the Ram. The celebration combines Buddhist and animistic features. Participants offer food to the monks at the temple. Lustral water is sprinkled on sacred Buddha images by the monks in a gesture of paying respect, and on the palms of monks by the people, elder relatives, and friends. A general house-cleaning typically takes place at this time. After the offerings, a water festival ensues to wish for abundant rain. The occasion is marked with parades, boat-races, dances, and merit-making. Fire-crackers are set off to frighten away evil spirits. Water-sprinklers and containers are an essential part of the paraphernalia used for the celebration, particularly for the storage of water. Ceramic vessels could have fulfilled these needs.

At the beginning of the rainy season, usually in late May, a ceremony is held to propitiate the spirits of the fields and to ritualistically bless and sow the seeds before the rice is planted. The auspicious day and hour are set by astrologers. A sacred plough, decorated with flowers, is drawn by buffaloes, sacred rice is sowed, and the soil is furrowed. Then the buffaloes are released. Three bowls, which could have been ceramic, are placed in a designated area: one is filled with water, one with rice, and one is empty. If the animals go to the bowl filled with water an adequate rainfall will ensue; selection of the bowl of rice assures a good harvest; if the animals go to the empty bowl a poor harvest will follow. Flowers, drums, chants, and conches accompany the festival.

The most sacred of all Buddhist holidays is celebrated on the day of the full moon of the sixth lunar month, which usually falls in May. The birth, death, and enlightenment of Buddha are celebrated by candlelight processions around the temples.

The Buddhist Lent begins in July. It is a three month period when monks remain in the temples and strict religious practices are observed.

At the end of the Buddhist Lent, usually in October or November, merit-making ceremonies are conducted. Partici pants go to temples and make offerings of food, robes, and other gifts to the monks. The occasions are marked by singing, dancing, and music.

The rainy season is usually over by November and the frequency of festivals increases. On the night of the full moon of the twelfth lunar month, a ceremony is held to give thanks to the water spirits. It also offers tribute to the *naga* king, who lives at the bottom of the sea and is a follower of Buddha. Boats made of banana leaves containing flowers, incense sticks, and candles float as offerings on rivers, canals, and ponds.

An ancient Hindu ceremony is held annually in villages at the end of the rainy season to pay homage to the 'miracle rice', a concentrated composite of a variety of ingredients, which was offered to migrant religious devotees in India. The temple compound is alive with festivity. Food-stalls are lit by oil lamps, trees decorated with balloons and toys, a stage setting for the performance of scenes from classical

mythology, and continuous music. Outside the compound, earthenware stoves heat large bowls of coconut milk. Near by, bowls contain the ingredients for the 'miracle rice'. They are sugar, roasted rice, pounded peanuts, sesame seeds, honey, orange-flower essence, and oil. The mixture is boiled, cooled, and divided into small portions; then it is wrapped in banana leaves, and speared on a bamboo skewer. A procession forms with offerings of rice, flowers, candles, and incense sticks. Two females lead the procession carrying bowls that contain rice and flowers, which they scatter at the feet of the people. Ceramic alms bowls are carried for traditional coin offerings by monks. After the chanting is completed, the monks are presented with food.

In February a ceremony is held to commemorate Buddha's impromptu sermon to 1,250 disciples. The occasion includes making merit by releasing live animals and a candlelight procession around the temple. Special presentations are made and prayers to Buddha are offered for the welfare of all souls.

Other religious rituals, common to the cultures of South-East Asia, are performed for specific events include blessing a new house and paying respect to teachers.

Since one's house is an important possession, a special ritual is held to ensure that it will bring good luck and happiness to the residents. A Hindu ceremony is conducted to lower the main post of the house into the ground. The most auspicious day, time, type of wood, location, and participants must be considered. All the paraphernalia of Buddhist rituals are present including materials to inscribe Khmer characters on the post.

An ancient ceremony is held annually to pay homage to the gods and past and present teachers of classical dance. Students must pay respect to the teachers by offering flowers, candles, and incense sticks. Lotus blossoms and jasmine are placed in vases and floral garlands on trays, which adorn the altar. Bananas and fruits are offered to the monkeys; a pig's head, sweets, and rice are prepared for the gods; and giant offerings include uncooked meats and liquor. A mixture of fragrant flower petals, good luck leaves, and popped rice are placed in a large bowl. The offerings are presented with a dance and a handful of the auspicious mixture is hurled onto the altar floor by each dancer as a gesture of homage. All of the offerings are blessed with lustral water, which is poured from a sacred conch.

A rice goddess is frequently worshipped in rural areas. She came to South-East Asia from Mount Meru and was accompan ied by the bountiful fish in the area. If she is kept happy with fferings of food and faithfully worshipped, prosperity and good health will ensue for the provider. After an adequate amount of rainfall and a bountiful harvest, the rice goddess is rewarded with an offering of fruits and sweets.

Ceremonial Uses

The major ceremonies in the lives of rural Kampucheans are birth, ordination into the Buddhist monkhood, marriage, and death.

BIRTH

A pregnant woman is believed to be vulnerable to evil spirits. Preparations before birth consist mainly of protecting her from these evil spirits. A sacred white cord encircles the room where the expectant mother will give birth for protection.

A midwife assists in the delivery. After the baby is born, the placenta is placed in an earthenware jar, which is buried under the tree or plant where the guardian spirit lives. The mother is given lustral water to drink. A bowl of areca nuts, betel-leaves, and candles is offered to the midwife in appreciation for her assistance.

After birth a mother begins the ‘staying by the fire’ ceremony. Fire is believed to be a purifying agent. For seven days the mother lies on a specially-prepared bed heated by a charcoal fire. Wood from bamboo and banana trees is loosely interlaid to form a lattice. The spaces are filled with clay to retain the heat. Before the ceremony begins, the stove is blessed and holy water is sprinkled on it, offering protection from the fire to the mother. The spirit of fire is appeased with offerings of food, flowers, candles, and incense sticks.

ORDINATION

Buddhism decrees that every male over twenty years of age should enter the monkhood, although some serve as novices at the age of nine or ten. The age that a male enters and the duration of his service vary and are determined by one's family. Usually a young man serves in the monkhood before marriage. The Buddhist Lent is a popular period and a practical time for ordination, as it is in between the planting and harvesting of rice. The symbolic significance is the repayment of a debt by the young man to his parents, who gave him life.

According to legend, the *naga* changed himself into human form to become a monk. One night he reverted to his original snake form. Buddha told him that only humans could become monks, so the *naga* asked Buddha to use his name in the ceremony. Today in Thailand a man who is to be ordained is called a ‘nahk’, or *naga.*

The pre-ordination ceremony is Hindu-influenced. Music pervades and the playing of drums, gongs, and cymbals goes on incessantly. Flowers, candles, incense sticks, and the sacred white cord are present. A procession forms and moves three times clockwise around the temple representing Buddha, his teaching, and the monks. In ancient times the man to be ordained rode on the back of an elephant or a horse.

The ordination ceremony is Buddhist. After the procession is completed the young man to be ordained enters the temple. A monk conducts the ceremony, which usually consists of a dialogue between the two parties, who chant in Pali, a language of ancient India used for writing and chanting Buddhist scrip tures.

MARRIAGE

The use of ceramic vessels in conjunction with marriage probably began soon after the betrothal. In Kampuchea, as early as the seventh century, an eight day ceremony was held after a marriage had been arranged. The families of the pros pective bride and groom did not leave their houses during that time and a lamp, perhaps an unglazed ceramic vessel containing oil, was lit. It burned continuously for eight days and nights.[2]

A wedding usually consists of three ceremonies. First, the house where the couple will live is blessed. Relatives and friends make merit by offering food to the monks and the implements to be used for the lustral water pouring ceremony are blessed. Second, the lustral water is poured over the hands of the bridal couple. Third, the bridal bed is prepared.

In modern Kampuchea a marriage ceremony begins with a procession of friends and relatives carrying gifts on trays. It is accompanied by singing, dancing, flowers, and often a group of musicians. A general atmosphere of gaiety prevails. The pro cession begins at the house of the groom and merrily wends its way to the house of the parents of the bride. Buddhist monks arrive, gifts are presented, and chanting begins. The monks sit in a semi-circle around an altar, which is bedecked with flowers in vases, bowls of fruit, and incense sticks. An urn, which is used for collecting gifts of money, stands near the altar. Ceramic vessels could have been placed on the altar as containers.

The bridal couple is joined together, either at their heads or hands, by a white cord, symbolizing unity. A similar cord is held by the monks and encircles the entire compound to avert evil spirits and to protect the people inside the compound. The fear of penetration by evil spirits must be strong because a special ritual is conducted to ensure that they do not influence the marriage. Candles are passed around to the relatives, who sit in a circle. In Thailand the ceremony is ended by the head monk sprinkling lustral water on the bridal couple.

A lustral water-pouring ceremony is usually held later in the day and often attended by a greater number and broader group of friends than the earlier ceremony. It is a Hindu-inspired ritual and Buddhist monks are not present. The guests form a procession, which passes by the bridal couple, who are kneeling. Each guest pours lustral water from a conch shell, which is placed in a metal pedestal bowl, over the hands of the bride and groom. Small bowls filled with auspicious flower petals are used to collect the excess water from the conch. The ceramic conch is one of the most skilfully-potted Khmer forms and most likely served an important and special purpose, such as a lustral water-sprinkler at a marriage ceremony. Perhaps it rested on a brown monochrome pedestal bowl with a disc in the centre (Plate 53).

The water-pouring ceremony is followed by a feast that is comparable to a Christian wedding reception. Specially pre pared food, music, and dancing prevail amidst wishes for lifelong happiness to the newly married couple.

The ceremony for the preparation of the bridal bed is performed by a respected elderly married couple. Rainwater in a small bowl symbolizes purity. Candles and incense are lighted for the altar.

DEATH

Exactly how the Khmers disposed of their dead is uncertain. Chinese dynastic records report that at Funan, in the first half of the sixth century, four methods were used: submersion in water, burial in the earth, and consumption by birds or fire.[3] In Champa a corpse was wrapped, carried to the sea-shore or river bank, and burned on a pyre; the bones and ashes were placed in a vessel that was thrown into the water. The material of the vessel depended upon the social rank of the dead person: gold was used for a king, silver for a public official, and earthenware for a commoner.[4] The Malays, in the fifth and sixth centuries, carried the body to a designated place, where it was devoured by birds; afterwards, the bones of the dead were burned and placed in a jar, then thrown into the water.[5] Khmer inscriptions in the seventh century refer to ashes of the dead in pots.[6] The Pyus of Burma, in the eighth century, cremated the dead and kept the ashes in earthenware urns.[7] In Northern Thailand cremation has only recently been adopted by the masses. Previously it was reserved for nobility and monks; commoners were buried in the earth. Zhou Da-guan reported that the king of Angkor was buried in a tower.[8] Perhaps the ashes were placed in the tower after cremation, which is the custom today in Phnom Penh and Bangkok. Zhou Da-guan describing funerals at Angkor in the late thirteenth century, wrote that the most prevalent procedure was to place the body on a straw mat and cover it with a cloth. Then a procession, accompanied by music and banners, was formed and the body was carried outside the city walls, where it was left to be devoured by birds and animals. He also noted an increasing acceptance of cremation of the dead, especially by the Chinese.[9]

In modern Kampuchea the dead are cremated. The ashes are placed in an earthenware covered jar and buried near a temple.

In modern Thailand the corpse is bathed in holy water to purify the body by members of the family and close friends soon after death. If the person died at home

the body may remain in the house for a period of time. A light burns conti nuously at the head of the corpse, which is placed pointing west towards the setting sun, a symbol of death. Today the light is usually a metal oil lamp or container for a candle but, in the Angkorian period, a ceramic vessel could have served the purpose. The symbolism of the light assimilates Buddhist and animistic beliefs. The burning and extinguishing of the flame represent the life cycle according to Buddhism. It serves as a guiding light for the soul on its way to heaven in animistic worship. A white cord, flowers, incense sticks, and a coin accompany the body. All these elements symbolize the dead person's concern for the members of the family who are living and the dual cosmology of their merit and sins. A period of mourning is observed for at least three days after death. Buddhist monks chant nightly and relatives and friends gather to pay their respects to the dead. A wooden coffin is made and the body is taken by procession to the cremation grounds, usually a temple. It is placed on a pyre built of aromatic wood. Coconut water made from a young green coconut is poured on the ground to ensure fertile soil in the after-life. The Thais believe that coconut water is the purest form and they pour it over the body before cremation. A ceramic lustral water-sprinkler may be used for pouring the water. A fire is lit and the body is cremated. After the burning the monks conduct a final ceremony at the home. The monks form a circle around a large bowl of warm water and dried soy bean. They chant and bless the lustral water, which is sprinkled throughout the house by family members in an act of purification. It is also used to cleanse people who have had contact with the corpse.

The funeral ceremony ends with a social gathering of the mourners, who talk, chew betel, and play games such as chess, sometimes throughout the night. Entertainment is often pro vided. Classical music, dancing, or drama, enacting scenes from the traditional epic literature, are typical types of entertainment. The mood of the funeral reflects the theme of rebirth and continuity of life.

In a royal cremation ceremony in Thailand the body of the dead king is housed in a replica of Mount Meru, the mythical mountain.

Recent epigraphic research has shown that most of the Angkorian edifices were funerary temples. At excavated sites, statues depicting the deceased king in divine form have been found with royal ashes inserted into the bases. Since the temples were often a personal magnification of the king it was appro priate to deposit his ashes in the temple after his death. This act animated the idol and gave the *devaraja* cult a living image.

Excavations of funerary deposits at Angkor have produced vessels surrounded by precious objects, often made of bronze, and Chinese ceramics. Khmer ceramics found in the burials are usually damaged in some way, as if they had been intentionally sacrificed, a characteristic that has also been observed in ce ramics found around kiln areas in Northern Thailand. Perhaps the purpose was similar to the Sawankhalok wares which were used for burial in Indonesia and the Philippines. If a vessel was damaged it was believed that it would not appeal to the spirits, thus causing them to look for accomodation elsewhere.

Everyday Uses

Khmer ceramics are strong and sturdy vessels. The shapes are simple and functional. They are wares that were meant to be used. Undoubtedly they met the needs of the domestic popula tion, who were primarily farmers living in rural Kampuchea.

The technique of forming vessels from clay has been known universally since the beginning of civilization. The most impor tant early use of pottery was for containers of food and liquids. Since South-East Asia has a prevailing tradition of using shells,

baskets, bamboo, leaves, and reeds of plants as containers for serving and cooking food, the potting technique may have been adopted later in that area than in other cultures.

A typical farming village in South-East Asia is situated near a river to ensure a suitable supply of water and fish. The temple is the focal point of the village and serves as a centre for festivals and social activities. The market is another essential component of the village.

The annual cycle of rice cultivation for the typical farmer in Kampuchea is governed by the monsoons. In April, after the monsoon has passed, the ground is softened and ready for working. Approximately three weeks are spent preparing the soil for planting. The fields are tilled twice with a wooden plough and a buffalo. Then a log is drawn across the soil to flatten it. The ploughing is done by men and older boys.

Women are responsible for seeding, which takes approxi mately two weeks, usually in June. The children are required to guard the fields night and day to ward off birds and rats while the seeds are germinating.

August and September are the wettest months of the year and constitute the busiest period for the farmer. During this time the rice is transplanted to other plots.

Between September and December the rice ripens. During this period villagers who are trained in special handicrafts work on their crafts while others repair dikes, weed the fields, or grow secondary crops.

Harvest begins in late November or early December and usually lasts about three weeks. The rice is cut with a sickle. The handle is made from a root and the blade is metal. The handle of the sickle is carved in the shape of a dragon’s tail, because it is believed that a dragon spirit governs the earth and controls the growth of the rice. After cutting, the rice is tied into sheaves and dried in the sun for several days. It is threshed by hand and stored. In Angkorian times it was most likely transferred to the granaries of the king. A typical village granary is beehive-shaped and made of woven bamboo that is plastered with mud and buffalo dung. The roof is usually thatched although pros perous villagers use tiles. The granary stands on posts and is approached by a ladder.

The house of the Khmer farmer in the past was built of wood and has perished. But it was most likely similar to one used by contemporary farmers. The thick jungles produce an abundance of hardwoods that are suitable for constructing houses, boats, carts, furniture, and utensils such as spatulas for peeling yams and tubers. A typical house is one storey tall and stands on wooden stilts, with a stairway leading up to the door. A medium-sized earthenware or stoneware jar filled with fresh drinking water is placed outside the house as an offering of goodwill for passers-by. A ladle made from a coconut with a bamboo handle is placed across the mouth of the jar. The space underneath the house is used for keeping domestic animals such as water-buffalo, chickens, and pigs, for storing household goods such as large jars for water, and for working on handi crafts such as weaving. The entrance platform is located at the top of the stairs and is used for washing one's feet before entering the house. The area is constructed of wooden slats that alternate with open spaces. Stoneware jars used as water-containers are placed on the platform. A small bowl floats on the surface of the water inside the large jar and is used for pouring water from the jar onto one’s feet. The loosely-spaced wooden slats allow the water to drain onto the ground.

A washing area adjoins the kitchen and is located on the first floor in the western section of a house. Often it is an open platform that contains large brown monochrome stoneware jars filled with water. The washing room is reserved for use by members of the family only. It provides water for bathing, washing dishes and kitchen utensils, and cleaning the interior of the house. The elderly members of the

household bathe from the large jars before eating; other members of the family bathe from the well. Covered pots containing water for drinking are kept inside the house. The Khmers may have used earthenware vessels for this purpose. Because of its porosity earthenware keeps the drinking water cool. Smaller pots are used for rinsing the mouth after chewing betel.

Daily household chores are handled by the female members. Young girls are responsible for collecting water from the village well twice a day. Long-necked brown-glazed ceramic bottles may have been used. The tall neck could be grasped by the hand for carrying, the bulbous body is large enough for a sufficient amount of water, and the form is easily portable (Plate 49). A small brown-glazed bowl may have been inverted and placed on top of the mouth. It would keep insects and dust out of the water in addition to serving as a drinking cup. It resembles a contemporary metal form used in South-East Asia today. The bottle could also have been used by workers in the rice fields for transporting drinking water. A similar shape is used today.

The brown monochrome storage jars were made in medium and large sizes and offered flexibility in placing and contents. Besides water, they may have been used as containers for rice, oil, or preserved foods such as pepper, citron, or mango. In Burma similar jars were sealed with cloth or pig's bladder for protection from insects. In modern Thailand a metal cover that looks like a round cake-pan is inverted and placed over the mouth rim of the jar.

Rice wine was probably brewed in the medium-sized jars. A relief at Bayon depicts men drinking through reeds from a similar jar. The Khmers made several kinds of wine, using honey, sugar, and rice. Mountain people today in north-eastern Kampuchea and the mountain areas of Vietnam make a local wine using the same ingredients as the ancient Khmers. Rice wine is a concoction that is usually reserved for special celebra tions or for welcoming visitors. It is prepared by placing rice husks and a fermenting agent in a jar; the opening is sealed with a mixture of clay and wood ashes; after fermentation the jar is opened and water is added, which converts the mixture to wine.

Water was of course vital for the Khmer farmer. An adequate balance of water supply for rice cultivation depended upon the rainfall. The monsoon climate that dominates South-East Asia produces rainfall that is irregular in timing and amount. Con servation of water for use during the dry season is crucial for survival and storage vessels are essential. The importance of water is attested to by inscriptions which specify that it was a primary duty of the king to ensure an adequate water supply for the kingdom.

The Khmers achieved a high degree of hydraulic technology and built up a large-scale irrigation and water control system. The Tonlé Sap Lake, 78 to 104 kilometres long and 10 to 13 kilometres wide, is the main source of water in Kampuchea. During the rainy season the force of the Mekong River, which is caused by floods and melted snow from its source in Tibet, is strong enough to reverse the course of the river and make it rise to a higher level than the lake. Reservoirs, which filled with water in the rainy season and emptied when necessary during the dry season, were additional water conservation sources.

A special festival, highlighted by boat-races, was held annually on the river. The purpose of the event was to encourage the floods to stop and the Tonlé Sap to reverse the direction of its current.

Water-control systems can be traced to the Pallava period, which flourished in eastern India from the fifth through the ninth century. The technology may have been transmitted from India to Funan and then to the Khmers. The Chinese were also

skilled hydraulic engineers and initiated water-control and dyke construction in Vietnam.

Recreation in the village is spontaneous and unaffected. It comes from the heart and is a desire for expression, often in response to a current event. Singing, dancing, music, drama, and games such as chess and checkers all provide relaxation and deviation from the villagers' daily routine. Fighting competi tions between animals such as cocks, fish, or crickets are favourite village pastimes and interest is enhanced by betting on the outcome of the contest.

The inscriptions provide substantial insight into the foods and spices that were grown in the Khmer Empire. A variety of fruits and vegetables were produced to supplement the basic diet of rice and fish. Undoubtedly Khmer food was prepared similarly to the food in modern Kampuchea and Thailand. The basic products, the seasonings, and the preparation combine to produce a type of food that is unique to the area. Many of the dishes are highly seasoned, yet no one flavour dominates. It is a harmonious blend of tastes.

Three meals are eaten a day and similar dishes are served at each meal. A typical Khmer meal might have consisted of rice with a curry made from buffalo, chicken, or fish, vegetable dishes to eat with the rice, a broth, and often a salad, and fruit for dessert. The dishes that are prepared vary depending on available products, household economics, and the occasion.

Food was probably cooked on one or more earthernware stoves that were heated by charcoal. Unglazed utilitarian shapes with a bulbous body, wide mouth, and round base could have been used for cooking rice or vegetables, such as cabbage, beans, pumpkin, or peas, or for preparing broths, perhaps made with buffalo meat.

Boiled rice is the main staple of the Khmer diet and is served at every meal. It is bland and cooked without salt or fat. The brown portion is fed to the domestic animals. The rice is served in a large covered bowl, which is placed on the floor in the centre of a mat that is woven from reeds. Members of the family sit in a circle around the mat. Individual portions are served in smaller bowls. Although no ceramic counterpart seems to exist for the large service bowl, all of the green and brown mono chrome small bowls could have been used as individual contain ers for rice.

Glutinous, or sticky, rice is a special variety that is grown in Kampuchea, North-eastern Thailand, and Laos. It is fast-maturing rice and requires a shorter growing period than the standard rice. It is placed in glazed ceramic jars with water and soaked overnight to make it swell. The medium brown-glazed Khmer jars would have been suitable for this purpose. Then it is steamed and ready to eat. When glutinous rice is eaten with other foods, such as curry and fish, a small chunk is broken off, shaped into a ball, and eaten with the fingers. A favourite dish is a combination of glutinous rice that has been cooked in coconut milk and freshly-sliced mangoes. If it is eaten when the mangoes are ripe, it is believed to be beneficial for restoring youth.

Rice was cultivated in Funan and Chenla. The technology of ploughing and transplanting may have been transmitted to the Khmers from the Chinese.

Fish constituted an important part of the Khmer diet. It was an abundant source of protein, especially when the flood waters filled the Tonlé Sap in Kampuchea and the rivers of Thailand. Fish, either fresh, dried, or fermented, is eaten nearly every day by all social classes in Kampuchea.

Fish is prepared in a variety of ways, steamed, fried, broiled over charcoal, or smoked. A characteristic fish dish is made by steaming a medium-sized whole fish and frying it until the skin is crisp. It is served with cooked vegetables, a fish sauce, and rice.

Numerous foods were prepared by steaming and it is possible that the brown monochrome pedestal bowl with a disc in the centre was used as a steamer (Plate 53).

A similar form in bronze was used for cooking sacrificial meats. The well could be filled with hot water, and a smaller vessel containing food or liquid could be placed on the disc.

Today small fish, such as minnows and shrimp, are dried or smoked, and eaten with curries. This would have been an ex cellent way for the Khmers to preserve an abundant supply of fish. Dried fish are a typical gift for a new mother.

Fish sauce is a common and popular accompaniment for rice, curries, and vegetables. The basic ingredients are smoked herring, lime juice, garlic, chili peppers, tamarind, and green mango. The mixture is finely chopped. When blended it pro duces a salty, tangy, and spicy sauce.

A non-edible use for fish was to make grease from pulverized fish blended with mineral lime and ground to a powder. Zhou Da-guan reported that it was used for oiling boats at Angkor.[10]

Spices are used in almost all food preparations and are a fundamental ingredient in cooking. Added to other staples, they provide variety in taste and texture. Spices were known in ancient Egypt, China, and India, and became a premium trade item between the countries. Spices mentioned in the inscrip tions are ginger, tumeric, pepper, and nutmeg. Ground tumeric was used as a cosmetic powder. Additional spices, which are indigenous to the area and are used frequently in contemporary cooking, may also have been used by the Khmers. The primary spices are basil, cardamon, chili, cinnamon, and clove.

Spices, which include roots, leaves, and seeds, are prepared by placing the selected blend of whole seeds into a mortar and pestle. The Khmer ceramic mortar is brown glazed on the exterior only, thickly potted, with tall, slightly angular walls, a wide mouth, and a heavy dense base. It is also used for making curry-pastes, betel, medicines, and perfumes. After the spices are pounded to a medium or fine powder they are often mixed with a shrimp paste. Dried and roasted chili peppers are also a popular condiment.

Small pots with a short neck and narrow mouth would have been suitable for the storage of spices. Today foods are stored in similar pots and protected by enclosing the pot in a net and hanging it from the ceiling on a bamboo pole.

Besides cooking, spices are also used for making oil, perfume, and medicines. In Khmer civilization additional uses of turmeric included a cosmetic powder and a dye for woven straw mats used for sleeping.

Certain spices have anti-oxidant qualities that act as preserv atives and inhibit spoilage. Shrimp paste, combined with spices, can be stored for several weeks. Small ceramic pots could have been used as containers for preserved foods. Cinnamon sticks were used in clothing-trunks on ocean voyages as protection against moths. Ginger is frequently an ingredient in medicines. Oil extracted from certain spices is used to perfume wine.

Salt is a prime necessity for cooking, seasoning, and preser ving food. It was produced in the flat areas located near the sea and obtained by evaporation of sea water. In pre-Angkorian times, salt was transported by boat on the internal waterways and used as an item of regional trade. Salt is associated with spirits in China, the Philippines, and Malaysia and it is believed to contain supernatural powers capable of driving out malevo lent spirits. It is placed in small containers and buried with the dead.

The palm grows prolifically throughout South-East Asia and includes several varieties. The coconut palm is one of the most beneficial because it is a fruitful tree and its products have multiple uses, which are increased by a variety of species. The palm provides food, drink, shelter, and shade. The nut of the coconut palm is hard-shelled with a somewhat fibrous exterior and a lining of succulent white meat which

is kept moist by a liquid. The coconut shell is used as a bowl and when attached to a bamboo pole serves as a ladle. The husk of the nut is burned for fuel. The fibre of the husk is used to make doormats and mattresses. Coconut milk is used abundantly in cooking. The white liquid is made by shredding the coconut meat and cooking it in water, then pressing it through a strainer.

Another variety of the coconut palm is a hard-shelled nut that is a bright green colour. The top is cut off, a straw inserted, and it is served as a drink. When it is fermented the coconut palm juice becomes a potent drink. This same coconut is used to make steamed custard.

Besides food, coconut milk is used for washing silk fabrics; the dried meat is used for making soaps and lotions, and coconut palm-leaves are popular as construction materials for temporary shelters and roofing.

An abundant variety of delicious and unique fruits are grown in South-East Asia today and many species are mentioned in the inscriptions: several types of oranges and bananas, jack-fruit, water-melon, tamarind, fig, mango, gooseberry, and lime. Tamarind juice was used as a hair rinse. Since plates are extremely rare in Khmer ceramics, banana or other broad leaves were probably used for serving and eating fruits. The mango must have had a special significance for the Khmers as the first ripe crop of mangoes was reserved for the king, and the inscriptions mention several places at Angkor named after the mango.

The Khmers undoubtedly prepared sweet desserts for special occasions such as weddings or offerings of thanks to benevolent spirits. Today the desserts of Kampuchea and Thailand are a delectable blend of ancient ingredients. Generally the desserts are sweet, heavy, and fragrant. The most common ingredients are lotus seeds, rice-flour, glutinous rice, palm sugar, cassava roots, and coconut. The scent is added by making syrup from bland beans or seeds and jasmine-scented water, or by placing the sweets near a burning scented candle.

A woman’s toilet was an important part of the daily routine for royalty. The ritual probably began with a betel-quid and freshly prepared ointments. The ingredients may have been ground in a mortar and pestle and mixed with oil and dried scented flower petals to form a paste. Numerous small pots would have been needed to contain powders, perfumes, oint ments for massages and baths. In India a ceramic vessel was filled with scented water and used for bathing.

Perfume was a popular luxury that was used by both women and men. Inscriptions refer to guards of sacred perfume so, undoubtedly, it served a religious purpose and was used in ceremonies and rituals. Perfume-containers were presented as gifts to foundations. Perfume ingredients were ground in a mortar and pestle by slaves. Popular modern scents are frangipane and citronella. Sandalwood is added to mixtures as an essence.

A cylindrical jar with a compressed middle section and a broad shoulder may have been used as a container for cosme tics, particularly perfumes (Plate 67). Incised decoration makes the shoulder the focal point. Perhaps the jar was made to place on a low wooden dressingrtable.

Based on ceramic finds in Thailand it is apparent that one of the major uses of small pots was for lime containers. A large number of pots with traces of lime on the interior have been ound in North-eastern Thailand. They were most likely indi vidual containers for lime, which was one of the essential ingredients required for chewing betel. The remains of lime found inside the pots is finely ground and hardened into a white paste, sometimes with a pinkish tinge. It readily disintegrates to powder when scraped with a sharp instrument. Often the layer of lime is thick enough to increase the weight of a piece.

The most prolific ceramic form that contained lime is a bird-shaped pot with a round body and applied beak, tail, and eyes (Plates 13, 14, 15, 16). Often the glaze on the interior is eroded, perhaps by the high acid content of the lime. The mouth opening at the top of the pot is wide enough to insert an implement and remove the paste for spreading on to the betel leaf.

Other forms that have been found with evidence of lime content are round animal-style pots in the form of an elephant or rabbit (Plates 25, 26, 28, 29). Brown monochrome examples are more common than green monochromes.

The lime pots were produced between the middle of the eleventh and the early twelfth centuries with the most prolific production in the last quarter of the eleventh century.

Betel-chewing was known in India in the early centuries of the Christian era and was, most likely, transmitted to South-East Asia by traders and seamen. In the tenth and eleventh centuries Champa presented areca nuts to China as tribute so there is evidence that the Chinese also enjoyed chewing betel.[11] Extensive finds of ceramic containers with lime contents in North-eastern Thailand attest to the wide-spread acceptance of the practice by the Khmers in the last half of the eleventh century. The habit continues today throughout South-East Asia and offering a betel-nut tray is a mark of hospitality that is shared among friends and neighbours in the rural villages.

Betel-nut chewing is a misnomer because betel is a leaf rather than a nut. And it is not chewed alone but in combination with other ingredients that are assembled to form a quid.

Betel-chewing acts as a mild stimulant and produces a feeling of contentment. While it strengthens the gums, the lime content can be harmful to the teeth and cause tooth decay.

The components of a betel quid are the fruit of the areca palm, a betel-leaf, and lime powder; anise and clove are optional. The areca or betel-tree is slender, tall and graceful. It produces a greyish-brown fruit, which is a cluster of berries that are round or oval with a fibrous husk. The interior white pulp has an orange-coloured centre. The areca fruit is a mixture of alkaloids, fat, and sugar. The pulp is extracted from the fruit. Afterwards it is sliced, boiled, and dried. The areca pulp is a red colour and tints the saliva when chewed. The betel-leaf is produced by a pepper plant known as the piper betel. A choice betel-leaf is dark-green in colour and fleshy. The betel-leaf contains phenols, which give an aromatic scent and a sharp taste. The lime powder is ground from burnt shells and adds alkali. It is combined with a small amount of water to form a paste.

To prepare a betel-quid a thin layer of lime paste is spread on to the centre of the betel-leaf with the forefinger; next a slice of areca is placed on top of the lime paste; then small quantities of betel flavourings such as anise, clove, or dried jasmine are added; finally the betel-leaf is folded in towards the centre and fastened with a clove. The packet is placed in the mouth and chewed slowly.

The betel contents are stored in a box with compartments for a fruit slicer and a mortar and spatula for the preparation of lime. The betel-leaves are usually placed in a triangular silver holder. Undoubtedly betel boxes for the king and his court were made of metal such as gold, silver, or bronze. Boxes used by the common people were probably made of wood or lacquer just as they are today. The contents of the box are shared except for the lime paste, which is stored in a separate and individual container, perhaps because of its association with aphrodisiac powers, or because of the small amount used in the preparation of a quid.

Individual lime pots are the only type of betel equipment that has been found among the Khmer ceramics. Other forms, such as the tray, leaf-holder, slicer, and

small containers, which are known in other parts of South-East Asia, are absent from the Khmer finds.

Betel-chewing is a habit that was enjoyed by men and women and incorporated into the daily lives of the Khmers at all social levels. Royal betel-nut bearers at Angkor are referred to in the Chinese annals indicating that the practice was an integral part of court life and enjoyed by royalty. Betel trays were used at the coronation ceremony of a king. Additionally betel-chewing was associated with many important rituals and ceremonies that were observed by the common people.

Throughout history betel has been associated with the daily customs and rituals of villagers. In modern Thailand male betel-leaves are placed on the Buddha shelf in a village house. Betel is used in rituals that are performed before planting rice and after harvest to ensure a plentiful crop. It is offered to Buddhist monks as a gesture of making merit. It is commonly chewed after meals. According to ancient mythology, the character of a person can be identified by the way he folds a betel-quid. Eating areca nut and betel-leaf at the end of a lawsuit symbolizes settlement. Betel-leaves are used in betrothel and marriage ceremonies and represent marital fidelity and fraternal love. To determine the sex of a child before birth, the midwife tosses small pieces of the areca fruit onto the floor. She spits liquid from the betel-quid on to the stomach of the new-born baby to protect it from illness. The midwife receives betel ingredients as partial payment for her expected assistance with delivery during the birth of a child. After giving birth, the mother is rubbed with a red moisturizing paste made from betel. Because of its association with courage, a betel-quid is given to boys before circumcision.

Betel is an essential element in rituals that are associated with spirits of nature, especially those conducted by mediums. It is offered to summon protective spirits of relatives and deities before a seance and to appease the spirits of the sea and wind.

1. Briggs, op. cit., p. 22.
2. Coedès, *Indianized States of Southeast Asia,* op. cit., p. 75.
3. Briggs, op. cit., p. 29.
4. Coedès, *Indianized States of Southeast Asia,* op. cit., p. 60.
5. Ibid., p. 51.
6. Groslier, op. cit., p. 37, fn. 8.
7. Coedès, *Indianized States of Southeast Asia,* op. cit., p. 77.
8. Briggs, op. cit., p. 204.
9. Chou Ta-kuan, op. cit., pp. 31-2.
10. Ibid., p. 38.
11. *Chinese Celadons and Other Related Wares in Southeast Asia,* Singapore, Southeast Asian Ceramic Society, 1979, pp. 76-7.

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