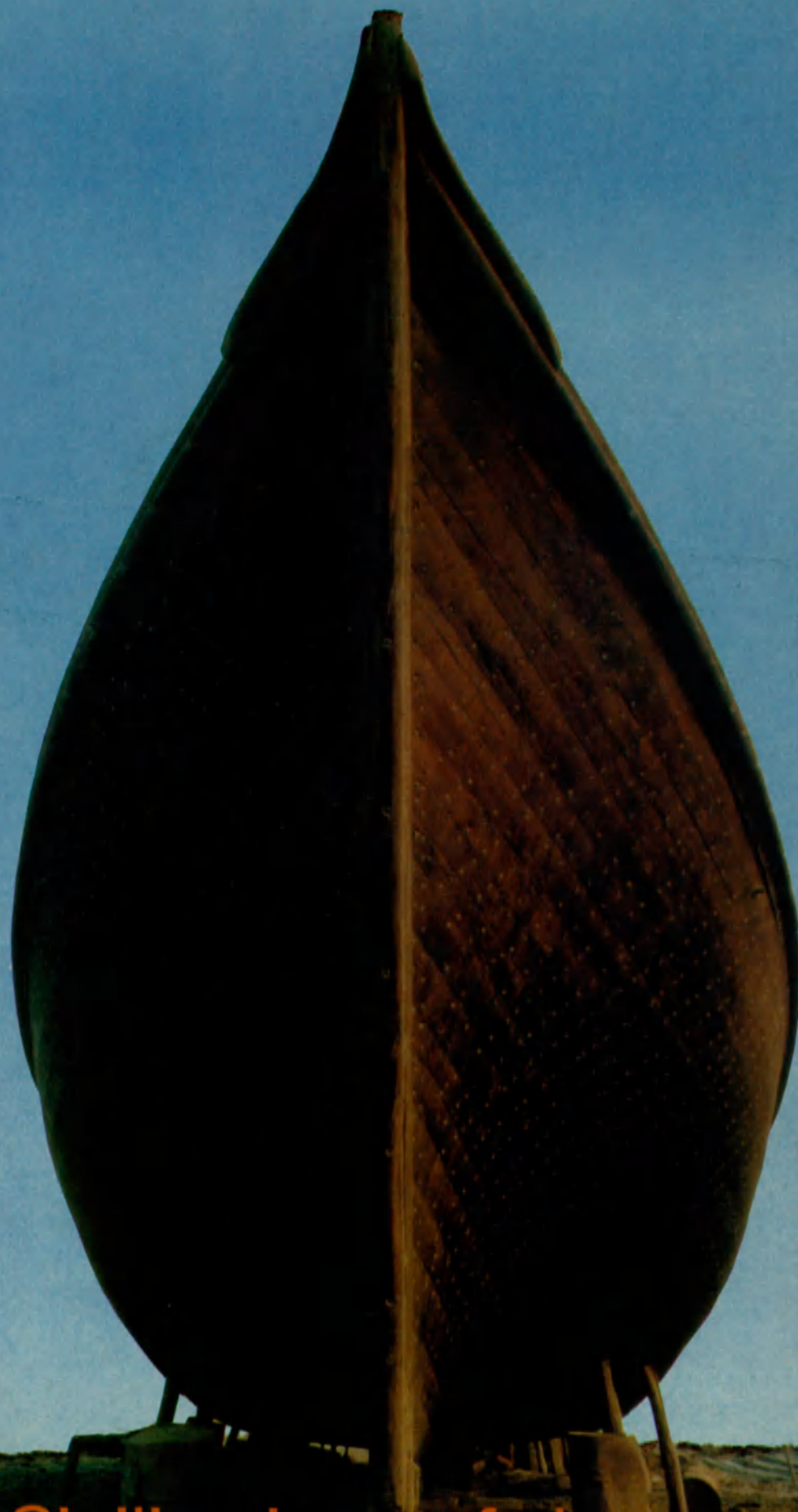


The
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Courier



Civilizations of the sea

A time to live...

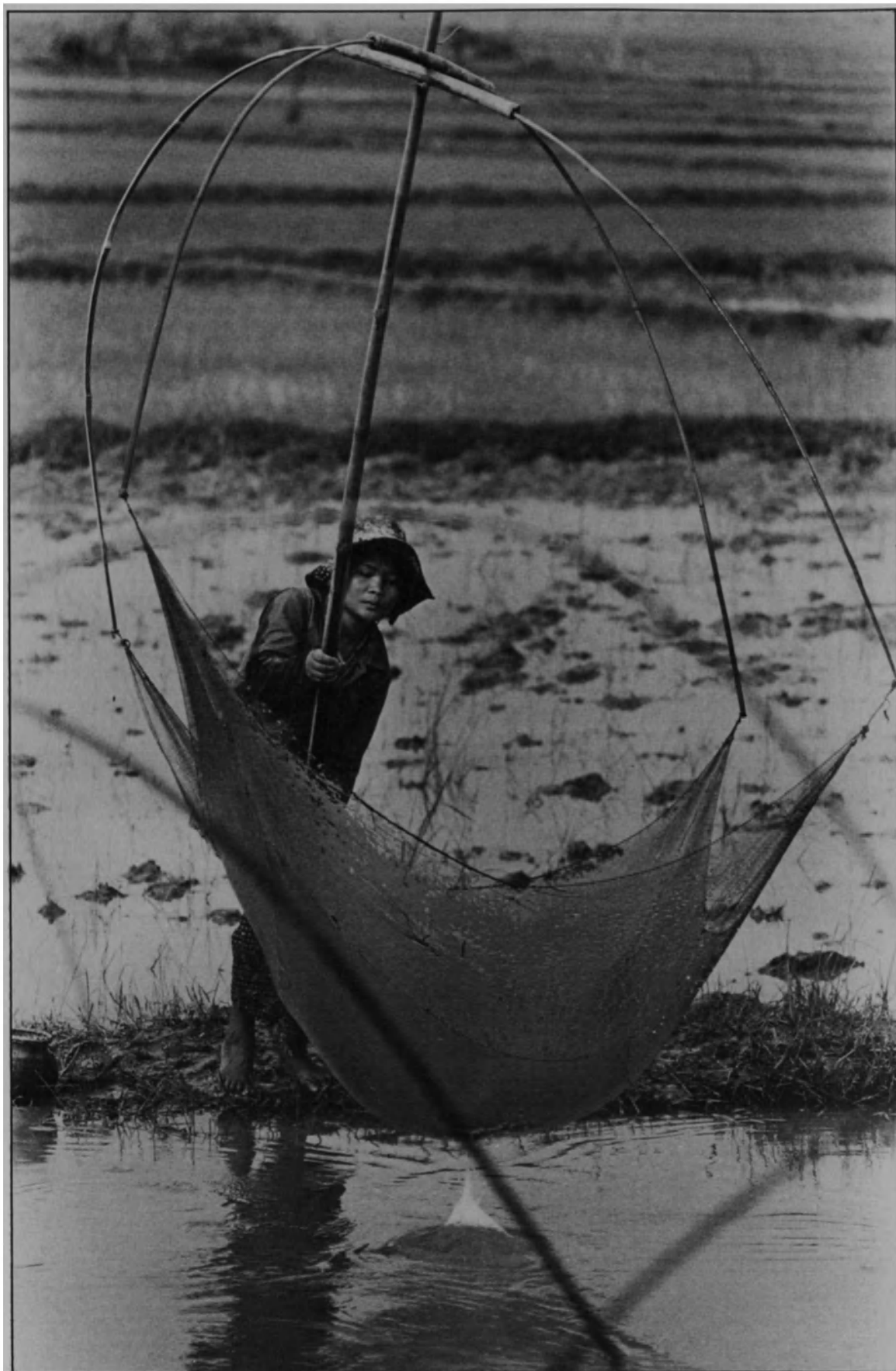


Photo © Heldur J. Netroeny, Stockholm

20 LAO PEOPLE'S DEMOCRATIC REPUBLIC

River harvest

Wet-rice farming in the lowlands, where more than half the population is concentrated, and shifting dry-rice cultivation in the hills, are the main sources of food for the Lao people. Almost every household also raises livestock and poultry and hunting and fishing provide a supplement to the family diet. Above, a Lao fisher-girl in the Ventiane region.

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Editorial

JUST as the latest scientific discoveries tend to confirm that all life originally came from the sea, so some of the more startling developments in modern technology seem to suggest that the sea's resources may be the key to the future of the Earth.

Between these two observations, between the abyss of the past and the dizzying possibilities of the future, lies the history of humanity, which is inseparable from the story of the oceans. How manifold, therefore, are the complexities that beset any attempt to encompass and quantify such a reality, how inexhaustible the prospects of study which it offers! From thousands of possible themes and angles, we have been obliged to select a mere handful to illustrate this issue on Civilizations of the Sea.

Our investigation of the marine environment focuses on the sea as the cradle of civilizations, the sea as a vector of cultural transmission and exchange, and the sea as an issue facing the world of the twenty-first century. Instead of attempting to present a panoramic picture, a task which would in any case have been impossible, we have endeavoured to heighten our readers' interest in and concern for this fundamental element of life on earth in a coverage which ranges from the invention of the humblest techniques to the flowering of the richest myths, from harsh sufferings endured in history to the routine of everyday life in the modern world, from the Eskimos to the Melanesians. We have not tried to sum up the extent of human knowledge about the oceans but to show some fruits of

the impact which they have had on our imagination.

Not surprisingly, this approach has led us to examine some of the "problem areas" of the ocean today: marine pollution, shores and islands, the international law of the sea, the sea as common heritage of mankind.

Some of Unesco's fundamental preoccupations lie in this area in which it is striving to promote scientific research and action in the modern world.

Cover: A boom, a kind of large dhow, under construction in a boatyard at al-Dawha, capital of Qatar. Characteristic features of these vessels, which are found throughout the Arabian peninsula and Iran, are a long sloping stem-post and pointed poop.

Photo © Carlos Saldi, Paris

The Phoenicians, master mariners of antiquity

by *Mhamed Fantar*

THE Phoenicians were a people of ancient times who belonged to the north-west Semitic family and whose exact origins are a matter of controversy.

Phoenicia covered an area corresponding to modern Lebanon plus certain parts of present-day Syria and Israel. The Phoenicians seem to have settled there about 3000 BC.

Archaeologists have linked the Phoenician world to the civilization of Canaan (the name given in the Bible to Palestine before the arrival of the Hebrews). This ethnic substratum seems to have been enriched and transformed by both ethnic and cultural contributions due to invasions in about 1200 BC by the so-called "people of the sea".

The persistence amongst the Phoenicians of the feeling that they belonged to the land of Canaan has been cited in support of this hypothesis. Indeed it is hard to see to what other cultural stream the Canaan of the Torah can be attributed. Moreover, the "Punics" of the fifth century AD, to which Saint Augustine of Hippo refers, also claimed to be Canaanites.

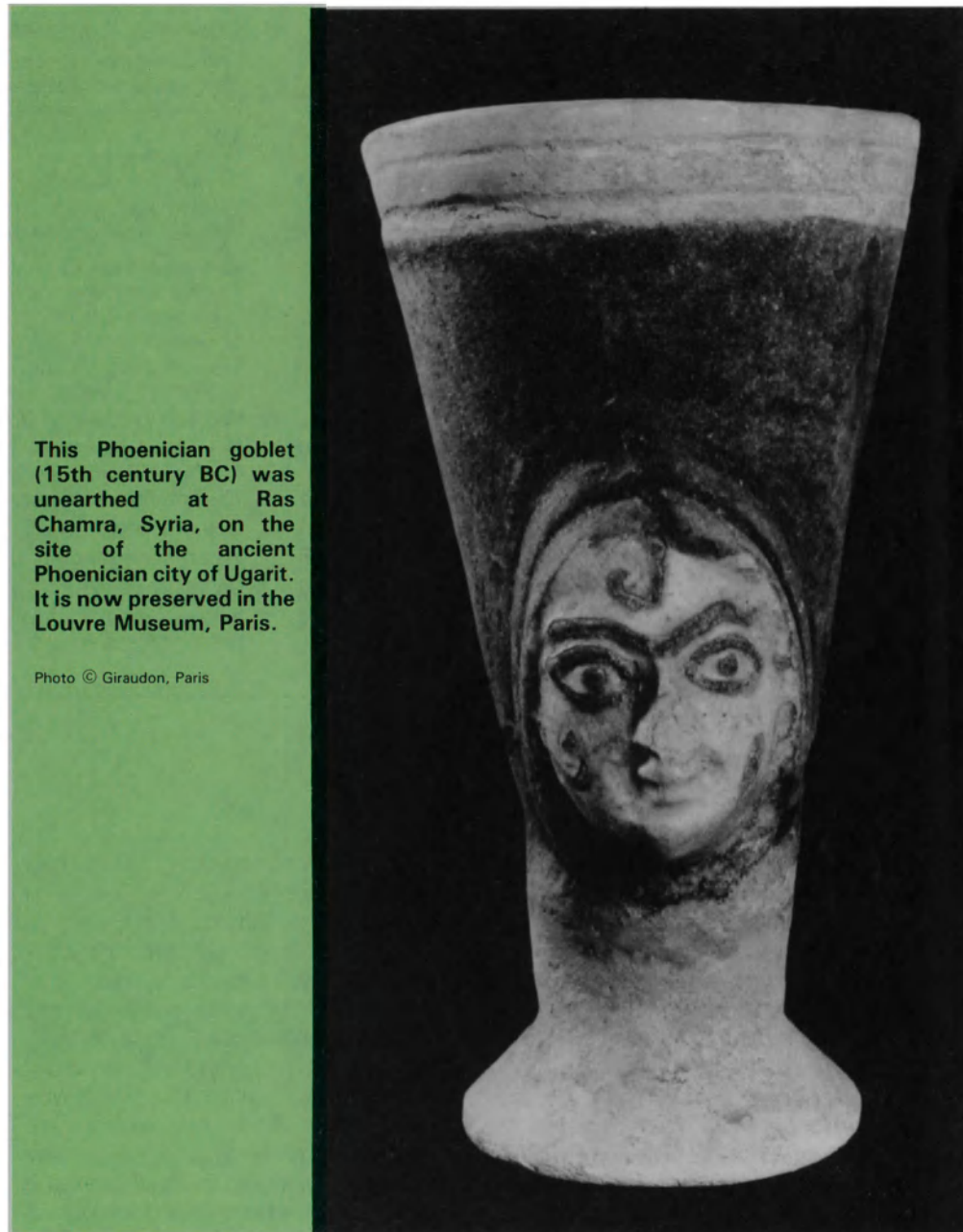
There is also the linguistic argument according to which the Greek word *phoinikes*, from which "Phoenician" is derived, is merely a translation of "Canaan", both names recalling the purple dye which was a typical product of Phoenicia.

At all events, a new dominant factor emerged with the Phoenicians—the sea—to which they deliberately turned. Whether it was the Mediterranean, the Red Sea or elsewhere, it was the sea that determined the destiny of the Phoenicians.

They lived on the coast between the Gulf of Issus to the north and Mount Carmel to the south. Sidon, Tyre, Byblos and Arwad were amongst their prestigious City-States, each with its own institutions, religion, ways and customs.

Phoenician maritime supremacy appears to have begun at the same time as the Iron Age (about 1200 BC). This hypothesis seems to be supported by Graeco-Latin writings, Scripture, and

MHAMED FANTAR, of Tunisia, is director of the Tunisian National Institute of Archaeology and Art and professor of archaeology at the University of Tunis. A specialist in Phoenician archaeology and epigraphy, he has published numerous books and studies on Carthage and the Phoenicians including *Carthage, la Prestigieuse Cité d'Elissa*.



This Phoenician goblet (15th century BC) was unearthed at Ras Chamra, Syria, on the site of the ancient Phoenician city of Ugarit. It is now preserved in the Louvre Museum, Paris.

Photo © Giraudon, Paris

archaeological data. If ancient historiography is to be believed, Utica, Lixus in North Africa and Gadès in Spain originated between the end of the second millennium and the tenth century BC, in other words, at a time when ancient Greece was coming into existence, and Phoenician sailors brought to the Greeks of the islands much of what they may have needed in the way of material culture and new ideas.

It would be very useful to have an in-

ventory of all the documentary evidence regarding these contacts which the Phoenicians maintained with the Greeks from an early stage of their maritime supremacy, but unfortunately, because of the "phoenicophobia" which prevailed during the nineteenth and first half of the present century, this evidence has been played down. Nevertheless there is nothing to prevent our having recourse to these documents and objectively putting them to good use in the interests of historical accuracy.

Carved on a sarcophagus, this depiction of a Phoenician merchant ship dates from early in the Christian era. It is now in the National Museum, Beirut.

Photo Jean Mazel © Robert Laffont archives, Paris



Numerous classical documents, dating from various periods, testify to the maritime greatness of the Phoenicians. Apart from the allusions to them in Homer's *Odyssey*, there is the account by Herodotus of the voyage which the Phoenician fleet made on the instructions of the Pharaoh Nechao II of Egypt (who died in 594 BC). It sailed along the east coast of Africa, rounded the Cape of Good Hope and passed northwards through the Atlantic Ocean to reach the Mediterranean and return to Egypt. This outstanding exploit is considered to be one of the best proofs of Phoenician mastery of the seas.

Their ships braved Scylla and Charybdis in the Straits of Messina, and ploughed their way through the open sea to reach the southern coast of the Iberian peninsula, where contemporary historians place the kingdom of Tarshish or Tartessos (in present-day Andalusia). Here is the lament that Ezekiel addressed to Tyre:

O thou that art situate at the entry of the sea, which art a merchant of the people for many isles... O Tyrus, thou hast said, I am of perfect beauty.

Thy borders are in the midst of the seas, thy builders have perfected thy beauty.

They have made all thy ship boards of fir

of Senir; they have taken cedars from Lebanon to make masts for thee.

Of the oaks of Bashan have they made thine oars... thy benches of ivory, brought out of the isles of Chittim.

Fine linen with brodered work from Egypt was that which thou spreadest forth to be thy sail; blue and purple from the isles of Elishah was that which covered thee.

The inhabitants of Zidon and Arvad were thy mariners; thy wise men, O Tyrus, that were in thee, were thy pilots.

... all the ships of the sea with their mariners were in thee to occupy thy merchandise.

... and thou wast replenished and made very glorious in the midst of the seas.

(Ezekiel chapter 27)

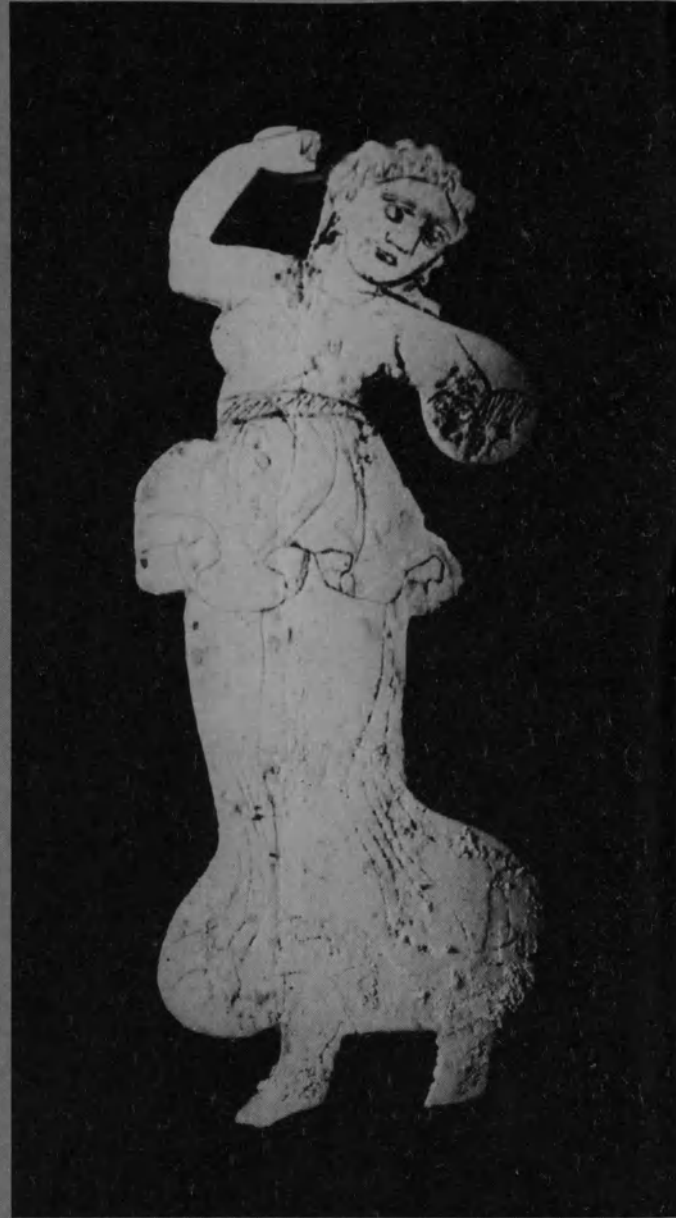
Nothing could express more eloquently than these beautiful verses the maritime power of the Phoenicians at the time when Tyre, a sovereign State, was founding colonies on the faraway coasts of unknown lands.

In addition to documentary evidence, there are archaeological facts. The dagger of Byblos has often been mentioned and reproduced in illustrations. The engravings which it bears tell of a memorable event—the return from the land of Ophir (no doubt a market in

Southern Arabia where payments were made in gold), a region rich in precious metals and exotic products, to which Phoenician vessels travelled. The king of Byblos himself went down to the harbour to welcome back the fearless travellers.

A silver patera (a typically Phoenician product) found at Prenesta (now Palestrina) in Italy bears a series of images, also engraved, depicting a princely hunt in which the imaginary appears to surpass historical fact. The prince is being attacked by a gorilla or chimpanzee. Possibly this recalls the journeys which took the Phoenicians to the heart of equatorial Africa.

To meet their commercial needs and ensure good conditions for their trading activities, these adventurers established warehouses and, later, colonies, as far away as the shores of the Atlantic, with the very clear intention of occupying the territory, appropriating it and settling on it—in short, of acquiring new homelands, without however expelling the aboriginal inhabitants. Amongst the best known of these settlements were Carthage (near present-day Tunis), Hadrumetum (near Sousse), Leptis Minor (present-day Lamtah) in Tunisia, Lixus (near Larache) in Morocco, Gadès (present-day Cadiz) in Spain, Nora in Sardinia, Panorme (Palermo) and Motya in Sicily. This expansion and these



Photos © Luc Joubert, Paris

These three specimens of Punic art illustrate some of the extraneous influences on Phoenician culture. Above left, head of a terra-cotta figurine which, like others unearthed in the same 6th-century-BC tomb at Carthage, was probably a talisman. The discovery of these statuettes at Carthage brought further proof of the close and enduring relations between Cyprus, where they seem to have originated, and the Phoenician world. Small perfume bottle (height 9 cm), left, like other objects discovered in Punic cemeteries, seems to indicate by virtue of its style that although the Carthaginians adopted neither the religion nor the customs of the Nile valley, they knew of and set store by Egyptian magic and funerary practices. It is now in the Bardo National Museum, Tunis. Above, 3-cm-high ivory figurine reveals Italiote influence on Punic art (Carthage Museum).

► seafaring exploits would not have been possible without elaborate technical support, whether in the form of the advances achieved in shipbuilding, especially in the use of the keel, ribs and nails, or of the ability to navigate by reading the stars.

Phoenician expansion also seems to have been favoured by the situation prevailing in the Mediterranean, in so far

as no capable adversary or rival power existed there. The Greek presence did not yet count on the eve of this expansion. It was not until the end of the ninth century and the first half of the eighth century BC that Greece joined in the great Mediterranean adventure and Greek colonies were established in the Western Mediterranean. The city of Carthage appears to

have been founded partly to control and contain this increasingly troublesome Greek presence.

Carthage was founded by the Phoenicians about 825-819 BC to serve both as a military base and a great trading centre. It gradually asserted itself as the capital of the Phoenician cities in the western Mediterranean, with responsibility for

their defence and the protection of their interests. From that time onwards, the Phoenicians were no longer spoken of in this part of the ancient world. Thanks to the presence of Carthage, to the spread of its influence in every domain, to its open approach to the native populations and to the ethnic and cultural contacts which this implied, there emerged what are often vaguely referred to as the Punic—a new, predominantly indigenous, ethnic group and a new, predominantly Phoenician culture.

The apparent Punic unity often concealed specific peculiarities. However, like the Phoenicians, the Punic of Africa continued to be mainly turned towards the sea, although this did not mean that they gave up the benefits of the land and the products of the large farms of the African hinterland. The name of Carthage is for ever linked with the seafaring exploits of Himilco (who sailed as far as the British Isles) and Hanno (who reached the West African coast), as well as with Mago's treatise on agronomy.

The establishment of the link between the two Mediterranean basins must be credited to Carthage and the Phoenicians. In this way the western Mediterranean was integrated into the political, economic and cultural universe of the

historical East. Neolithic Africa learnt to write by adopting the Phoenician language and alphabet (from which the Aramaic and Greek alphabets were derived) without omitting to create its own system of writing (what we call Libyan).

Another result of this Phoenician and Carthaginian expansion was the profound change which took place in the political geography of the western Mediterranean. Benefiting from the experiences of the Phoenicians, the Greeks themselves also founded colonies—in southern Italy, Sicily, Gaul and even in Spain. This competition became a danger for the Phoenicians, who until then had been undisputed masters of these distant regions. From then on, they had to take account of the Greek presence.

But they also had other indigenous rivals. These were the Africans whose kingdoms seem to have been largely the product of their contact with the Phoenicians and with the culture which the latter brought in the form of goods and dialogue. It was the Phoenicians who introduced the concept of State, Kingdom or City-State to North Africa. The western Mediterranean was then to become the scene of many conflicts. One has only to recall the wars between

Carthage and the Greeks in Sicily and Corsica, or those between Rome and Carthage, which are referred to by Roman historians as "the Punic Wars".

But what is really important is the contribution of the Phoenicians and Carthage in the economic and socio-cultural domains.

Amongst the many gifts made by this civilization to the Western Mediterranean and especially to Africa, special mention must be made of the creation of urban centres and town-planning. Most of the so-called Punic or Roman towns generally bear names of Libyan origin. This supports the hypothesis of a Libyan foundation subsequently enriched by Phoenician and Carthaginian contributions thanks to which many localities, such as Kerkouane at Cape Bon in Tunisia, were able to grow until they attained the city stage.

The Phoenicians and Carthage sowed in the western Mediterranean the seed of the semitic East, whose saplings prospered especially well in the lands of the Maghreb. Mediterranean civilization can justly claim that "what I am I truly owe to many hands, but also to Carthage and the Phoenicians".

■ Mhamed Fantar

Tunisian farmers at Dougga tend their livestock in a setting dominated by Roman ruins. Dougga, known in antiquity as Thugga, was founded by the Phoenicians and became an important city during Roman times.



How Arab sailors read the stars

by Régis Morelon

AS early as the beginning of the eighth century, in the wake of the great Islamic conquests, the Arabs had direct access to many seas—the Red Sea, the Mediterranean, the Gulf, the Indian Ocean, the Atlantic. From end to end of this vast expanse, trade and commerce were partly conducted by sea, first of all in coastal waters and later on the high seas.

At that time orientation was a major problem. When we speak nowadays of orientation at sea, we immediately think of the compass, and we know that the magnetic needle was, indeed, used for navigation in the Gulf as early as the eleventh century, but only when the stars were not visible. All orientation at sea depended on observation of the heavens.

Nautical instruction manuals in those days were largely devoted to problems of astronomical observations—measuring the height of the heavenly bodies above the horizon and using the great catalogues of the stars. The most famous of these was the catalogue drawn up in the tenth century by the Islamic astronomer Al-Sufi in a manner that was both scientific and practical, since it gave the coordinates of every star and contained two drawings of each constellation—one as it appeared in the sky, and the other drawn symmetrically, as it would be seen on a copper globe reproducing the vault of heaven. With this catalogue and the copper globe which was meant to accompany it, the constellation by reference to which one wished to take one's bearings could easily be located in the sky.

At the turn of the fifteenth and sixteenth centuries, two great Arab navigators of the Indian Ocean, Ahmed Ibn Majid and Suleiman Mahri, revived this traditional method, and it is to them that we owe our knowledge of those features of Arabian nautical astronomy which are described below.

With the aid of a simple diagram (see diagram I), let us take a quick look at some elementary facts concerning the apparent movement of the stars on the heavenly sphere and to which reference will be made hereafter.

Let us consider the semi-vault of heaven as it appears to an observer loca-

ted at T, picked out with the aid of the four cardinal points NSEW, the local meridian being the circle NPZS. The north heavenly pole is at P and its height above the horizon—the arc NP—gives the latitude of the observation point. The heavenly equator is represented by the circle EGW. A star situated north of the

by establishing that the particular stars F, G, H, for example, on the diagram mentioned above were at the same height on the horizon, which corresponded to a definite latitude.

In addition to latitude, observation of the sky enabled them to determine the direction in which they were sailing,

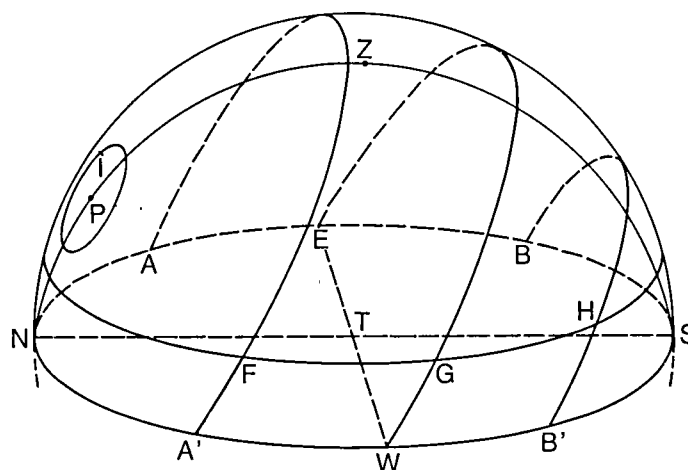


Diagram 1. Apparent movement of the stars on the heavenly sphere (see article).

Diagram © Régis Morelon

equator rises at A, its apparent trajectory on the heavenly sphere is the circle AFA', parallel to the equator, and it sets at A', symmetrical with A in relation to the meridian. Likewise, a star situated south of the equator will rise, for instance at B, its apparent trajectory will be the circle BHB', B' being symmetrical with B in relation to the meridian. A star situated at I, at a lower distance from the pole than the latitude of the spot, will always remain above the horizon in its daily movement. If its distance from the pole is known and its height as it passes below or above the meridian is noted, this will immediately give the height of the pole above the horizon.

A point on the earth is determined by its latitude and longitude. The longitude is given in relation to a meridian of origin, and involves the difference between a local time and an origin-time. However, movable chronometers which permit "time to be kept" precisely have existed for little more than a century. Consequently, it was impossible for Arab seamen to take a bearing in longitude. On the other hand, they calculated their latitude by observing the stars, or by measuring directly the height of the pole, or

which was ascertained by what we now call the compass-card.

The compass-card as it is represented on present-day compasses and navigational charts is a 32-point star which, when related to the horizon, shows the direction in which a vessel is heading. This choice of 32 compass-points on the horizon existed long before the compass and it is very likely that this division, established through observation of the rise and setting of certain stars, originated with the Arab seamen. Diagram 2 shows this card as it is described in the nautical instruction manuals of the Arabs, with the corresponding directions related to the four cardinal points.

We can see at once the symmetry in relation to the North-South line. On the East side, each of the 15 divisions is entitled "rise of such and such a star" and on the west side "setting of such and such a star". Thus we find repeated the symmetry of the points A and A' or B and B' in diagram 1. The names of the stars are inscribed in the centre of the drawing. Some of them still pose problems of identification, but during the history of navigation these names have become

REGIS MORELON, of France, is a member of the Dominican Institute of Oriental Studies, Cairo. He is a specialist in the history of Arab astronomy and his new study on Arab texts on astronomy is to be published shortly.

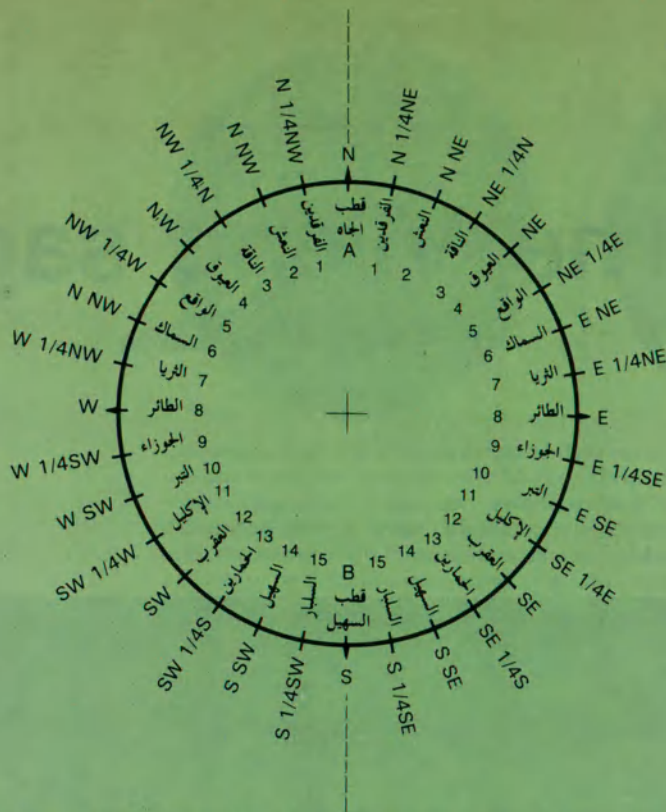
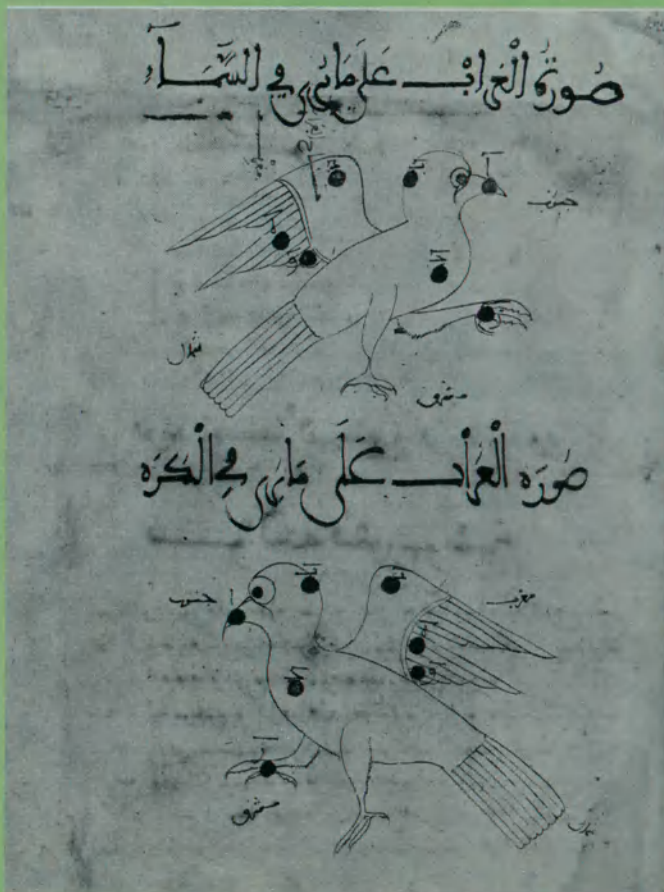


Diagram 2. Compass-card as described in Arab nautical instruction manuals.

Diagram © Régis Morelon

- | | |
|--------------|--------------------------|
| A North pole | 9 Orion |
| 1 Ursa minor | 10 Sirius |
| 2 Ursa major | 11 Scorpius |
| 3 Cassiopeia | 12 Antares |
| 4 Capella | 13 Argo navis |
| 5 Vega | 14 Canopus |
| 6 Arcturus | 15 Crux (Southern cross) |
| 7 Pleiades | B South pole |
| 8 Altair | |



Two symmetric drawings of the Corvus (Raven) constellation, drawn by the great Islamic astronomer Al-Sufi (903-986 AD).

purely conventional, just as what are called "the signs of the zodiac" have long since ceased to coincide with the constellations in which this description originated. Consequently, nautical instruction manuals show this "compass-card" with the old descriptions and indicate according to latitude which stars, by reference to their rising or setting, really determine on the horizon the different directions to be taken.

With the aid of the co-ordinates of those stars on the "compass-card" which it has been possible to identify, it can be calculated that this division was originally made by seamen navigating on the Indian Ocean at about 10° north latitude and simply noting the position on the horizon when the most typical stars rose and set.

We now have, then, sufficient information to read the instruction given for a particular maritime route.

At the end of the fifteenth century, Suleiman Mahri gave the following description of the route between Diu (Pakistan) and southern Ceylon (Sri Lanka):

"From Diu head for the 'rising of Suhayl' (SSE) until the north pole is 5 fingers (1) above the horizon, then turn landwards until thou art within 5 or 6 zam (2) of the land, then turn back in the direction of the 'rising of Suhayl' until the north pole is at a height of 3 fingers, then gradually head south because as thou drawest near to Ceylon the sea becomes rough whereas out to sea it is less rough. Thou shouldst turn towards the right very slowly. As soon as the 'two calves' (Beta and Gamma of the Little Bear horizontal to the East) are at a height of 7.75 fingers, head for the rising of 'agrab' (SE) until thou seest the 'two calves' at a height of 7.25 fingers. Then head eastwards for 18 zam until thou recognizest that thou art south of Ceylon—thou shalt know by the lightning flashes above the island, with or without rain..."

These few lines from Mahri comprise practically all the means of navigating at sea known in his time—height of the stars, compass-card, distance covered and indications furnished by the appearance of a coast.

It was with the aid of these that Arab seamen became the experts on navigation in the Indian Ocean and so in 1498, after rounding Africa, Vasco da Gama took Ibn Majid as his pilot from Malindi, on the east coast of Africa, as far as Calicut, in India. But after this initial voyage Portuguese ships arrived in strength in the Indian Ocean and snatched maritime supremacy from the Arab seamen throughout the region.

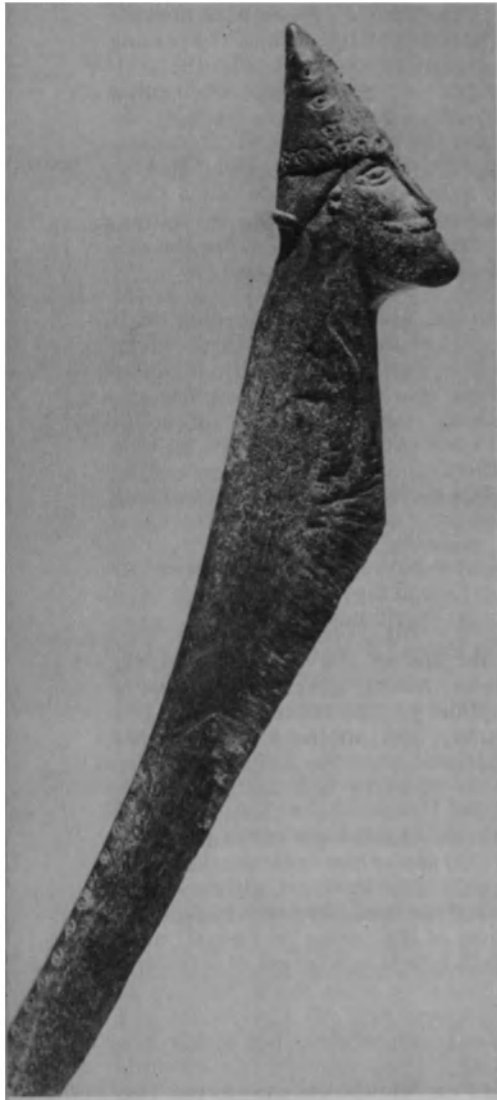
■ Régis Morelon

(1) The "finger" is a unit of angle read on instruments used by sailors to measure the height of a heavenly body above the horizon.

(2) The zam mentioned here is a unit of distance depending on the average speed of a sailing vessel of the period: about 12.6 sea-miles covered in three hours.

The Viking saga

by Magnus Magnusson

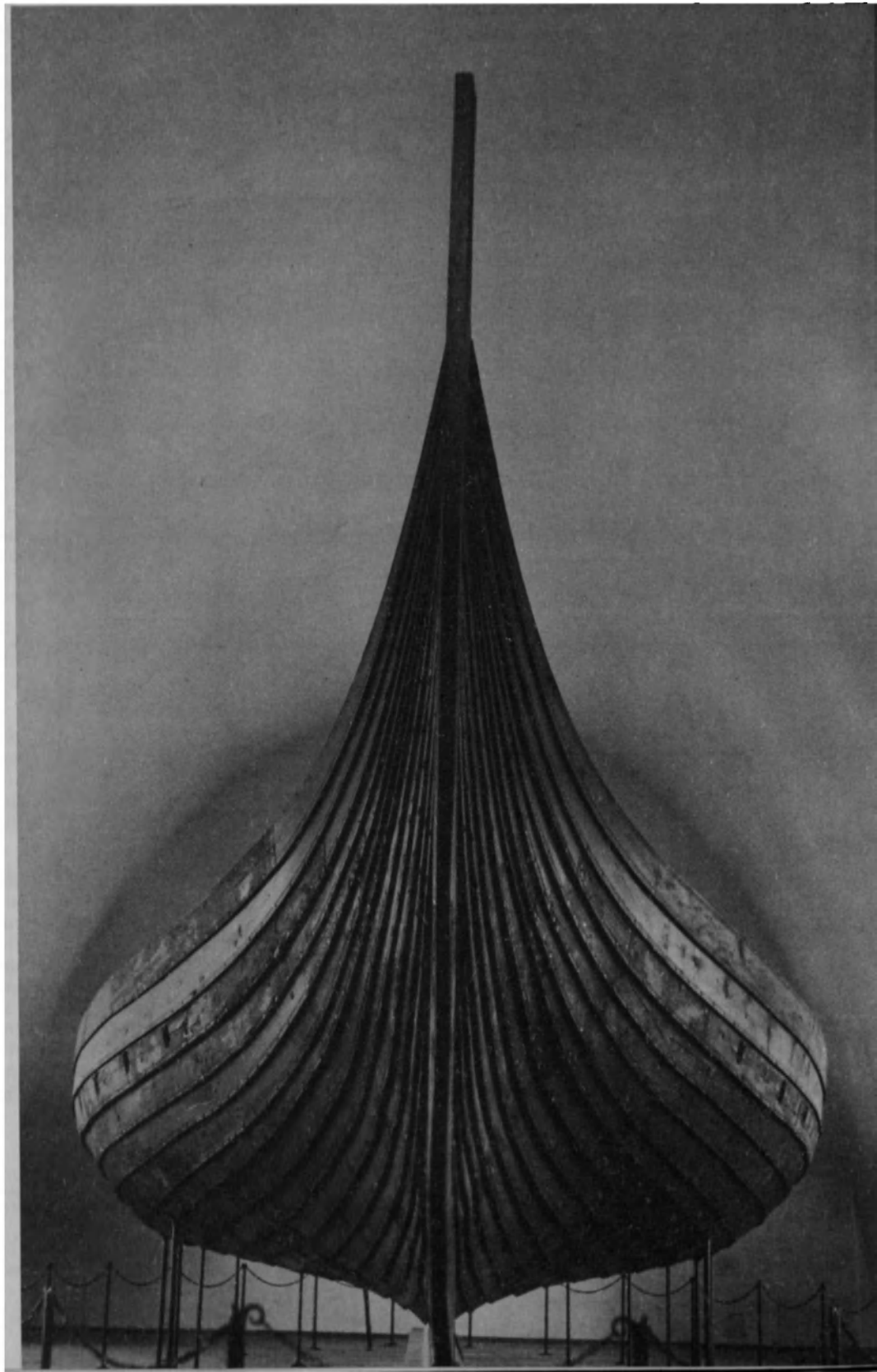


Carved out of elkbone, this helmeted head of a warrior (c. 10th century) was found at Sigtuna, Sweden.

Photo Soren Hallgren © ATA, Stockholm

Viking expansion was made possible by the development in 8th-century Scandinavia of strong, swift sailing ships whose construction and shallow draught enabled them to land on sloping beaches and manoeuvre in waters unsuitable to most European vessels of that time. Well-preserved Viking longship, right, was found in a burial mound at Gokstad on Oslo Fjord in 1880 and is now in the Viking Ship Museum, Oslo. It is 23 metres long and 5.25 metres wide amidships, but even when fully laden would only have drawn 1 metre of water. Its keel consists of a single timber 17 metres long. A replica of the Gokstad Ship crossed the Atlantic in 1893.

Photo Toni Schneiders © Rapho, Paris





Photos © L. A. East
The British Museum, London

Coins struck by the Vikings attest to their receptiveness to the cultures with which they came into contact. Above, 10th-century silver pennies from the Viking kingdom of York. Left, coin inscribed "Anlaf Cununc" (King Olaf) is decorated with a raven, traditionally associated with Odin. Right, penny with the name of St. Peter shows a sword and also Thor's hammer, a symbol as potent to a Viking as a cross to a Christian.

THE term "Viking" has come to mean anyone who happened to be a Scandinavian in the Middle Ages, whether he was a seaman, a farmer, a merchant, a poet, an explorer, a warrior, a craftsman, a settler—or a pirate. And the term "Viking Age" has been applied by historians—somewhat indiscriminately, it must be said—to cover three centuries of dynamic Scandinavian expansion that took place from around 800 AD onwards.

It has become popularly associated with an age of terror and unbridled piracy, when Norse freebooters came swarming out of their northern homelands in their lean and predatory longships, to burn and rape and pillage their way across civilized Europe. They have always been portrayed as merciless barbarians, heedless of their own lives or of the lives of others, intent only on destruction. They were anti-Christ personified; their emblems were Thor's terrible Hammer and Odin's sinister Ravens, symbolizing the violence and black-hearted evil of their pagan gods.

This deep-rooted popular prejudice about the Vikings can be traced back directly to the lurid sensationalism of ecclesiastical

MAGNUS MAGNUSSON, Icelandic-born author and journalist, is well-known in the UK as a TV and radio broadcaster specializing in archaeology and history. He wrote and presented in 1980 a major TV series on the Vikings which has been shown in many countries and has appeared in book form as *Vikings!* (BBC Publications with Bodley Head). Among his many other published works are the award-winning *Introducing Archaeology* (1972), *Viking Expansion Westwards* (1973), and *Iceland* (1979).

writers who were the occasional victims of smash-and-grab Viking raids. In a turbulent age, when piracy and casual raiding were a commonplace of everyday life all over Europe the Vikings happened to be more successful at it than most other people; and they paid the price for it by getting an extremely bad reputation.

But, curiously enough, no one knows for certain what the word "Viking" actually means! It may be related to the Old Norse word *vík*, meaning "bay" or "creek", suggesting that a Viking was someone who lurked with his ship in a hidden bay. Some think it may come from the Old Norse verb *víkja*, meaning "to turn aside", so that a Viking was someone who made detours on his voyage—presumably to go raiding. A third school of scholarly opinion looks for a derivation in the Anglo-Saxon word *wic*, itself borrowed from the Latin *vicus*, meaning a fortified camp or trading-post, so that "Viking" might mean a raider or a trader, or both!

But not every Scandinavian was a professional warrior or Viking; and not every Viking was a pirate. Modern scholarship is now beginning to highlight the constructive, rather than the destructive, impact of the Viking Age. Spectacular archaeological excavations like Coppergate in York, which unearthed a whole street from the Viking Age, are revealing the ordinary Viking man-in-the-street as a diligent and skilled artisan—the Viking as man, not the Viking as myth.

If the origin of the word "Viking" is obscure, so too are the motive causes of the so-called Viking Age itself. There is no ►



To relieve the tedium of the long northern winters, the Vikings played various board games, including dice games and a game similar to chess. Pieces were made of bone, amber or glass. Left, 10th-century wooden Viking gaming board from Ireland.

Photo © National Museum of Ireland, Dublin

► single, simple reason why the Scandinavians should suddenly have burst upon the European scene late in the eighth century (in the history books, at least—it probably wasn't as sudden as it has been made to appear). All major historical shifts have complex roots. We know that in the seventh century, the Scandinavians began developing new sources of iron, which had several consequences: improved iron production made for better weapons, and better farm implements; better farm implements led to agricultural improvements, which led in turn to better nutrition and a correspondingly lower mortality rate amongst infants. There is evidence about this time that land that had formerly been thought unsuitable for farming was being vigorously cleared of forest and scrub to make new farms for new generations of vigorous, well-nourished younger sons who wanted a place in the sun for themselves.

So an acute shortage of land was probably a major factor, which led to considerable settlement overseas; there is evidence of peaceful co-habitation between the Picts of northern Scotland and Norwegian emigrant farmers long before the outbreak of the Viking Age.

But there were other consequences, too. With its surplus iron production, Scandinavia had a new and much-prized product to sell to its neighbours; and the traders had sharp, well-tempered weapons with which to defend themselves from pirates that swarmed in the Baltic and along the shores of northern continental Europe. But in order to trade effectively, the Scandinavians needed good ships. They came in all shapes and sizes, from small six-oared boats for coastal waters to the enormous "dragon-ships" of royalty. In between came a versatile variety of cutters, ferries, pinnaces, plump-bellied cargo-boats, ocean-going ships and galleys.

But the pride of the fleet, the ship that has become the universal symbol of the Viking Age, was the lordly longship, undisputed master of the northern seas. These ships were the outcome of centuries of technological innovation and evolution which have been charted by chance archaeological discoveries, from flat-bottomed punts to the splendour and sophistication of the single-masted, square-sailed longships. Without the ships, the Viking Age would never have happened at all.

The Viking Age was not a concerted effort at empire-building. The Vikings were never a single, homogeneous people imbued with the same aims and ambitions. The three countries of the Scandinavian peninsula, as they are now defined by political geography, were not really nations at all in the modern sense of the term. Norway, for instance, was a scatter of inhabited areas under independent tribal chieftains along the western seaboard; even the name Norway (*Norvegur*) simply meant "North Way"—not so much a nation as a trade-route. And the three countries had distinct if sometimes overlapping "spheres of influence"—the Swedes in the Baltic and Russia, the Danes on the Continent and in England, and the Norwegians in Scotland and Ireland and the North Atlantic islands.

The first recorded Viking raid took place in the year 793, with a seaborne assault by prowling Norwegian marauders on the Holy Island of Lindisfarne, just off the north-eastern shoulder of England. But long before that, the Swedes had been busy in the Baltic, growing rich on trade. At the outset of the Viking Age, Swedish entrepreneurs started to penetrate the hinterland of Russia (they called it "Greater Sweden") in pursuit of the rich fur trade and the exotic markets of Arabia and the Far East. Swedish pioneers made their way through Russia by way of the major rivers like the Volga and the Dnieper, dragging their ships in exhausting overland portages on the way to the Caspian Sea and the Black Sea.

By the ninth century they had reached the capital of the greatest power in the western world, the successor to Rome—the Byzantine Empire centred on Constantinople. There, Viking mercenaries formed the elite bodyguard of the Byzantine emperors, the feared and famous Varangian Guard, a kind of Scandinavian Foreign Legion. But the Swedes never conquered Russia, as such; they contented themselves with taking control of existing trading posts and creating new ones to protect the trade-routes, but within two or three generations they had become totally assimilated and Slavified.

While the Swedes looked east, the Danes looked south-west along the northern coasts of Europe and towards England. Danish warriors were soon hammering at the cities of the crumbling Carolingian empire after the death of Charlemagne in 814 AD: Hamburg, Dorestad, Rouen, Paris, Nantes, Bordeaux—all river-cities, notice. The Viking longships, with their exceptionally shallow draught, could go much further up-river than



Photo © ATA, Stockholm

In the Viking age silver jewellery such as this delicately worked pair of ear-rings found in Sweden was imported into Scandinavia from the territory of the western Slavs, south of the Baltic.

had been thought possible before, and the effect was rather like that of dropping paratroops behind the enemy lines.

To start with, the Danish Vikings acted as pirates with official or unofficial royal backing. Later on, Danish designs on Europe, and especially England, became openly territorial; the flag followed the trade, just as trade had followed the piracy. But here, too, the Danes, just like the Swedes, became assimilated whenever they settled. In the year 911, one marauding army accepted by treaty huge tracts of land in Northern France in what is now called Normandy—"Northmandy", the land of the Northmen; 150 years later, the descendants of these Norse-Frenchmen would conquer all England under William the Conqueror. Before then, but only briefly, under King Knut (Canute) in the eleventh century, there was a united Scandinavian empire of the North Sea, comprising England, Denmark and Norway; but it quickly fell apart.

Norwegian adventurers joined Danish Vikings in subjugating the whole of northern England (the Danelaw, as it was called) before settling there as farmers and traders, where they developed great mercantile cities like York. They also took over much of mainland Scotland, the Hebrides, and the Northern Isles of Shetland and the Orkneys. In Ireland they played a lusty part in the endless internecine squabbles of rival Irish clans, and founded Ireland's first trading posts: Waterford, Wexford, Wicklow, Limerick and, most especially, Dublin. They were insatiable explorers in search of new trade opportunities to exploit, new lands to settle, new horizons to cross. They discovered Spitzbergen and Jan Mayen Island; they discovered and colonized the Faroes, far out in the heaving Atlantic; they discovered and colonized Iceland, where they established Europe's first Parliamentary republic—a new nation that is still regarded as the oldest democracy in Europe, and which has left us the most enduring cultural monument of the Viking Age, the Icelandic Sagas.

From Iceland, they discovered and settled Greenland. And it was from Greenland, round about the millennial year of 1000, that the Vikings launched their last and most ambitious expeditions of all, the discovery and attempted settlement of the



Photo Georg Gerster © Rapho, Paris

Air view of the Viking cemetery at Lindholm Hoje, northern Jutland. Low boat-shaped mounds and stone settings in different forms mark the graves.

eastern seaboard of North America: "Vinland", the land of wild grapes, as it was called in the two Icelandic Sagas that record the first undisputed European discovery of the New World.

The discovery of North America, and the abortive attempts at colonization which were thwarted by the indigenous Red Indians, used to be considered mere legend; but now archaeology has unearthed authenticated evidence of a Viking settlement at L'Anse aux Meadows, in northern Newfoundland. All other

alleged Viking "finds", like the runic Kensington Stone, have long since been exposed as forgeries or hoaxes, or merely wishful thinking.

The impact of the Vikings was ultimately less lasting than might have been expected. Why was that? They had all the necessary energy, they had their own administrative systems of justice and royal authority, they had become converted to Christianity, they had their own coinage, they seemed to have everything. They had criss-crossed half the world in their open boats and vastly extended its known horizons. They had gone everywhere there was to go, and beyond. They had dared everything there was to dare. They had given Europe a new trading vigour, vigorous new art-forms, vigorous new settlers.

But they had neither the manpower nor the staying-power, neither the reserves of wealth nor the political experience, neither the cohesion at home nor the confidence abroad, to master effectively the older, richer, more stable States they tried to overrun. Instead, being rootless men of the sea, they put their roots down where they landed, and then blended into the landscape. Somehow or other, the dynamic simply petered out.

But they left in the annals of history, a heritage of heroic endeavour and courage, a legacy of robust audacity, that has won the grudging admiration even of those who would otherwise deplore their incidental depredations.

■ Magnus Magnusson



Photo Toni Schneiders © Rapho, Paris

Left, timber richly carved with interlaced fighting animals is a structural detail from the 12th-century Stave Church at Urnes in western Norway. It was incorporated into the Church from an even earlier building. A remarkable example of the art and architecture of northern Europe at the end of the Viking period, Urnes Church is today inscribed on Unesco's World Heritage List of cultural and natural properties of outstanding universal value.

Coastal and island civilizations of Africa

by Ibrahima Baba Kaké

AS the German anthropologist Leo Frobenius (1873-1936) wrote: "When the first European navigators arrived in the Gulf of Guinea and landed at Ouidah, the captains were astonished to find well laid out streets, tree-lined for several miles. Travelling from dawn till dusk, they traversed a countryside of magnificent fields and inhabited by men dressed in silks and velvet. They saw great States, well-ordered down to the smallest detail, powerful sovereigns, rich industries, and peoples civilized to their finger-tips.

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And the countries on the eastern coast, such as Mozambique, for example, were just the same."

All the studies made of the history and archaeology of the African coastal areas fully bear out this report.

Let us first take a look at the west coast of the continent. The area extending from about longitude 15 degrees west to longitude 10 degrees east, or from present-day Guinea-Bissau to the United Cameroon Republic, is known in geographical terms as the Gulf of Guinea. The prevailing climate is equatorial, very humid, and the region owes its riotous vegetation to rain borne in on the south-west trade winds and the monsoon.

Generally speaking this coast is difficult of access to shipping because of its coastal bar and is not favourable to human settle-



Photo © Werner Forman archives, London

Chinese plates of the late Ming period are embedded in this 18th-century pillar-tomb at Kunduchi, 25 kilometres north of Dar es Salaam (United Republic of Tanzania). They are one of many pieces of archaeological evidence in this region for the existence of trading connexions between the coast of east Africa and China via the silk routes.

Songs of the pirogue

by Francis M'Boulé

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THE pirogue, or dugout canoe, is a central element in the life of the Duala people who live in the coastal region of Cameroon, on the banks of the network of rivers that come together in the Suelaba estuary before spilling out into the Atlantic Ocean.

Indeed, the pirogue embodies every aspect of Duala culture. It is a utilitarian object, providing a means of transport for people and for merchandise as well as being the fishermen's tool. It is a symbolic object that engenders myths and affirms the pre-eminence of the God of Water. It is a link that binds men together since, once they have settled in an area, the pirogue on the water, far more than any reference to some more or less vaguely remembered common ancestor, is the expression of the unity of all fisherfolk.

The pirogue makes contact easier and favours the extension of family links. It is a means of settling any disputes that may arise, it plays its part in ceremonies such as the enthronement of the chief and is, of course, central to such institutions as pirogue racing. It is a means of artistic expression (the finely carved figureheads on the prow) and it confirms the cultural unity of the society through the songs of the crews (which celebrate the pirogue as ancestor, as the mother of heroes, as the mother's noble son, etc.).

Pirogue races are still held today. Nine days before the event, all the men capable of taking part gather together. The evenings are alive with song and the feats of the great piroguemen of the past are recounted.

The songs of the piroguemen cover every aspect of the life of the community—economic, political and personal. The song is improvised by the soloist and is then taken up in turn by his audience, reinforcing the unity of the group.

The history of the group is also reflected in the creation of the figureheads that decorate the prows of the racing pirogues, the most powerful figure or animal representing the kinship group.

The prow presents a challenge to rival groups who take it up by creating in their turn similar figures which, it is hoped, will stand out by their originality.

Thus, for a Duala, the pirogue is indeed an extension of himself.

Before the start of a pirogue race the rival crews sing in an attempt to intimidate their opponents. Here are two of these songs:

*Yo, Yo, Yo!
Nkondo (1) mightier
than all other "lands"!*

(1) Name of the pirogue.

ment; it has been called "The White man's grave", and it is equally deadly for the "Black man".

However, long before the Europeans arrived on the scene, very advanced civilizations flourished on these inhospitable shores. The finest example of such civilizations is that of Benin.

The archaeological digs carried out by Leo Frobenius at the beginning of this century, at Ifé, have shown that, before the sixteenth century, the Yoruba people had already established an advanced civilization. There Frobenius unearthed finely moulded terra-cotta busts of negroes. Near them were found headdresses decorated with owls and crocodiles, the images of divinities and other, richly-dressed personages, as well as stone vases with vitrified interiors, beads which bore witness to the existence of an ancient glassware industry, crystal, and large sculpted statues.

All these objects are the artistic evidence of an advanced civilization whose existence had previously been unsuspected. The bronzes found by Frobenius are masterpieces, the precursors of the famous Benin bronzes. From this ancient culture dating from the beginning of the Iron Age, and from its counterparts in the west, sprang the technical innovations that were to enable later peoples to create the States and Empires of the tropical forest zone: those of Oyo, Benin, Adansi, Denkyera, Ashanti, and others. The principal States of Guinea and the hinterland were firmly established by the time the Europeans arrived, but they were inward-looking and owed little to their

Fishermen from Cayar north of Dakar (Senegal) watch as fire consumes the hut of another fisherman, lost at sea. They have set fire to the hut in accordance with an ancient rite of the Ewe people which prescribes that since the fisherman's death has been caused by a "sea demon" which entered his hut, the hut must be burned to prevent the evil from spreading to nearby dwellings and to force the demon to return to the ocean depths from whence it was conjured by an evil spell.

Photo © Folco Quilici, Rome



proximity to the sea.

Meantime, what was the situation in the east? On the African shores washed by the tides of the Indian Ocean, the Bantu-Islamic civilization of the Swahilis (literally, people of the coast) had developed.

This was a people with close links with the civilizations of the Orient, and in particular with India. The Portuguese were astonished to find there City-States and Governments as rich and as complex as those of Europe, powerful stone-built cities and ports bustling with merchant shipping. They encountered men accustomed to

voyaging in eastern seas and whose knowledge of navigation was greater than their own.

The greater part of this east coast civilization was destroyed. Except in the north, little or nothing survived of its erstwhile prosperity. Most of the towns whose remains are to be found on the western shores of the Indian Ocean date from the seventeenth or eighteenth centuries.

It is said that, in the thirteenth century, the Swahilis transported by sea an elephant which was presented to the Emperor of China. Their ships (*mtepe*), some of them ▶

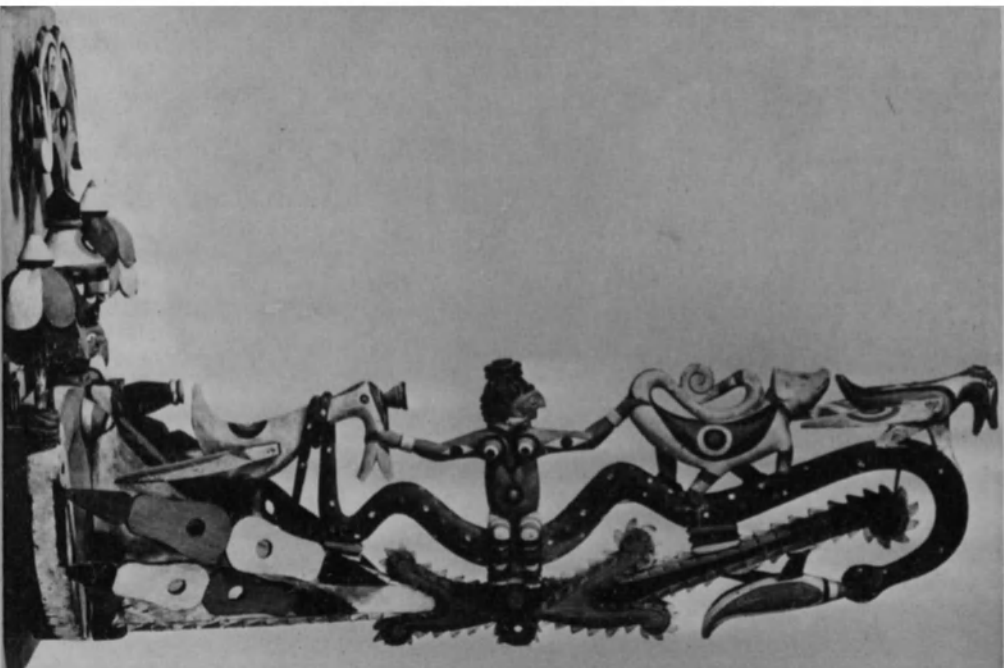


Photo © Museum für Volkerkunde, West Berlin

African birds and snakes mingle with European motifs in the design of this finely crafted ornamental prow of a Duala pirogue. The bird is associated with the gods of the air, the snake with water divinities. The central figure, a woman with multicoloured breasts, is a motif from a genealogical tree, and the animals she holds in her hands may have a totemic significance.

*Come and see
Nkondo, mightier
than all other "lands".*

*I love Nkondo,
the one pirogue which troubles
all the land of the Duala.*

*Nkondo the triumphant...
You, sons of Duala,
descendants of Bedi,
I defy you
Nkondo! mightier
than all other "lands".*

*Be not dismayed,
Ours is the only pirogue
that fills the hearts of others
with hate and fear.*

★ ★ ★

*Ebenye, mun'ango
A ma pumwa wenge
Kana mbela na
A ma longo wenge
Kana ngoso (1) na...*

*Ebenye, your son
has flown today
like an eagle.
Today he has sung
like a nightingale (2)...*

(1) Ngoso: (parrot); literary style which might be likened to the epic style in Western literature.

(2) "Parrot" in the Duala version.

► seventy-tonners, were in use for centuries in the Indian Ocean. The Swahilis had a wide range of sailing ships for trade, for fishing and for the transport of farmworkers along the eastern seaboard of Africa. According to some researchers, hundreds of Swahili vessels (in addition to the Arab dhows from the Gulf) plied between the ports of Tanga and Kilwa (in the present-day United Republic of Tanzania).

A great variety of influences and cultures contributed here to the establishment of a long-lasting east African civilization. The wide and varied trading contacts with the Orient are attested to by the oldest original document, a "Travellers Log", dating from 100 AD and probably written by a Greek from Egypt; it takes the form of a guide for the sailor or the merchant, and lists the ports of east Africa and their trading interests; it covers an area extending as far as the southern port of Rhapta, which was, apparently, located close to present-day Pangani in the United Republic of Tanzania. Thus, some fifteen hundred years before the arrival of the Europeans, the east coast of Africa was already involved in regular, peaceful trade with the cities of the Red Sea, southern Arabia, the Gulf, India, Ceylon (Sri Lanka) and more distant countries.

In the Europe of the colonial period, this was generally considered to be an Arab civilization. The Portuguese of the sixteenth century gave none of the credit for it to the Africans and invariably referred to the peoples of Kilwa, Mombasa, Malindi and other east African towns as "Moors". Today it is recognized that, relatively early on, the City-States of the east African coast, although subject to strong Arab and Muslim influence, were predominantly of African culture. Undoubtedly, the brilliant Swahili or coastal civilization owed much to the Indian Ocean, since it was built on maritime trade.

Leaving the mainland coasts, let us examine the situation of the offshore islands.

When the Portuguese arrived at the Cape Verde Islands in the fifteenth century, although they were already known to the Arabs, they found them virtually uninhabited. The Portuguese navigators settled there and began a fruitful two-way trade with Europe and Africa, and for a time Cape Verde became the focal point of the slave trade in the Atlantic.

Carved wooden figures of a man and woman adorn a Vezo tomb near Morondava on the west coast of Madagascar. The Vezo are a group of fishing people living in close communion with the sea, which is a favourite theme of Malagasy poets such as Jean Joseph Rabéarivelo who has written of:

*she whose feet are impacted in the sea
and whose sticky hands emerge from it
full of coral and of sparkling blocks of
salt.*



Further south, in the Gulf of Guinea, are the volcanic islands of Fernando Poo (now Bioko), São Tomé and Príncipe. They were inhabited by Blacks, either the descendants of shipwrecked sailors or of slaves who went there with the first Portuguese occupiers.

Throughout the sixteenth, seventeenth and eighteenth centuries, the Cape Verde Islands, São Tomé and Príncipe (together with other parts of continental Africa where the Portuguese presence was less lasting), Brazil and Lisbon were elements in a single trading system based on a geographical fact then of importance to navigation, the maritime currents, and which fed on the trade in slaves destined for the American continent.

The culture that evolved in these "creole" islands has remained alive. In the south Atlantic islands, the word "creole" evokes the most successful bio-social amalgam achieved by the Portuguese in the Tropics. Here was developed a new type of man, a new type of mentality and even a new language, Creole, born of a harmonious fusion of Whites and of Black slaves. On the route between southern Europe and South America, these islands, with their original, racially-mixed society, represented a transitional link between Africa and the Atlantic world.

Much the same scenario is to be found in the Indian Ocean, in the Mascarene Islands (Mauritius and Réunion) and Madagascar.

From the end of the eighteenth century, the peopling of Mauritius was dependent on French immigration. French is still spoken there today, along with English and seventeen other languages—a veritable Tower of Babel. But the most widely used language is Creole. On Mauritius are to be found Indians, Chinese, and east Africans, many of whom are involved in the growing of sugar cane, in the exploitation of the salt marshes and in the construction of giant furnaces for the burning of coral.

The Island of Réunion, it has been said, was born of an idea of Colbert put into practice by the *Compagnie des Indes*. In 1644, the Isle Bourbon, as it was then called, had a population of 1,200 made up of shipwrecked Dutchmen, pirates and women destined for the settlers at Fort Dauphin, in Madagascar. The slave trade provided the first labourers. With the rise in demand for coffee in the eighteenth century population growth accelerated, with Blacks being brought in from Madagascar and Mozambique. Bearing in mind the elements contributed by the Chinese and the Muslims, Réunion could also be said to be a crossroads for the intermingling of civilizations.

The most fantastic hypotheses have been put forward regarding the origins of the Malagasies. However, in 1614, the Portuguese Jesuit Luis Mariano wrote: "The first inhabitants came some from Malacca and some from Kaffraria" (the generic term applied by the Portuguese to all the territories along the south-east coast of Africa).

Most Malagasies are of mixed descent. The eighteen tribes of the Island are not monolithic racial blocs, and the language shows remarkable unity. It is an Indonesian language, but its pronunciation suggests an African influence.

Equatorial Guinea: a nation moulded by the sea

by Catherine Gillard

AN archetypal maritime country by virtue of its configuration and history, Equatorial Guinea is a land of shores and islands which has been prominent down the ages as a base for observation and action.

There are three Guineas in Africa: the Guinea whose capital is Conakry; Guinea-Bissau; and Equatorial Guinea. The latter is the least known. Located in the Gulf of Guinea, it is known as "Equatorial" Guinea because its territory straddles the Equator. Relatively small (28,051 sq. km.), it comprises continental Guinea, known as Rio Muni, and a group of islands. Rio Muni is bordered to the north by Cameroon, to the east and south by Gabon. It has a long coastline (around 180 km.) in comparison to its maximum east-west distance (220 km.) and its area (26,000 sq. km.). The insular part of Guinea comprises five islands of varying size in the Gulf of Guinea: Bioko (formerly Fernando Poo), 2,017 sq. km.; Annobón, 17 sq. km.; Corisco, 15 sq. km.; Elobey Grande, 2.27 sq. km.; and Elobey Chico, 0.19 sq. km.

From this brief description it can be seen that Equatorial Guinea is divided into a maritime entity and an area of mainland. If the islands are much less important than mainland Guinea in terms of size, they take precedence strategically. Bioko provides an anchorage in the Gulf of Guinea off the coast of Cameroon, and Annobón offers a harbour off the coast of Gabon. It is not surprising that the great navigators should have been interested in these islands during the period of colonial conquest.

In their quest for a new and quicker route to the Indies, Spaniards and Portuguese discovered new lands. Pedro de Escobar and Juan de Santerem were among the Portuguese sailors who followed the coast of Africa. After setting sail from Sao Tomé, they sighted a hitherto unknown island on New Year's Day 1471 and named it Annobón ("New Year" in Portuguese). In 1472 a Portuguese adventurer named Fernao do Poo landed on an island which he called "Fer-

mosa" ("marvellous"). This island would later be named for him by the Spaniards. The search for a route to the Indies caused rivalry between Spain and Portugal. By the Treaties of San Ildefonso (1777) and El Prado (1778) Portugal ceded to Spain both Annobón and Fernao do Poo (Fernando Poo) together with trading rights in the ports and along the coast adjacent to Fernando Poo. Spain wanted to provide herself with supplies of slaves and grow rich in gold and ivory. But she found it difficult to penetrate into the interior of her new territories.

The Spaniards did not really begin to settle in the island and on the coast of Equatorial Guinea until 1858; exploration of the hinterland got underway even later. The voyages of the great navigators, the slave trade and the search for wealth, all the great dynamic forces which triggered the conquest of the oceans, came into play on the modest island territory of Equatorial Guinea. Its history is a crucible of all the desires which impelled peoples to embark on epic journeys of seaborne exploration. This magical point on the Gulf of Guinea has attracted Portuguese, Dutch, Spaniards, English, and French, all seeking to conquer the world and its wealth by sea. These islands have long been seen as a prize or as a gateway to power.

New commercial considerations are emerging today, at a time when the world powers are trying to find a basis for agreement on the exploitation of the sea. These islands of Equatorial Guinea are once again a prize. The country's territorial waters and the continental shelf hold rich promise since neighbouring countries have discovered offshore oil deposits. Oil and mineral exploration companies have offered to co-operate with the Governments of Equatorial Guinea. These resources may become an undeniable asset in the political and economic life of Equatorial Guinea.

Equatorial Guinea has an existence as a nation moulded by the sea, different from and complementary to its life as part of the continent. From the time of the great explorers to the most recent negotiations on the law of the sea, this small and unfortunately all too little-known country has been constantly marked by its island destiny. ■

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Photo © Pierre Argo, Paris

The islands of Cape Verde

by Elisa Andrade

These children live on the Indian Ocean island of Mauritius, where European, African, Chinese and Indian peoples and cultures have met and intermingled. English, French, Creole, Indian and Chinese dialects are spoken on the island which is dotted with Hindu temples, Muslim mosques, Buddhist pagodas and Christian churches.

Photo © Pierre Argo, Paris

► Cultural features reveal a similarly proportionate balance of influences. Thus the shape of the houses, the smith's bellows, the megaliths, the ancestor cult, the polite forms of address and the oral literature, among other characteristics, owe much to Indonesia.

Other aspects, however, such as the importance of cattle, evoke eastern Africa. Dance and musical instruments have been borrowed from both areas, and these double roots are everywhere to be seen, with, however, a certain Indonesian cultural preponderance, which can perhaps be explained on the basis of the supposition that the Indonesians arrived via the northern Indian Ocean and the African coast by taking advantage of the monsoon winds.

It would seem, therefore, that, except for the inhabitants of the islands, the African coastal civilizations of the continent's Atlantic flank drew little advantage from the sea, whereas those of the eastern coastal regions knew how to exploit the opportunities offered them by the Indian Ocean. The Swahili City-States were maritime powers, thalassocracies. The absence of maritime States on the west flank of the continent was not due solely to geographical considerations but also to the lack of a merchant class anxious to grow rich on maritime trade. Furthermore, the peoples of the western coastal regions do not appear to have mastered navigational techniques.

Nevertheless, the sea played an important role in the expansion of these coastal civilizations, especially at the time of the slave trade between Africa and the New World. If Brazil is the country in which the presence of African civilizations is most clearly evident, it must not be forgotten that they left a strong imprint on the southern United States, the Caribbean and the whole of South America.

■ Ibrahima Baba Kake

SPREAD out like a crescent in the Atlantic Ocean some 600 kilometres off the coasts of Mauritania and Senegal, the Cape Verde Islands form two clusters named from their position relative to the prevalent north-east wind: the Windward Islands, comprising Santa Antão, São Vicente, Santa Luzia, São Nicolau, Sal and Boa Vista and the islets of Branco and Razo, and the Leeward Islands, consisting of Maio, São Tiago, Fogo and Brava, and the three Rombo islets.

The history of Cape Verde is rooted in the history of Portuguese colonial expansion. Many Portuguese historians and chroniclers maintain that the Islands were discovered between 1460 and 1462 in the course of two successive voyages. Oral tradition, supported by certain Portuguese sources, has it that the Island of São Tiago was inhabited by Wolofs, who ended up there after civil wars on the mainland, and the Island of Sal (Salt Island) by Lebu, Serer and Felup peoples, attracted there by its salt-pans. However, these settlers were too few in number to resist the Portuguese penetration.

The difficulty of growing the cereals to which the Portuguese were accustomed on the poor soil and in the inhospitable climate of the Islands, coupled with Portugal's low population level, acted as a brake on European settlement of Cape Verde. In June 1466 therefore, to provide a further incentive to settlement, King Alfonso of Portugal (1432-1481) granted the settlers a Charter of Privileges. His brother Fernando, to whom he had made a gift of the Islands, was also granted jurisdiction in civil and criminal affairs over all the "Moors, Blacks and Whites", whether freemen or slaves, provided that they were Christians. At the same time, the settlers were granted, in perpetuity, the right to trade and to deal in slaves throughout the entire region from the River Senegal to Sierra Leone, with the exception of the Arguin Bay area, which was a Crown monopoly.

ELISA ANDRADE, of Cape Verde, specializes in socio-economics and planning for development. She completed her post-graduate studies at the University of Algiers and the African Institute of Economic Development and Planning, Dakar. The author of a number of articles on socio-economic problems, she is at present preparing a doctorate in History and Civilization at the University of Paris VII.

The Charter enabled the settlers to organize the slave trade which was to provide manpower both for the colonial development of the Islands and for export to the slave markets of Brazil and the West Indies.

The distance from metropolitan Portugal, the difficulty of communication between the Islands, and the virtually complete absence of European women immigrants, favoured a process of racial intermingling which is now evident in about ninety per cent of the population.

Throughout its history, right up to the eve of independence in 1975, Cape Verde was the hub of Portuguese expansion in all its varied forms. Thus, after the abolition of slavery in 1876, the export of contract labourers replaced that of slaves. And after the Conference of Berlin in 1885, which confirmed the division of the African continent between the Western European colonial powers, officials of the colonial administrative corps gradually replaced the pioneer settlers, the slave traders and the merchants.

Before the days of the steamship and radio communications, islands scattered along the continental coasts played an essential role in the development of long-distance navigation and trade. Owing to its geographical position, halfway between the African continent, Europe and the Americas, and on the route to the East, Cape Verde was destined, from the beginning, to become a cross-roads of commerce and the slave trade and to be a watering and supply point for shipping. The colonial development policy of Cape Verde was, therefore, based on its geo-political and strategic position.

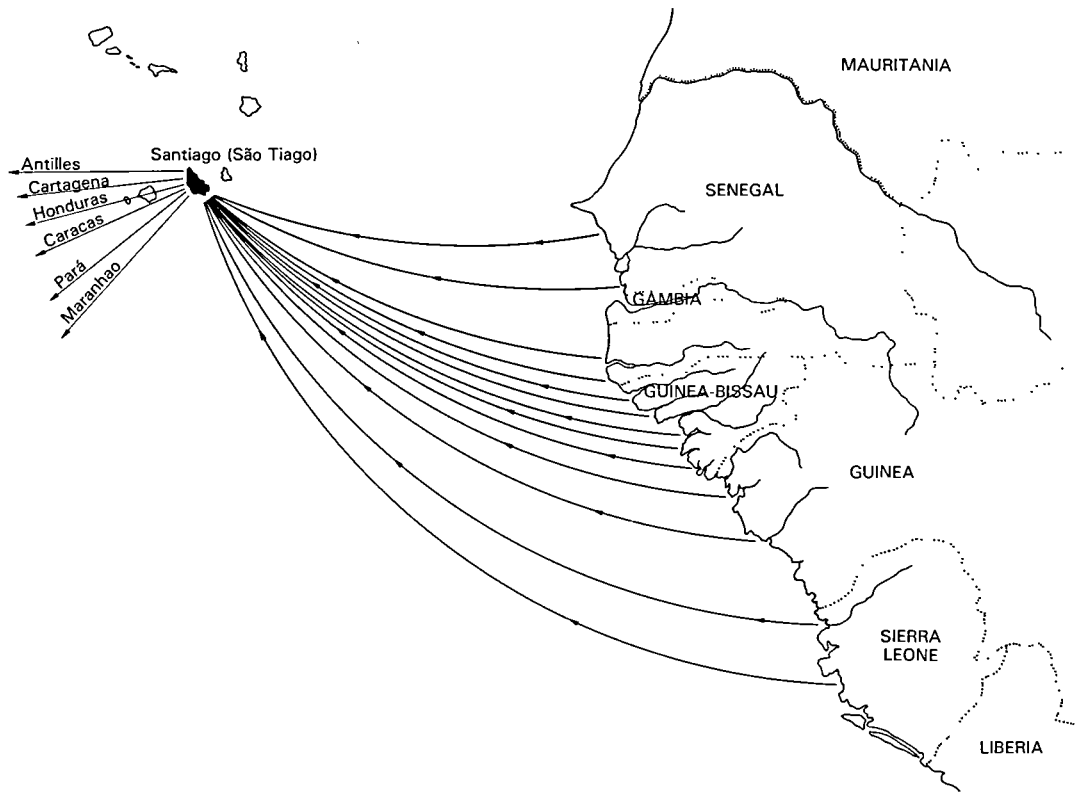
By introducing slave labour into the Islands, the settlers were able to create a dual agricultural system, one producing cereals, vegetables and fruit for internal consumption, and the other producing cash crops for export, such as cotton, sugar cane and wine.

Towards the middle of the sixteenth century, slaves expert in the weaving of pagnes (African loin-cloths) were imported and their output, much in demand by slave traders, was used principally in barter for the acquisition of slaves from the continent.

Horses, donkeys, goats, pigs, and cows were introduced into the Islands to provide fresh and salted meat and hides for sale to visiting ships and, later, for export.

ROUTES OF SLAVERY

Map shows routes of slave ships which transported their cargoes from the west coast of Africa to the Americas via the Island of São Tiago, in the Cape Verde archipelago.



Map © All Rights Reserved

The boundaries on this map do not imply official endorsement or acceptance by Unesco or the United Nations.

São Tiago was the main slave depot from whence slaves were exported to the Canaries, Portugal and Spain, and later to the West Indies and Brazil. Ships sailing the rivers of Guinea in search of slaves were obliged to call in at the Islands to pay the royal tax.

Cape Verde was also a virtually obligatory port of call at which all long-distance shipping had to stop to take on water and other provisions. In 1497, Vasco de Gama's "armada", en

route for the East, dropped anchor at Ribeira Grande (today Cidade Velha) to take on supplies of water and food. Three years later came Pedro Alvares Cabral, on his way to Brazil. And in 1522, the Islands were visited by the ships of Fernão de Magalhães (Magellan) on their historic circumnavigation of the world.

From the middle of the sixteenth century, French ships from Senegal, Gorée and Benin called in to buy provi-

sions and slaves which they later sold in their American colonies; English, Dutch and Spanish ships, on their way to India, also called in for supplies.

This was a period in which, with the development of commerce, shipping and the slave trade, the property-owning classes of Cape Verde flourished and grew rich. But this was soon to be followed by the decline of slave-based societies.

During the period of the enforced union of Portugal with Spain (1580-1640), the Spanish took advantage of the Portuguese colonial policy. By deviating the slave trade towards the West Indies they freed the slave ships from the obligation to call in at São Tiago to pay the royal tax, and the Islands thus lost one of their main sources of revenue.

Other measures and other historical events had a crippling effect on the interests of the Cape Verde elite: they were forbidden to deal in certain products essential for the acquisition of slaves, the slave-trading areas contracted, there were frequent attacks by French and English pirates, the Portuguese empire was reduced, to the area which today is Guinea-Bissau, and trade was monopolized by the great trading companies established from 1664 onwards; the total abolition of slavery was to be the final blow.

■ Elisa Andrade



Left, salt is an important product on the island of Sal, Cape Verde Islands.

From myth to reality

The rise of scientific map-making

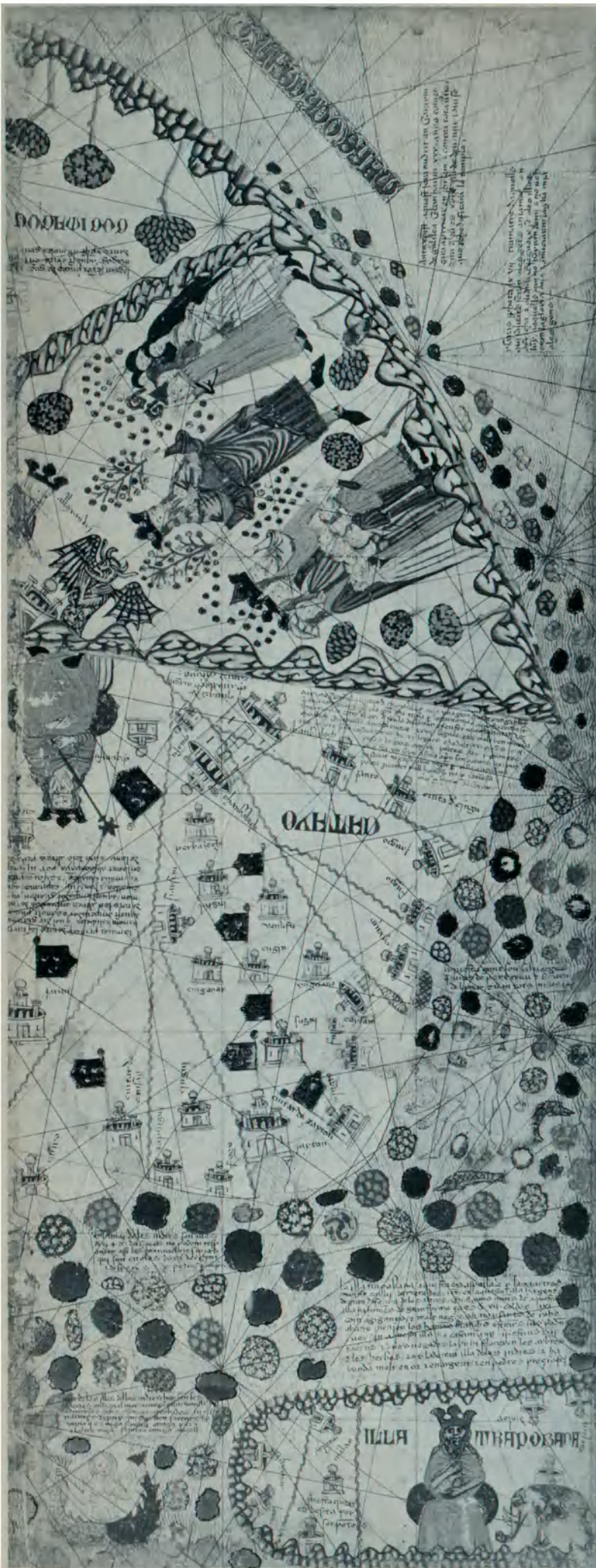
by Vitorino M. Godinho

The Portuguese "Cantino Map", dating from 1502, is a landmark in cartographic history. For the first time a map depicts the African continent in its true profile, India as a triangular peninsula, a somewhat deformed Indochina and the immensity of both the Indian and the Atlantic Oceans.

Photo. © Roncaglia, Modena. Biblioteca Estense, Modena

The "Catalan Atlas" (1375) is thought to be the work of a celebrated Jewish cartographer of Majorca, Abraham Cresques. Consisting of six panels of parchment-covered wood, it depicts the world from western Europe to the Far East as it was known from tradition and the writings of travellers. Astrological, astronomical and cosmographical diagrams are featured on the first two panels. Fragment shown here is second half of the sixth panel. Text at bottom left corner, above the picture of a mermaid, reads: "Sea of the isles of the Indies where there are spices, in this sea sail a number of ships of various peoples and there are several kinds of fish called mermaids, one species is half woman and half fish and another half woman and half bird."

Photo © Urs Graf, Dietikon-Zürich



DURING the Middle Ages geography was based on myth rather than on fact. The changes that occurred in and around the thirteenth century made possible the first timid intrusion of reality. Before then there had been no system for visualizing the globe. Planispheres and maps of the world, as they were known, merely juxtaposed land masses separated by seas and criss-crossed by rivers which were given imaginary courses (in keeping with the logic of the myth) in disregard of any scientific law of correspondence between their forms, their dimensions or even their relative positions; they were no more than symbolic configurations.

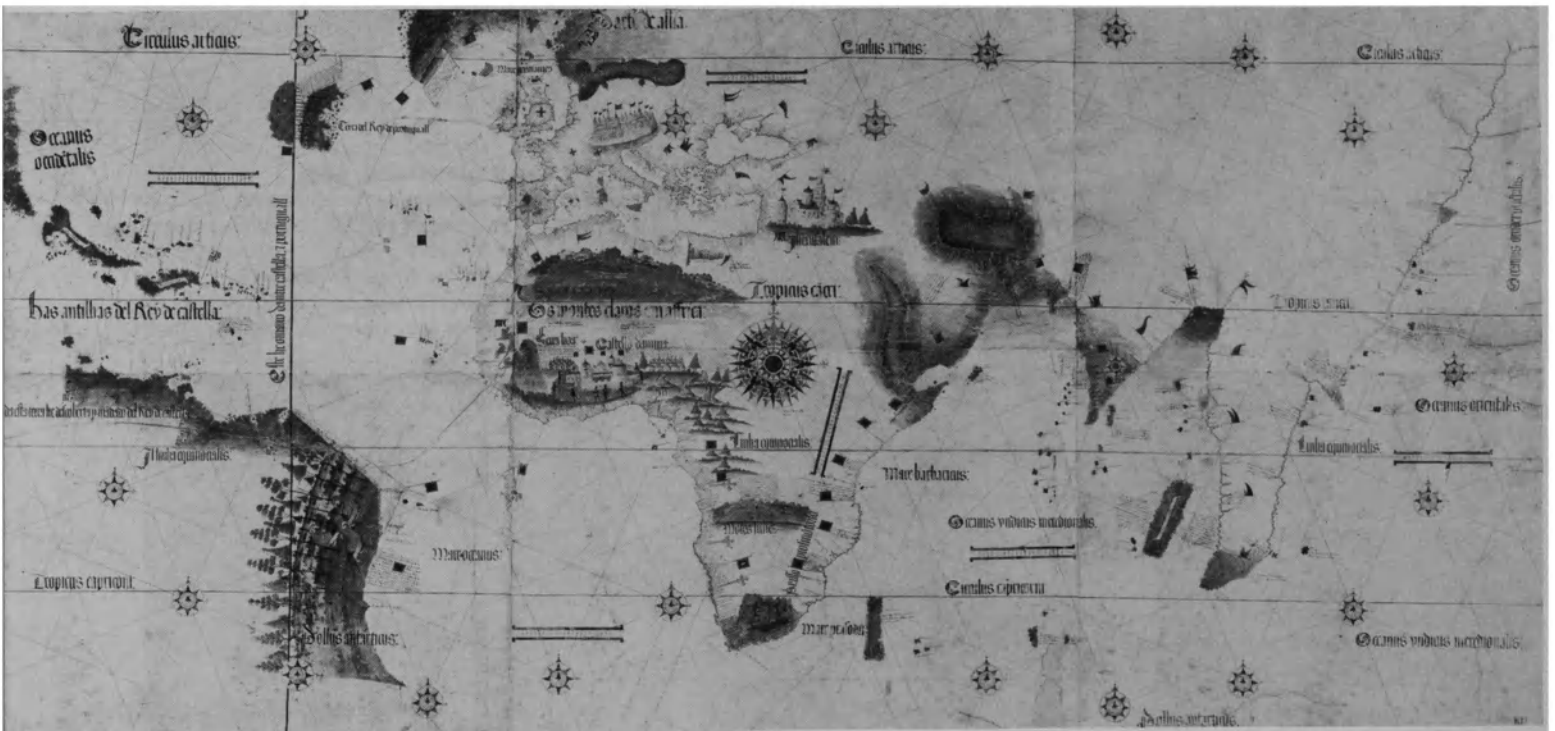
The years 1270-1320 witnessed the resurgence of Euclidean geometry (giving science the means with which to define space) as well as the astronomy of Ptolemy (passed down through Islam), the optics of Apollonius and Ptolemy,

Based on this new-found knowledge, the first cartographic system was established using rhumb lines and the estimation of distances. At that time, the "Sea between lands" (the Mediterranean) was plotted correctly (except for elongation in the longitude) and became the centre of the scientific representation of the *oikumene* (the inhabited world) which, on the basis of information brought back by caravaneers on the Asian routes, then extended as far as Cathay.

Those who would like a view of the world as it appeared in the years 1375-1381 need only examine the Catalan Atlas of the Cresques, a father and son team of cartographers from Majorca. The splendour of its illumination reveals the camel trails of Africa and the Orient, kingdoms of gold, the opulent cities of Asia, fleets of the Indian Ocean and the galleys of the coasts of Madeira and the

Portugal and Bordeaux, wool from Old Castile, Wales and the Midlands, linen from Ireland and Minho, and fish from all regions. Shipbuilding remained active thanks to the timber from the Sierra de Cantabria, the Landes and other areas.

It is often held that this maritime activity was due to the introduction of Mediterranean shipbuilding methods (galleys) from Genoa. But galleys were in fact only useful for naval warfare, and the vessels used in the Atlantic were of Atlantic design and construction. From Biscay there came the cog, a broad-beamed vessel which was to serve as a model for Italian and Catalan merchant sailing ships, and it was doubtless in the ports along the northern coast of Spain that the hinged rudder was invented to replace the two rear oars that were used to steer ships. The triangular lateen sail most certainly came from the Mediterranean, whilst improvements in hulls and



the medicine of Hippocrates, Galen and Avicenna. Indo-Islamic arithmetic and algebra were introduced at the same time as the Chinese "South Pole indicator", which was used in the Mediterranean as a veritable compass. Missionaries and merchants discovered the vast Asian continent and the existence of the caravan routes across the Sahara became known.

Canaries. The British Isles, however, are sketched very approximately and, as one moves away from the hub of scientific knowledge and measurement, the detail becomes blurred, as, for example, in south-east Asia. Nevertheless, in this same atlas, as in all maps of the thirteenth and fourteenth centuries, mythical elements still remain.

As early as the eleventh or possibly the mid-twelfth century, from Guadalquivir to the shores of the English Channel and on up to Northern Ireland, people began to settle on the sea coasts, building ports which, by the fourteenth century, had developed from simple centres of fishing and other activities or small Muslim trading posts into a network of communication and trade routes for the barter of iron from Biscay, tin from Cornwall, salt from Andalusia, Setubal, the Tagus, Aveiro, Brouages and the Breton coast, wines from Andalusia,

other parts of the ship came from Scandinavia and the North Sea countries.

Nor was the arrival of Italian and Catalan merchants responsible for stimulating Atlantic trade; on the contrary, the endogenous evolution of the Iberian peninsula was the more probable cause of oceanic and mercantile expansion from the eleventh to the fifteenth century.

Although the annexation of the Canaries (in the fourteenth and fifteenth centuries) resulted primarily from the action of groups from Catalonia, Valencia, Andalusia and also Portugal anxious to capture slaves for the sugar cane plantations and to obtain sealskins for leatherworking and other industries, and despite the colonization of the archipelago by the Normans at the beginning of the fifteenth century, this period should not be considered as the backcloth to the discovery movement nor the point at which the cen-

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COLOUR PAGES

Opposite page. Disporting fish adorn a Roman ornamental pond at Utica, Tunisia. A settlement founded in the 8th or 7th century BC by Phoenician seafarers, Utica later became the administrative centre of the Roman province of Africa.

Photo Lawson © Rapho, Paris

Centre pages

Left hand page. Above, a Greenland eskimo in his light canoe or kayak. Traditionally built by shrinking seal or other animal skins over a wooden frame, kayaks are valued because they enable hunters to approach their prey silently. Below, fishermen's boats drawn up on one of Senegal's Atlantic beaches.

Photo Lenars © Atlas Photo, Paris
Photo Dominique Roger, Unesco

Right hand page. Above, Samoans race in speedy longboats built with the skills which enabled the Pacific peoples to explore the earth's largest ocean in ancient times. Below, in the Antilles, traditional races between the crews of rival fishing boats are today increasingly held under commercial sponsorship.

Photo Jack Fields © Rapho, Paris
Photo Rivera © Atlas Photo, Paris

Photo © Edimedia, Paris



Landing at the Azores; fresco painted in 1580 by the Italian artists Fabricio Castello and Nicolas Granello, now in the Monastery of San Lorenzo el Real del Escorial, near Madrid. The development of the caravel during the 15th century as a replacement for the galley made possible the great voyages of discovery of the 15th and 16th centuries.

► tre of activity shifted closer to the Atlantic. Decades passed before Castile allowed its ships to fit out in ports on the Guadalquivir in search of gold from the coast of Mina (in present-day Ghana) or a western route to Zipango (Japan) and Cathay. Moreover, the French and English turned their eyes to the ocean only towards the end of the sixteenth century.

It was primarily the Portuguese who advanced the great discoveries as a solution to the long depression that afflicted Christendom (among other spheres) during the thirteenth and fourteenth centuries.

It was towards the middle of the fifteenth century that this long downward slide was reversed. About this time the Portuguese began to take an interest in African spices (not to mention the ivory they had already been seeking), yet it was under John II of Portugal during the 1480s that they began to covet Asian spices and narcotics, and sought to link the north-western African group of countries and the Islands to the route for

the Cape of Good Hope. This occurred at the same time as the voyages of Columbus and the C rte-Real brothers (Portuguese navigators who discovered Labrador, Newfoundland and Greenland).

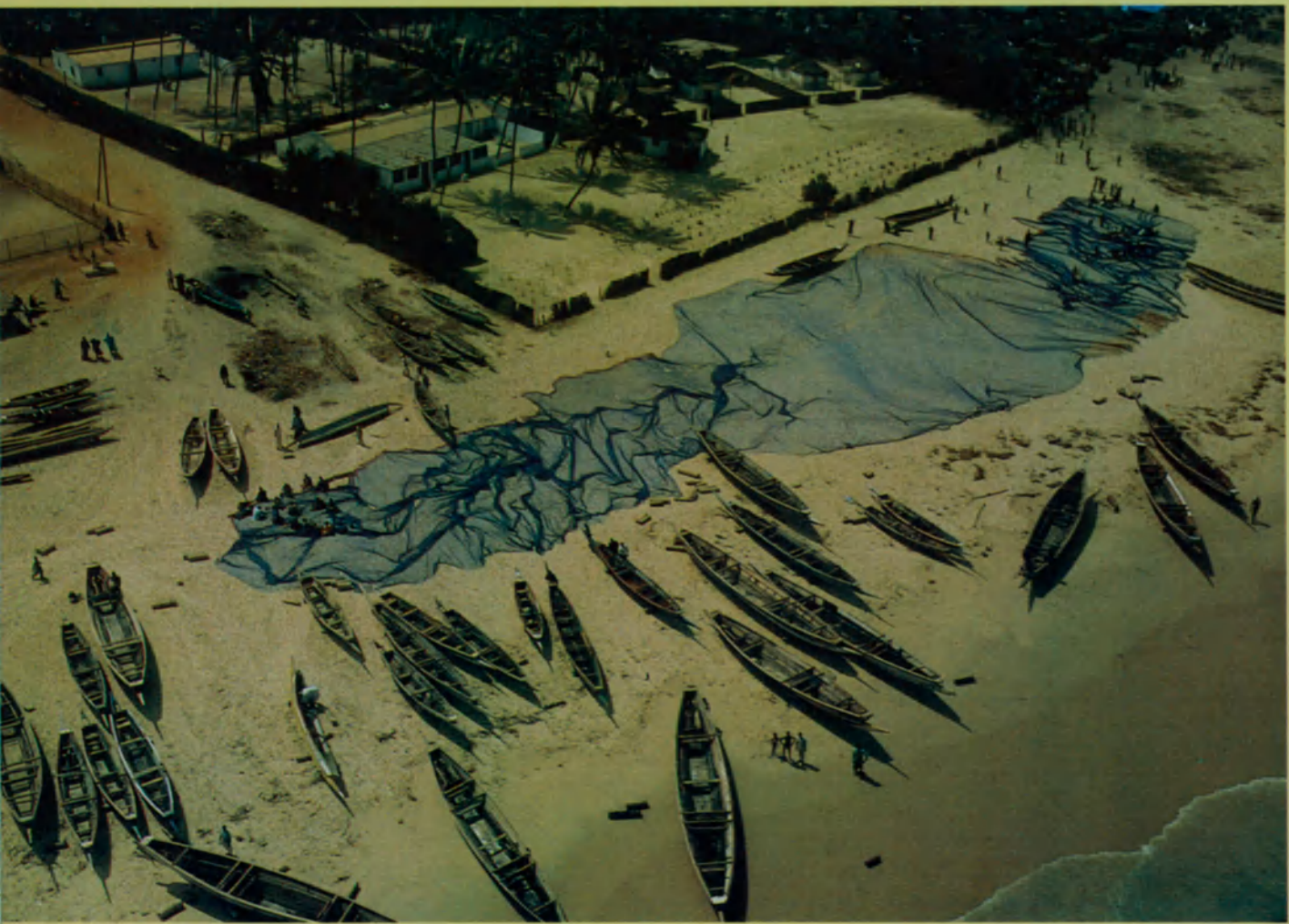
Three innovations were to open the door to the oceans. The first, the caravel, was launched by the Portuguese in 1440-1450. It replaced the galley which, along with the heavy carracks and combined sail/oar boats, was poorly suited to exploration. The caravel was an adaptation of earlier Muslim, Nordic and Atlantic vessels. It was longer for similar width, had a hinged axial rudder and triangular sails for bowline navigation (hugging the wind), and was light, sturdy and manoeuvrable.

Secondly, the caravel was an invention that made the conquest of the oceans possible because it was related to a new style of navigation. This did not yet imply the use of scientific experimentation; the scientific aspect emerged gradually. However, systematic exploration began,

and myths were tested against observation. Winds and currents were noted down, landmarks and depths were recorded and an effort was made to determine the position of a ship and its course when it was on the high seas, perhaps hundreds of miles from shore. Regular observations of the height of the polar star during the night watches combined with the use of other instruments and observations made it possible to plot courses on the open sea, especially for return voyages or to reach difficult to find islands in the ocean. During the 1480s, this systematic nautical practice, coupled with important borrowings from Judaic and Muslim sources, evolved into navigation by the stars. Concurrently, the works of Ptolemy and other ancient scholars were rediscovered and typesetting made their dissemination possible at the end of the fifteenth century. Latitude, calculated according to the midday height of the sun on land and at sea, became a basis for scientific cartography.

Thirdly, progress in artillery made it









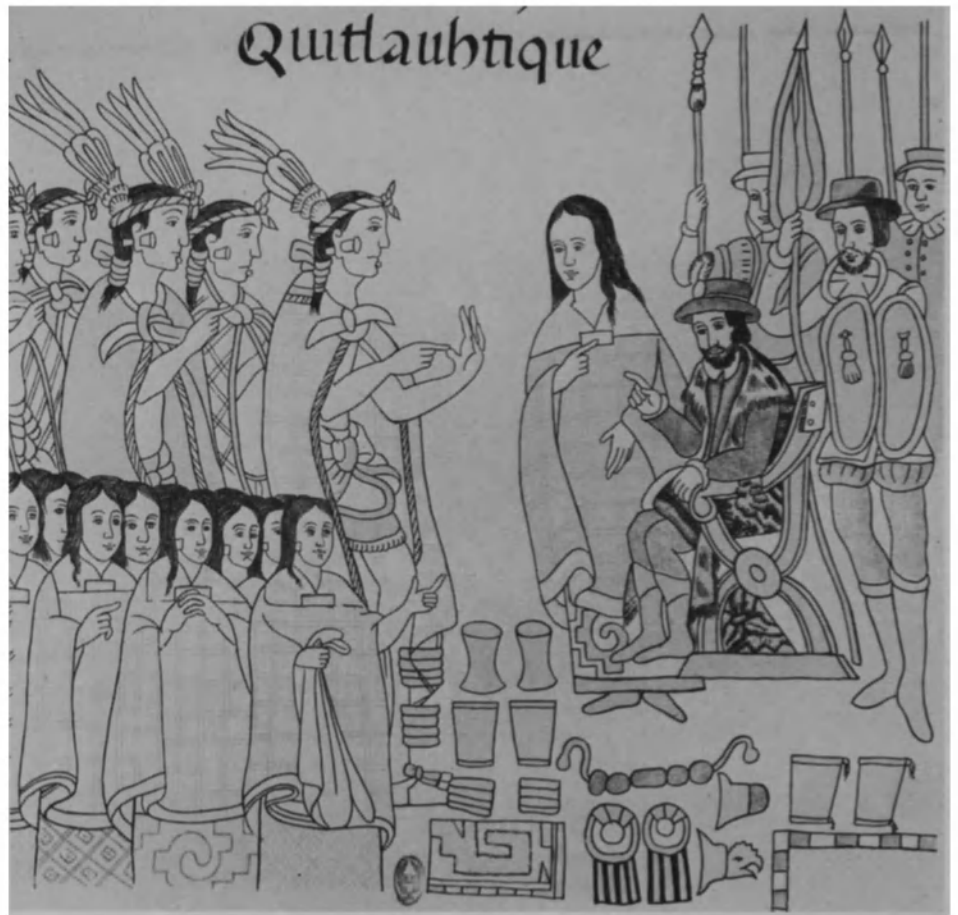
COLOUR PAGE

Opposite page above

Australian aborigine fishing with a harpoon on the Gove Peninsula, on the Gulf of Carpentaria. He seeks his prey at low tide and hurls his harpoon with extraordinary precision.

Photo © Folco Quilici, Rome

Photo © Jean-Loup Charmet, Paris. Facsimile of a 16th-century Mexican manuscript, the Lienzo de Tlaxcala. Bibliothèque de la Sorbonne, Paris



La Malinche, between the Aztec emperor Montezuma and the Spanish conquistador Hernando Cortes. Of Aztec origin, and sold to the Mayas as a slave. La Malinche was offered to the Spaniards as a "gift". She became Cortes' interpreter, adviser and mistress and bore him a son. She was long regarded by Mexicans as exemplifying the betrayal of indigenous values and submission to European power and culture, but today she is seen by some as the symbol of the intermingling of cultures and the herald of the destiny of her country which was to be neither Spanish nor Aztec but Mexican. More than this declares the Bulgarian writer Tzvetan Todorov, she represents "the present condition of all men, since, though we may not all be bilingual, we are inevitably bi-cultural or even tri-cultural."

Opposite page below

Fishermen on Lake Pátzcuaro in Mexico with butterfly nets across the bows of their canoes.

Photo Georg Gerster © Rapho, Paris

CONTINUED FROM PAGE 22

possible to instal weapons aboard ships. Caravels and other vessels, heavily armed, ruled the seas, forcing contact with other civilizations.

The first resolve to explore grew from an economic situation that followed the great depression and a reversal in the trend related to the "cluster of inventions" of the middle of the fifteenth century. Other series of inventions sprang up at the end of the fifteenth century, throughout the sixteenth century and at the dawn of the seventeenth century. The uncovering of things hidden and the gathering together of dispersed information, required new patterns of reasoning and a new procedure, the "experiment", a word in common usage by then that henceforth took on new meaning.

Of course, the importance of previous intellectual revolutions should not be underestimated. The Arabs, for instance, who dominated the entire Indian Ocean and communication with the Far East possessed a chart indicating the actual shapes of land masses and the true locations of their coastlines, as Ibn Khaldun

explained in 1374-1378. This chart was called *al Kumbas* (compass) because the drawing was based on the use of the magnetic needle. It indicated the places where the winds blew, as well as their direction, affording mariners a means to take bearings during voyages. However, the following remark was added concerning the ocean: "This is not at all valid for the neighbouring sea, and that is why boats do not sail in those waters—if they were to lose sight of the coasts they would not know how to return, all the more so since the vapours floating in the atmosphere hinder navigation."

To measure the progress achieved over a span of 125 years thanks to the caravel and the great discoveries, one need only compare the Catalan atlas to the Portuguese map known as the Cantino map of 1502. For the first time the entire African continent appears in its actual profile (only slightly elongated in longitude). India has grown into the shape of a triangular peninsula, shortened and simplified. Although an inordinately swelled Indochina descends too

far in latitude and Sumatra is incorrectly placed (the Portuguese still had not sailed beyond the Malabar coast), the immensity of the Indian and Atlantic Oceans is here depicted, the Atlantic being separated in part by the Caribbean Islands in the centre, king of Portugal's Land (Labrador-Newfoundland) to the north, and Brazil, whose coastline is still incompletely drawn, to the south. Similarly, in the north, Asia is still shown extending as far as Scandinavia. The Americas came very slowly to be distinguished as a single entity, separated from the Asian and southern continents by the immensity of the Pacific Ocean.

De Ruysch's planisphere of 1508, Schöner's globe of 1513, Apianus' map of the world of 1520 and Francesco Roselli's map of the world of 1530 still show Greenland and Newfoundland connected to Asia, while the Atlantic joins the ocean that washes the Asian shore, whether between Newfoundland and the Caribbean or between the Caribbean and Brazil—a Brazil which is the southern continent of traditional mythical



Detail from a 16th-century tapestry showing the arrival of the Portuguese navigator Vasco da Gama at Calicut (Kozhikode) in India in 1498.

► geography, at times rendered as an island. The *Globo Dourado*, or golden globe of 1528 shows the Americas to be one solid land mass, undivided from north to south, in which only the southern part is detached from the southern continent, whilst the whole is still integrated into the enormous Asiatic mass. New Spain was placed in Mangi (southern China), Cathay bordered on the Gulf of Mexico and Florida. Nevertheless, the sea already separated Greenland from the Land of Cod (Newfoundland) and, in Portugal, as early as 1501, the concept of the Americas as continents, apparent in the modified version of Cantino's maps, had become the accepted standard.

Another major revolution in the manner of thinking (after that of the thirteenth century) manifested itself in the drawing of the universal map of the globe using the new scientifically-determined latitudes, weaving the web of the world's routes, placing mankind throughout the entire planet. Thus was created an organized system of researched information in which the observations of the caravaneer combined with those of the pilot against a background of expansion and commerce.

For the first time, rather than acting on the basis of symbols and myths, men built physically upon the basis of something they had defined—space, spaces—and could base their actions on rational thought. For thousands of years the earth had been no more than a sort of strip whose ends did not meet; the Americas and the Pacific were unknown, and traffic existed only between Europe, Eurasia and Africa north of the equator, and between eastern Africa and the Far East. The world was a mosaic of cultures and civilizations, many of which were unaware of the others' existence, and between which there was little or no communication. The intellectual and

Arrival of the Portuguese in Japan. This detail from a 16th-century Japanese painted screen, by artists of the Kanō school, bears witness to the influence which, despite only brief contacts, Europe had on Japanese art. After the arrival of the Portuguese in Japan and the two-year mission of St. Francis-Xavier, the Japanese made several experimental attempts to assimilate certain aspects of Western art. This example of Euro-Asian art is purely Japanese in technique, but deals with scenes and events directly relating to Europeans.



Photo © Giraudon, Paris. Musée Guimet, Paris.

technical resources of the time were incapable of providing a conception of the entire globe in all its diversity, divisions and unities; there was no means of guaranteeing that the traveller would be able to return to his home port. There were but shreds of reality in a world of mythical geography and fabulous beings. Henceforth, man possessed a system of representation that was both verifiable and effective for movement and communication. Barriers that compartmentalized nations disappeared, and along with them vanished the earthly paradises, the Eldorados, fabulous islands of eternal youth, opulent kingdoms built entirely of gold and precious stones, lost Christendoms, impassable deserts that were hot as furnaces, boiling seas, giants too fearful to meet, pygmies hidden deep inside impenetrable forests.

The spherical conception of the world predominated, although in certain circles of bookish tradition, it remained related to legend and myth. The *Sphaera Mundi* of the thirteenth-century English mathematician and astronomer John Holywood (known also as Sacro Bosco) continued to be the foundation for a great deal of educational and even practical training. Thirty editions appeared from 1472 to 1500, and forty more had come out by 1647. The Mandeville book was also widely published, the *Imago Mundi* remained influential, and an equally large number of copies of the widely-read *Auto das Sete Partidas* (which included the fabulous letter from Prester John describing his kingdom to the monarchs of the Western world) were printed.

Men reasoned in terms of navigation and relegated all fantastic geography to literary circles, far from mercantile and maritime practices. The idea of the sphericity of the planet, recognized and analysed, was proven scientifically by means of the shadow of the eclipse, the way in which boats disappeared beyond the horizon, the circumnavigation of the earth by Magellan and his lieutenant El Cano. Discussions concerning the length of degrees of latitude and longitude (from 16 2/3 to 17, 17 1/2 and 18 leagues) prepared the way for the establishment of uniform measurements by the Academies (especially the French) in the seventeenth



Photo © Council of Europe, Strasbourg

Henry the Navigator (1394-1460) is shown bottom right in this detail from the famous St. Vincent polyptych, by the 15th-century Portuguese artist Nuno Gonçalves, now in the Museum of Ancient Art, Lisbon. Henry was the third son of king John I of Portugal. After having "evangelized" Morocco, Henry, who at the age of 26 was named Grand Master of the Order of Christ, decided "to extend the arms of the Cross to the ends of the earth". To his castle at Sagres, Cape St. Vincent, he summoned freebooters, Arab merchants, Jewish cartographers, Venetian and Genoese sea captains, Ethiopian monks and German astronomers. In his shipyards at Cape St. Vincent he built a new type of vessel, the caravel, which combined the best elements of naval design of the period. He ordered his seamen to turn their backs on the Mediterranean and head south across the Atlantic. His ships explored the west coast of Africa as far as Senegal and, before he died, had reached the Gulf of Guinea.

century. The installation of the maritime clock mounted on a Cardan bearing aboard ships for calculating longitude meant that maps were drawn in an increasingly scientific manner. The existence of the Antipodes was proven by experience and solid reasoning and the notion that the torrid and Polar regions were uninhabitable was shown to be false. This new way of thinking, based on experience and rational demonstration, is quite clear in the *Tradado da Esfera* (1536?) by the Portuguese navigator João de Castro, the man who first conceived the scientific expedition.

Thus, the voyages of the navigators and caravaneers, and the search for merchandise led to knowledge (using cartographic representations based on scientific systems) about States, nations, products, landscapes, and people of diverse customs on the European, African, Asian and American continents. Between

1560 and 1570 there already existed literature covering a large part of the earth, from China and Japan to Brazil and Guinea, from Canada to the Cape of Good Hope. Travel logs, books of weights and measures, geographies, and chronicles of all sorts provided a fairly accurate body of knowledge about the entire planet, lands and seas, peoples and landscapes.

The *Lusiads* (1572) by the Portuguese author Camoes summed up this new-found knowledge: The marvellous no longer depends on wondrous deeds and fables which are but a poetic way of portraying reality and building a bridge over to Utopia, the island of love. Even before 1516, Diego Velho had already sung:

*The new things before us
Are now so evident to our eyes
That never did another soul
See a world like unto it.*

■ Vitorino M. Godinho



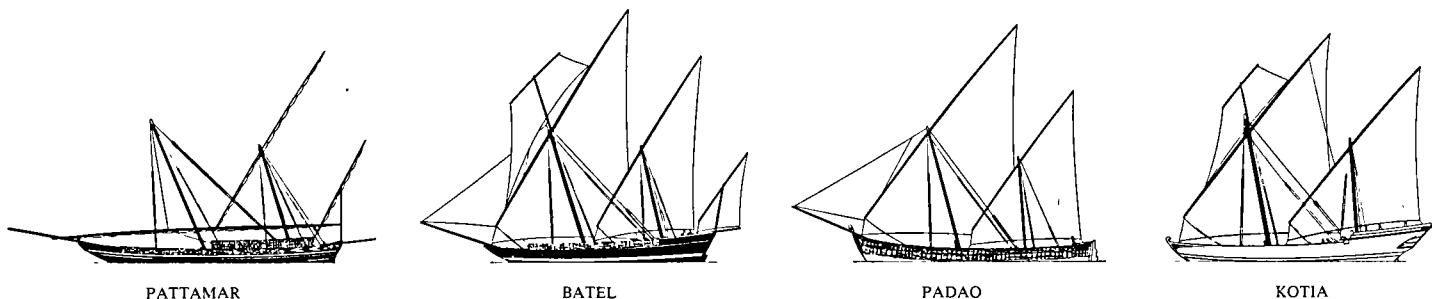
Elephants, palm-trees and exotic scenes of African inspiration adorn this 16th-century engraved silver plate. In the centre are displayed the royal arms of Portugal of that period.

Photo © Council of Europe, Strasbourg



Photo © Cliff Hawkins, New Zealand

Under full sail, the *thoni* "Maria Antoraj" leaves Bombay for the port of Veraval, Gujarat State.



The dhow: queen of the Indian Ocean

by Cliff Hawkins

A thousand years before the birth of Muhammad (570 AD), Arab seamen were sailing the waters of the Gulf in a new type of vessel, a broad-beamed shallow-draught, lateen-rigged craft known to us today under the generic name of the dhow. Taking advantage of the monsoon winds, the dhow, in all its local variants, soon became the queen of the Indian Ocean.

THE dhow can justly claim to be the traditional craft of the Indian Ocean. Precursors of the dhow are believed to have plied their trade from the Gujarat ports of Cambay and Ghogha to Persia (Iran) and Iraq between 2500 and 1500 BC. Long before the Portuguese arrived in the Indian Ocean Arab dhows were trading through the Malabar ports of Calicut, Cochin and Quilon with Malacca, China and the Indies. Two great religions spread to present-day Indonesia and beyond as a result of Arab and Indian trade with the East, the Muslims introducing the Islamic faith about the twelfth century and the Hindus their religion even earlier.

During the twelfth century the Omanis settled in Zanzibar, so that when Alfonso de Albuquerque sailed into the Indian Ocean in 1507 it was the Omani empire that the Portuguese had to conquer. In the meantime the speedy dhow was playing its part in the thriving Arab slave trade, and the Gulf harboured fleets of Omani dhows equipped for warfare.

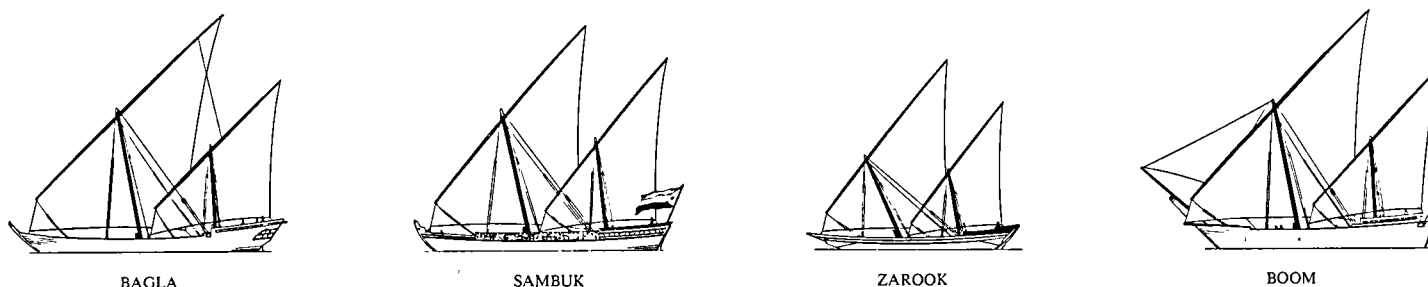
India's Malabar Coast is the last stronghold of the old style sailing dhows. Owing to the vagaries of the weather their trade is seasonal, as it always has been; but between the months of November and April the sea becomes alive with white cotton sails dotting the horizon as though a regatta were in progress.

CLIFFORD W. HAWKINS, of New Zealand, is an authority on dhows and has written widely on maritime history and seafaring. In addition to *The Dhow* (1980), his published works include *Argosy of Sail: a Photographic History* (1981) and *Praus of Indonesia* (1982).

Only in recent times, with the introduction of diesel power, have dhows become less reliant on the seasonal monsoon changes for their voyaging, but even with engines they are still compelled to cease operations during periods when storms of great severity are liable to strike with little or no warning. Indeed practically all the west coast ports of India are closed to shipping during the south-west monsoon. But no matter what the season the dhow world continues to embrace, like a crescent moon, the Arabian Sea from the Comoro Isles to East Africa, the Red Sea, South Arabia and the Gulf, right down the Indian sub-continent, taking in Lakshadweep (formerly the Laccadive, Minicoy and Amin-divi Islands), the Maldiva and Andaman Islands.

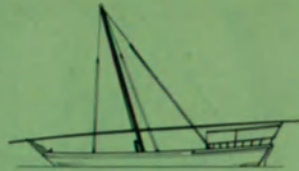
In time one learns the difference between a *pattamar* and a *padao* or *batel*, or whether a dhow comes from Kutch to the north of Bombay or from Mangalore to the south. No longer, unfortunately, does one have occasion to distinguish between an Indian *kotia* and an Arabian *baghla* since the last of the *baghlas* with their intricately carved transoms disappeared from service some forty or more years ago. Sadly too, very few of the older type of *kotia* with carved transom remain. Replacing them is a strikingly smart craft, very different in character, but still called a *kotia* and, in common with the earlier craft, carrying at its stemhead a parrot-head image, looking inboard. This motif, looking out ahead instead of inboard, is also carried by the *padaos* that frequent the Bombay area, especially Mahim Bay where they discharge gravel for the building industry under the shadow of an old Mogul fort.

Sambuks and *zarooks* are the predominant types of dhow in the Red Sea area, *booms*, *jalbauts* and *shewes* in the Gulf and *batels*, *battelas*, as well as *thonis*, on India's west coast. There are numerous motor dhows too, particularly of the *boom* and *dhang* type. And one must not forget all the various individual local craft that appear like a page from the





JALBAUT



SHEWE



BATTELA



THONI

► past such as the East African *jehazis* and the *odams* of Lakshadweep.

Until a few years ago the Maldives owned their own fleet of lovely *kotias* as did Colombo. The seamen of Lakshadweep continue to sail their *odams*, vessels that have their planking fastened together with coconut fibre or coir in the traditional manner. The only dhows seen in Sri Lanka these days are the *thonis* from Tuticorin across the Palk Strait and, of course, the numerous fishing catamarans.

The hulls of craft built throughout the Indian Ocean area traditionally had their timbers dowelled and sewn together as iron fastenings were unknown until their introduction from Europe in the tenth century. The method of sewing the planks of a hull together with coconut fibre can still be observed in the few remaining Omani *bedans* and in a number of Indian *batels* and *pattamars* as well as the Lakshadweep *odams*. The *pattamars* are remarkably commodious craft and, being undecked, are capable of carrying enormous loads of timber from the Malabar coast to Bombay. They rank among the largest dhows trading under sail alone at the present time.

Dhows have long ceased to operate on India's eastern seaboard where road transport has completely taken over. The configuration of much of the west coast, though, differs greatly from that of the east and the more difficult Malabar country will no doubt help to preserve the dhow trade there for many more years despite the bridging of rivers. Bulk cargoes are more conveniently carried by dhow, particularly silica sand, sent to Bombay for the manufacture of glass, tiles and timber. Other cargoes vary from cement to mangoes and coconuts.

Among the largest of all the Indian dhows that make long coastal voyages are the *thonis* from Tuticorin. They evolved from a barge that was introduced into the southern port many years ago to convey cargo between ship and shore, there being no deep-water berth at the time, ocean-going vessels having to remain anchored out in the roadstead.

The hull is sharp at both ends with straight stem and stern-posts only slightly angled. It is painted all over black with a white ribband a little below the deckline and large registration numbers at the bow and stern. An unusual feature is that the yards and sails are arranged so that the vessel can go about when changing from one tack to another instead of "wearing ship" as other dhows do. A number are three-masted and the mizzen always carries a small European-type gaff sail.

A unique characteristic of the crew of a *thoni* is that its members, almost without exception, are of the Roman Catholic faith, and in the forecastle where they sleep, right in the bows below deck, you will find a wick lamp always burning before a Madonna. Here is visible evidence of a religion introduced to India by the Portuguese in the seventeenth century. The crews of most other Indian dhows are, however, either Hindus or Muslims. A Hindu dhow master is known as a *tindel* and his crewmen are *khalasis*. The Muslim master is a *nakhoda*, by which name he is known in all Arabian vessels. His crew go by various names according to the area from which they come.

How different is the Arabian scene where it is rarely possible to observe a dhow carrying a sail much larger than a pocket handkerchief. Even so, the hull design of the Arabian craft closely resembles that of the dhows that sailed over a century ago, indicating that in Arabian waters modern technology has gone hand in hand with traditional craftsmanship instead of altogether opposing it.

One comes across some fine examples of mariners' art in the dhows. At one time it was seen in the intricate transom carving of the Indian *kotias* and Arabian *baghlas*, but, with the demise of both types of dhow, paintwork has become more popular. The upper hull strakes of the newer *kotias* are often brightly hued and the transom stern turned into a picture gallery or ornamented with floral design work of exceptional beauty. In Arabia, particularly with the *zarooks* and *sambuks*, ornamentation is more of a geometric nature. It is by such decor that a dhow's origin or ownership can be determined—that, the shape of the hull, and the crew who man her.

Because a dhow as a sailing ship was, and still is, a thing of great beauty, all the hard work associated with it is rarely thought of. As a diversion from their lot the Arab dhowmen resorted to music and when entering or leaving port they expressed their pleasure in a noisy orchestration of drums and conch shells the like of which is not to be heard today. But crews still chant away whenever there is a tedious task at hand, perhaps applying *shahamu* (a grease and lime mixture) to a hull to protect it from the teredo shipworm or calling for strength when some heavy hauling is required.

Maybe one day we shall see dhow regattas or perhaps some nautical festival in an effort to preserve a maritime past. This could be an extension to existing museum activities. What about it Mombasa, Kuwait or Doha?

■ Cliff Hawkins



DHANGI



JHAZI



ODAM



BEDAN

Pacific adventure

by Peter Gathercole

OUTSIDERS often see the Pacific world as little more than images of tropical beauty; cloudy peaks, sea, sunsets, palm trees and endless beaches. The reality is otherwise.

First, consider the size. The Pacific Ocean covers one third of our planet, and inevitably it is a world of islands—aside, that is, from Australia, the world's smallest continent, which lies somewhat apart in the southwest. There are perhaps 25,000 islands—ranging from New Guinea, the world's largest, to the merest speck of an atoll—of which about 1,500 are inhabited.

PETER GATHERCOLE, *British anthropologist, is Dean of Darwin College, Cambridge. He has taught at Otago University, Dunedin, New Zealand, as well as at the Universities of Oxford and Cambridge, and is the author of some 50 studies on the archaeology and anthropology of the Pacific region.*

Second, it is a world of people, five million of whom live between the Tropics. They inhabit a surprisingly diverse range of environments. Both atolls and high volcanic islands festoon the Central Basin, although they are fewer and more isolated towards its eastern edge. Arcs of mountain chains, geologically and environmentally more varied, lie to the west, fronting Asia, and extending as far south as New Zealand. So the Pacific consists of more than "desert islands" or volcanic outcrops. It is also lofty mountains, bleak extinct craters, dense and humid rain forests, and—in New Zealand—majestic stands of kauri pine and totara. Indeed, in that more temperate land is every variety of landscape.

The people themselves are equally varied and diverse in origin. When, after the Ice Age, Australia and New Guinea were still joined, hunters came from

southeast Asia, about 40,000 years ago, some of whom probably reached even the smaller islands immediately east of New Guinea. Among their descendants are today's Australian aborigines, whose culture is the most continuous in human history. The rest of the south Pacific was settled much later, however, by people whom anthropologists call Austronesians, because they spoke related languages from which most of the present-day languages of the area are derived. The Austronesians were the world's greatest colonizers, spreading eventually as far westward as Madagascar, eastward to Easter Island, northward to Hawaii, and as far south as New Zealand.

They peopled the Pacific, including the islands east of New Guinea, today called Melanesia, the scatter of islands (mostly atolls) to the north, known as Micronesia, and the entire central Pacific ▶

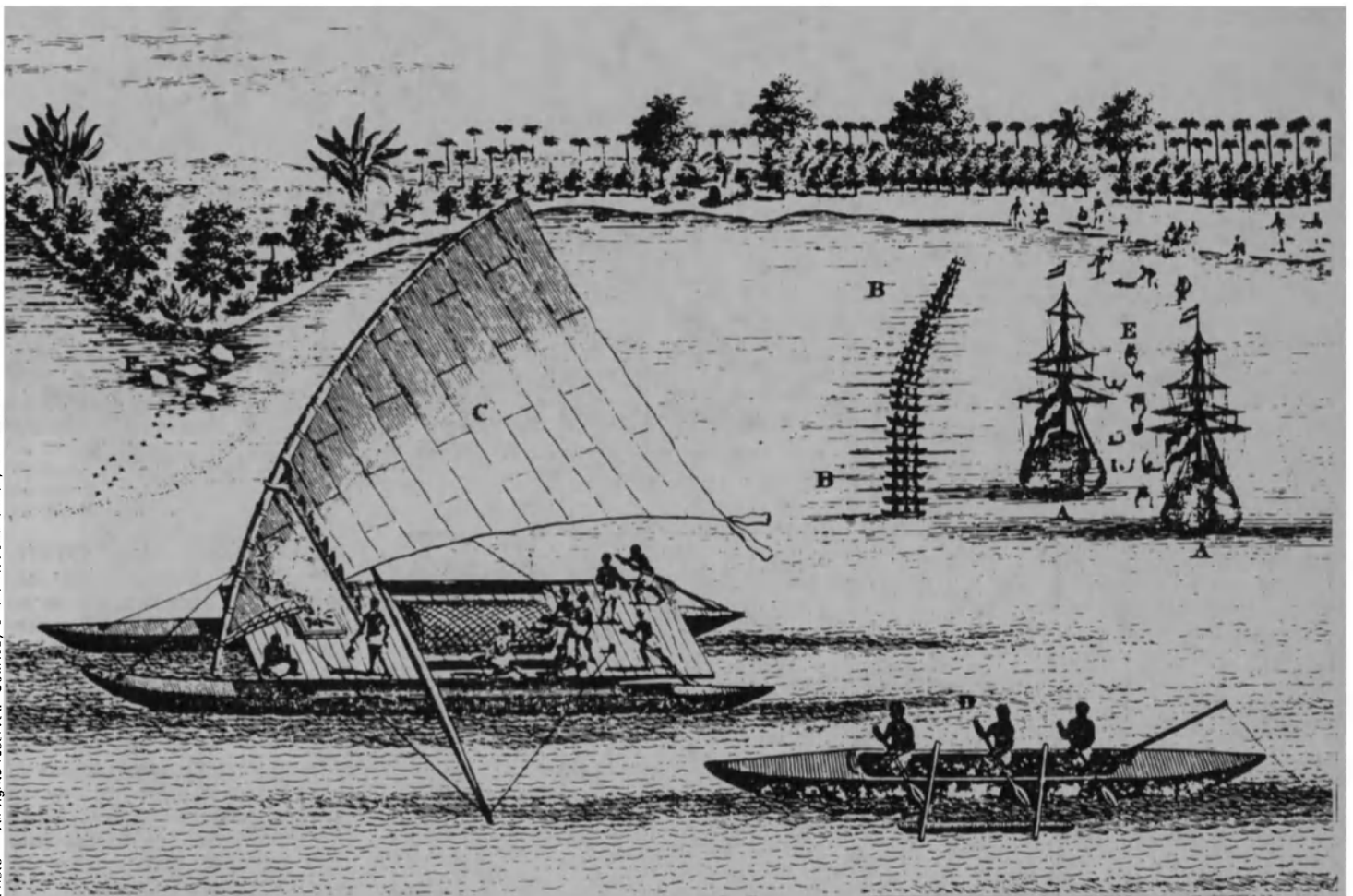


Photo c All rights reserved Courtesy of the National Library of Australia

Above, sketch of a Tongan, double hulled, ocean-going *tongiaki*, with in the right foreground a small fishing canoe and in the background visiting European ships lying at anchor in the harbour of Amsterdam Island, now Tongatapu, Tonga, as seen by the Dutch explorer Abel Tasman in 1643. Later, the English explorer Captain Cook (1728-1779) described his encounter with a huge *tongiaki* carrying 150 warriors and sailors "sailing three knots to our two and sailing us out of sight to windward before nightfall".

► triangle of Polynesia, including Samoa, Tonga, Tahiti, Hawaii, Easter Island and New Zealand. Of this remarkable progression of discovery, archaeology is today the main witness. Settlement was well under way by 2000 BC, and was completed before the end of the first millennium of our era.

Polynesians were skilled ocean-going navigators, as the extent of their voyages across the empty reaches of the Pacific shows. Their sixty-foot, double canoes were built essentially of wooden planks lashed to frames with coconut fibre and caulked with breadfruit gum. Under mat sails they could cover 100 to 150 miles per day. They were also masters of the art of preserving food and could travel up to 5,000 miles on a single voyage. Navigation techniques were probably similar to those found in Micronesia, and these must have been used to settle the far-flung islands of the "Polynesian Triangle".

It is remarkable that Micronesian canoe captains still navigate over hundreds of miles of ocean by traditional means. They use stars, especially when in zenith, as destination guides ("Star compasses"), also bird flight-paths, changing water colours (green betrays the presence of a reef) and swell patterns which give an island's bearings.

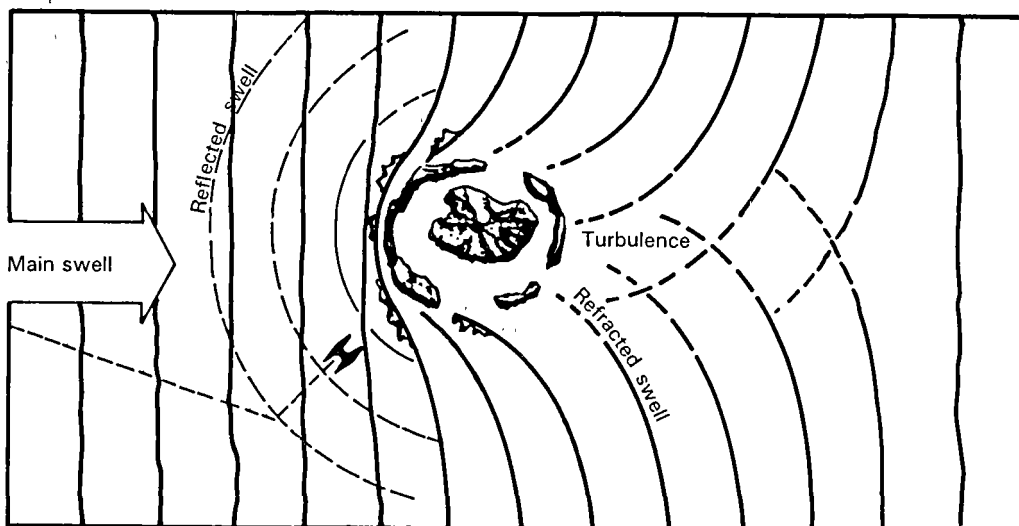
The Tongan ocean-going double canoe (*tongiaki*) was probably typical of the large canoes of Western Polynesia. Remarkably seaworthy, it attracted the admiration of such European explorers as Tasman (1643) and Cook (1773, 1774, 1777). One canoe seen by Tasman had a hearth in use on its deck.

The sea is many things; a highway and a source of danger, but above all a source of food. The Pacific has the richest range of marine fauna in the world and, not surprisingly, Pacific islanders are fine fishermen, using line, net or trap for a catch that can extend to shark, turtle and occasionally whale. Atoll inhabitants often take at least half their food needs from the sea: from lagoons, reefs or the open ocean.

Photo P. R. Curtissinger © Rapho, Paris

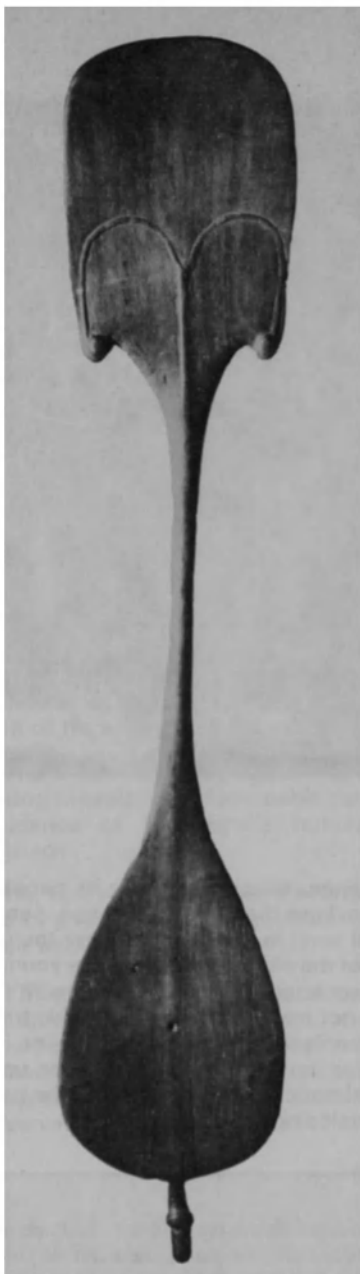


Building a canoe on Satawal Island (one of the Caroline Islands), Micronesia.



A SWELL WAY TO NAVIGATE. When main ocean swells encounter an obstacle, such as an island, they rebound creating new swell patterns which indicate the bearings of the obstacle. With years of training and experience behind them, Polynesian sailors can detect these changing swell patterns from the slap of waves on the hulls of their craft. Meeting the reflected swell from an island at an angle, they have only to steer into the swell to head straight for the unseen landfall.

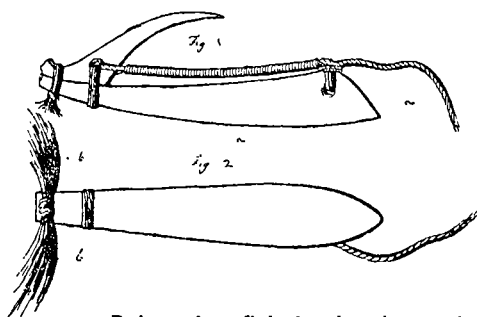
Diagram © Courtesy of the National Geographic Society, Washington, D. C.



Polynesian ceremonial canoe paddle (61.5 cm) representing the human face reduced to its essentials; used to beat time during ceremonial singing or dancing or twirled by the dancers in rapid, intricate movements.

*Guide the handle of my steering paddle,
My paddle Kautu-ki-te-rangi.
The handle heaves high into the sky,
The endlessly receding sky,
The endlessly approaching sky,
The sky wherein resides the heavenly force.*
Maori Sea Chant

Photo © Musée de l'Homme, Paris



Polynesian fish hooks drawn by Joseph Banks, a member of Captain Cook's first expedition to the Pacific.

Drawings © All rights reserved

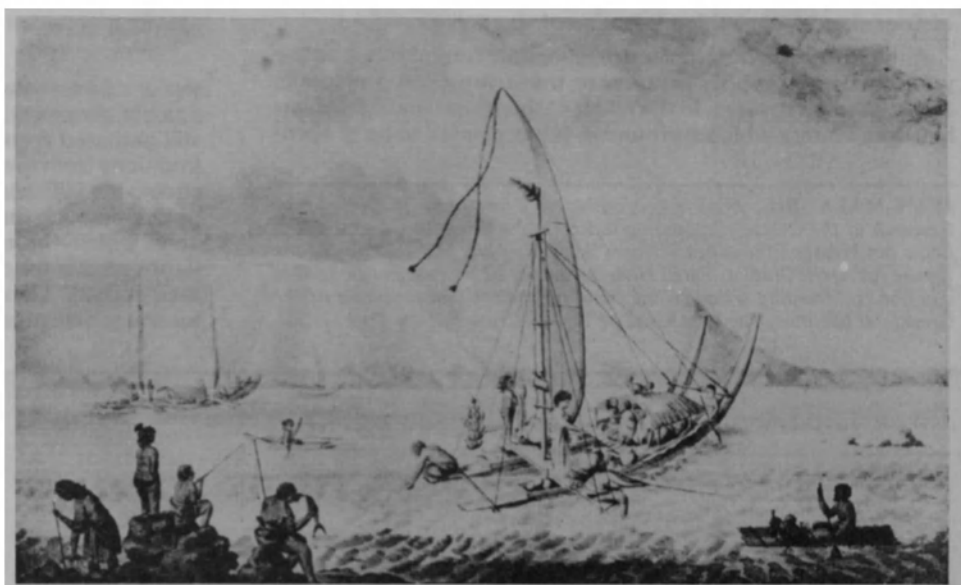
The naturalist Joseph Banks, a member of the British explorer Captain Cook's first expedition to the Pacific Ocean, which reached Tahiti in 1769, gave the following description of Tahitian fishing methods:

"In every expedient for taking fish they are vastly ingenious. Their Seines, nets for fish to mesh themselves in etc are exactly like ours: they strike fish with harpoons made of Cane and pointed with hard wood in a more dextrous manner than we can do with ours that are headed with iron, for we who fasten lines to ours need only lodge them in the fish to secure it, while they... throwing theirs quite from them must either mortally wound the fish or loose him. Their hooks... [are] of two sorts, first that... which is used for towing... The shank is made of mother of Pearl the most glossy that can be got...

for making all manner of woven objects, quite apart from the food value of the fruit.

The ancestors brought a number of plants vital for existence, including breadfruit, cassava, taro and yam. Ultimately these plants were joined by the sweet potato, arriving from the Americas by a means still not known. Cooked in the earth oven, often with pig meat, they form the basis even of feasts, for the people have always associated eating with some forms of ceremonial. Techniques for preserving taro, breadfruit, fish and meat for some time have always existed. Indeed, it was the existence of these techniques that enabled the Austronesians to survive voyages lasting as long as two months and provided the key to the great Pacific adventure.

■ Peter Gathercole



Vessels of the Island of Otaha: unsigned wash-drawing, made in 1769 during Captain Cook's first voyage to the Pacific, shows Society Islanders fishing from rafts and double-hulled and outrigger canoes.

Photo © All rights reserved

[there] is a tuft of white dogs or hogs hair which serves may be to imitate the tail of a fish. These hooks require no bait... the people who go out with them having found by the flights of birds which constantly attend shoals of Bonitos where they are, Paddle their Canoes as swift as they can across them and seldom fail to take some. This Indian invention seems far to exceed any thing of the kind which I have seen among Europeans...

"The other sort of hooks which they have are made likewise of mother of Pearl or some hard shell, and as they can not make them bearded as our hooks they supply that fault by making the points turn much inwards... they have them of all sizes and catch with them all kinds of fish very successfully I beleive".

But for many islanders the land is a far greater resource. Even the attenuated flora of atolls includes the ubiquitous coconut palm and pandanus, whose leaves, as well as those of the sugar cane and of the sago palm are invaluable for house thatching. The leaves are also used

The guidelines of tradition

by Jean Malaurie

LIKE the entire Arctic region, Greenland has been thrown open to rapid development. All the modern means available to industrialized countries—giant excavators, ice-breakers, nuclear submarines, cargo planes, mushroom towns, television networks—are being mobilized for the exploitation of its vast spaces.

The uranium deposits in south-west Greenland are said to be the most extensive available to the European Economic Community to which Greenland still belongs, although the precise form of its membership remains to be negotiated. Substantial oil resources are also being explored. Moreover, the future Canadian Arctic gas route (the Arctic Pilot Project) could become one of the West's main energy routes, traversed day and night by giant methane-carriers, if it is established in spite of Greenland's opposition because of the pollution risks.

Although modern Greenland is resolutely turned towards the world of tomorrow, its attitude to these futuristic projects is one of prudent reserve. In the midst of the frozen and particularly fragile waters which surround it, it has elected to be the pro-

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This miniature ivory mask, 3.5 cm. in height, is one of the oldest known specimens of Dorset culture Inuit (Eskimo) art. It dates from about 700 BC and comes from the Island of Sugluk in Hudson Strait, Canada.

Photo © Musée de l'Homme, Paris



pector of an ecological balance, thus maintaining its people's age-old alliance with the sea. Less than thirty years ago, people still gathered around the oil lamp in the igloos to hear the oral traditions from the mouths of the older generation. The younger people are still, consciously or unconsciously, imbued with this tradition which for them is not mere "folklore". It is this tradition which prompts Greenland's representatives at intergovernmental conferences to insist in the first place upon their country's inalienable historic rights, and then on the need for the greatest care in developing these spaces.

'The sea is our life'

by Gaba Broberg

Gaba Broberg is a Greenland Eskimo. When questioned about his future, this is what he said:

Greenland is our world, the world where the Inuits live. Inuit means the people of the Far North or, simply, men. Our people's history is lost in the mists of time. We probably came from Mongolia because we look very like Asians. Our ancestors crossed Mongolia, Siberia, Alaska and Arctic Canada by sledge as far as Greenland. Later, in the tenth century, the Vikings arrived in the fjords of southern Greenland, probably on a summer's day since they named our country "Groenland", which means "green country".

Our history does not go very far back, but we are a big family. Our language has the same roots as the other languages of the Arctic. We have the same traditions, the same kind of faces and the word "Inuit", by which we are all known, bears witness to our original unity.

For Inuits, the sea is life. The land is a place apart—the elsewhere. The sea (im-okh) with its whales, seals and fish, brings us food, clothing, material to build our boats and to make our artefacts sculpted from walrus teeth and stones polished by the sea. The sea is our daily bread. Even the children know this. To live as a fisherman means to live together and, above all, to share. It means to live with one's family, with the families of the village. The sea means living as a community. Our lives are conditioned by the sea. We all live along the coasts. The sea has developed in us a culture that is in harmony with nature.

The sea is the surface on which we move and travel. There are fishing and hunting expeditions, and journeys to collect supplies whenever the fishing and hunting have been good and we go to fetch the meat we have stocked up. There are also journeys to visit relations. There are no roads between the towns.

Nowadays there are planes, but we still use boats. In the past, we used kayaks.

Nowadays the kayak is used only for hunting. It is operated by a single man. It is and symbolizes the man's job. Another boat, called the umiak, is reserved for women. The umiak is like a house which carries the women, the children and the old folk. All the women from the village gather together on the boat.

Building a boat is a community task. Everyone joins in. This is still the case in northern and eastern Greenland.

Although the climate is harsh, it mustn't be thought that the country is uninhabitable, even if we cannot get away every year for a holiday in the Canaries or Mexico. The sun is not everything. Ours is a land of cold, ice and a special kind of light. The dark season lasts from the end of November until the 10th of January. During that period, we never see the sun, but there are four or five hours of light. In the past, we fished even during this period. Nowadays, during the sunless season, many of the men, especially the young ones, go to town in search of work. But the people in the villages are happier than the townsfolk.

In the villages, the people are always together, like a big family, sharing everything, meat and everything else. Nobody abandons anybody. But this balance is in danger of disappearing, of being replaced by "everyone for himself". In the past, everyone bore the darkness of the long winter months

Greenland's leaders never tire of repeating, both in speech and print, that "a natural order cannot be overturned with impunity—the ice restrains paroxysmal forces". Since time immemorial, they have feared these hostile forces which their high priests, the shamans or angakogs, had learned to appease. In spite of their limited finances and although only 10 per cent of their resources are still derived from hunting, they refuse to agree to the exploitation, against their people's interest, of the vast industrial wealth lying beneath their soil.

In this young nation, there are three distinct but connected systems of thought: shamanism, Christianity and autonomism. The Greenlanders want time for reflection, they want to follow their own historical sense of time, to consider their history as it is taught by their new élite while mobilizing all their spiritual and intellectual forces hidden under two and a half centuries of Christian mental colonialism which, though enlightened and positive in many ways, was nevertheless extremely dominating. It fought and destroyed the ancestral religion which formed the backbone of the traditional group.

Thanks to a mental revolution which will enable it more fully to assume its identity, the Greenland of the 1980's wants to belong to the world of today. And after all, is not the Eskimo's profound attachment to nature and its balances a direct expression of his ancestral religion?

The beautiful words (below) of my friend Gaba Broberg, a young Greenlander of insatiable curiosity, reflect the proverbial prudence of Greenland's hunters and fishermen: *Imera!* Perhaps!

He, too, reminds us that a country may be developed only in the long-term interest of its inhabitants and with due respect for their myths.

"Much of the progress that is being superimposed on society, although necessary, is too new or too rapid to be always beneficial. We must reconsider it ourselves in the light of our history which is being rewritten by us. Time, we need time..." Such are the comments one reads in the press and literature of Greenland, and how can one fail to approve of such prudence?

because he knew that there were others too. Now destruction is setting in. People still share in the small towns and villages. but this has become impossible in the big towns. Those who work in the towns, who don't fish or hunt and are obliged to buy their meat, those people no longer share.

Nevertheless, the Inuits have a kindly vision of the future, for the group feeling is part of the cultural and biological history of the Inuits and of their perception of the world. The Inuit will always keep his roots, his language and its dialects because of the affective links that bind him to his family.

My father, for instance, when he returned from hunting with a lot of meat, distributed it first of all to those families where there was no man in the house, then to the old and then to his own family, always keeping a good piece for his friends. This custom is common to all Inuits, whether they come from Siberia, Alaska, Greenland or Canada.

When you speak of poverty, you nearly always mention money. In this sense, it is true that we are poor, but we are very rich in human kindness.

We have been ecologists since time began. It is nature that counts and we reckon with nature. We are not afraid of civilization, it can bring good and bad. For instance, pollution was unknown here a few years ago. Now it comes by sea with the enormous freighters carrying

minerals which are constantly passing up and down our coasts. Our hunters and fishermen have had to change their habits. Animals are abandoning our region, the fish are moving away, our food is disappearing. But there is still not too much pollution. The problems are of another kind.

The people from outside—the whites—are both good and bad. Formerly, it was they who decided everything, but that is finished now. The time has come when equality has become a right. This equality has always been part of the daily life of the Inuits, but nowadays political activities in favour of equality are modelled on European habits. The young people have adopted a revolutionary, sometimes very aggressive outlook and this is bad. One cannot act in that way with a brother, be he good or bad, who has grown up amongst the Inuit people. One cannot suddenly say to him "clear out, it's finished". That's not the Inuit way of doing things. On the 1st May 1979, Denmark granted semi-autonomy to Greenland, but our country is still under Danish protection.

If I were to express a wish, I would say first of all that I would like to remain myself, to continue to be an Inuit with my own language and traditions. Without these, I am no longer anything, I am just anybody. I don't want anyone to come and destroy me, as has happened in some other countries. I fear those who want to devour my culture. There are on-

GODDESS OF THE SEA

"We are born of the sea", say the Inuits (Eskimos), and these hunters and fisherfolk have traditionally been dependent on the sea for their livelihood. The goddess of the sea, nourisher and protectress of animals, is one of the major figures of Inuit mythology. There are several versions of the myth about her, but they have a common ending in which a young woman, her fingers chopped off, sinks to the bottom of the sea where she reigns as queen. The story of the goddess is frequently portrayed in Inuit sculpture, engraving and drawing. This stone engraving, *Woman of the Sea* (1976) by the Inuit artist Soroseelutu, from Cape Dorset, Canada, recalls the theme of the chopped off fingers, from which sea creatures are born.

Drawing © National Museum of Man, Ottawa



ly 45,000 Inuits in the world, perhaps that is why I don't want to be eaten up and why I must survive both in body and spirit.

In the past, Inuits had time to create. They sculpted, and it was very well done. Now, as in other countries, it is less well done. Formerly, the objects we made had a religious significance, now that is lost. For instance, there were sculptures of Tupilak, a protective spirit of the Inuits. Now Tupilaks are mass-produced. He is still there, but he no longer has any influence. However, it's better than nothing. In any case, we must absolutely continue to make Tupilaks.

Formerly the Inuits sang to the rhythm of a drum. Now, except in the North and East of Greenland, young people use the electric guitar, but the older people still write poems which the young set to music. Progress must be accepted like the daylight.

As yet there is no tourism. When it comes, it will certainly change the country, but for the worse. The Inuits will have no thought but for making money. If we want to remain Inuit, we must remain men. Humanity is not to be bartered for money. Our vocation is to live as a group and to share. Of course we cannot go back to our traditional life of hunting and fishing for shrimps in a kayak, but I hope our children will continue to have affection, a certain human kindness, and the feeling that we are still a big family. ■

The peopling of the Americas

by Wigberto Jiménez Moreno

WHILE it is accepted that the earliest inhabitants of America came across the Bering Straits, controversy surrounds the hypotheses advanced by the French ethnologist Paul Rivet (1876-1958) who postulated that peoples from Australia crossed Antarctica and reached southern Chile and Patagonia 6,000 years before the Christian era, and that Melanesians and Polynesians reached the Pacific coast of north and south America.

It has been suggested that transatlantic as well as transpacific contacts existed in pre-Columbian times. There are those who maintain that Phoenicians or Carthaginians, or other groups from the Near East, the Mediterranean and even Africa reached the coasts of the Gulf of Mexico, the Caribbean, or the Atlantic coast of Brazil.

WIGBERTO JIMENEZ MORENO, of Mexico, is a professor at the Mexican National School of Anthropology and History. A member of the Mexican Academy of History, he is the author of a number of articles studies and books on history and anthropology, including *A History of Mexico*, written in collaboration with José Mirande and M. T. Fernández.

Doubt has been cast on the existence of many of these supposed pre-Columbian transoceanic voyages. As for Paul Rivet's hypotheses on Australian and Melano-Polynesian migrations, they were initially greeted with scepticism, especially the former, but the existence of a limited and late Polynesian influence has finally come to be accepted.

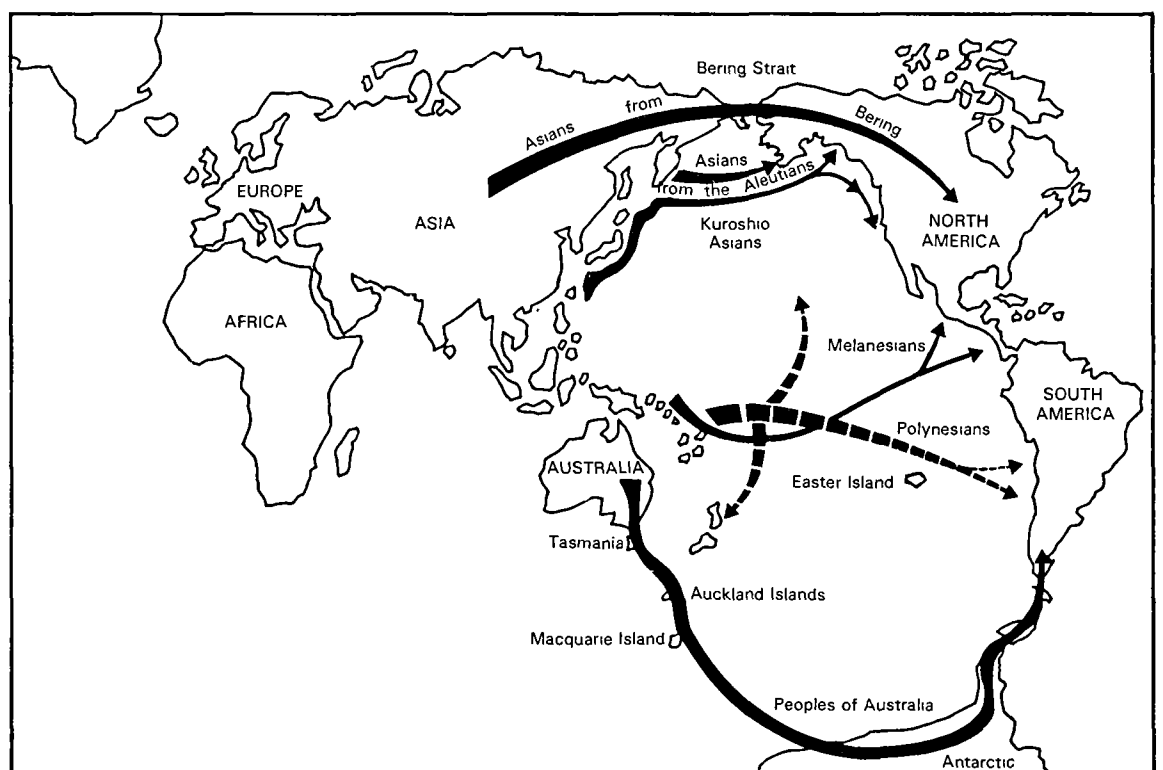
It also seems that a "counter-equatorial" maritime influence was exercised from Mindanao, the Moluccas and New Guinea, through Micronesia and Melanesia, then via the Marshall and Gilbert Islands, as far as Nicaragua and the Gulf of Fonseca. In 1952, after the Kon Tiki expedition, Thor Heyerdahl championed the opposing thesis according to which influences were transmitted from the Ecuadorian and Peruvian coasts to Polynesia, principally Easter Island. Perhaps it would be possible to find a Polynesian origin for American man (from Malaysia, the Philippines, Indonesia and Melanesia) in the later arrival of a pre-Inca élite, for there are undoubted cultural analogies between Panama, Colombia, Ecuador and Peru on the one hand, and Easter Island on the other.

There is also the hypothesis of a

Japanese incursion, which supposedly explains the appearance on the coast of Ecuador, 5,000 years ago, of the pottery of the Valdivia culture. However, the alleged arrival of ship-wrecked sailors or of an organized expedition from Japan comes up against many objections, notably because the Japanese Jomon ware, comparable to that of Valdivia, does not appear until half a millennium later. All the same, the most cautious and authoritative archaeologists declare that this still remains the most plausible hypothesis.

It is possible that some 3,000 years ago cultural influences were propagated by land along the Pacific and Caribbean littoral of Colombia from Valdivia to Puerto Hormiga (see map). The same influences could then have spread by sea, first from east to west off the northern coast of Panama, then from south to north along the east coast of Costa Rica, Nicaragua and part of Honduras, perhaps continuing through the Yucatan Channel and the Straits of Florida. In this way they might have reached the Atlantic coast of what is now Florida, where at a place called Orange a form of pottery appeared 2,000 years before the Christian era which was extraordinarily

Map of the peopling of the Americas according to the most widely accepted theories. It shows the arrival of Asian peoples from across the Bering Strait in North America, of Melanesians and Polynesians on the coasts of North and South America from across the Pacific, and of peoples from Australia in southern Chile and Patagonia after having crossed the Antarctic.



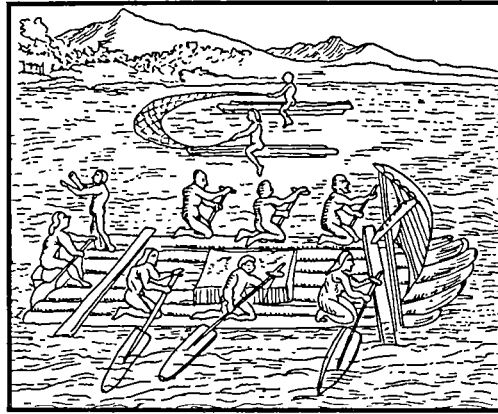
similar to that of Machalilla on the Ecuadorian coast which dates from the same period and which followed the pottery of Valdivia.

In his comparative study on the earliest cultures of the Americas, Dr. J. A. Ford distinguishes several waves of peoples which came by sea and settled on the Pacific coast between Acapulco (Mexico) and the Gulf of Paita-Sechura (northern Peru). He also points out the existence of coastal settlements between Puerto Hormiga and Orange, and on Stallings Island at the mouth of the Savannah river.

The US anthropologist Michael Coe has pointed out the similarities between the pottery of Las Conchas I and II (800 to 200 BC) from La Victoria, near the Guatemalan port of Ocos, and that of Chorrera (1800 to 1500 BC) in Ecuador's Rio Guayas basin. Similarly, it is during the first half of the last millennium of the pre-Christian era (1000 to 500 BC) with the flowering of Tlatilco in the valley of Mexico, that important analogies appear between the Tlatilco culture and that of Chavin. Coe points to the existence of contacts between Peru and La Victoria during this period and even during the preceding 500 years, suggesting that La Victoria might have been a port of call between a Mexican port and another port in Ecuador or Peru (not forgetting Tumaco in southern Colombia). Thus the cultural influences of central and Andine America which are perceptible in the pottery may have been transmitted by sea in both directions.

How were these Pacific voyages undertaken? Several writers have insisted that sail-powered rafts were the most common means of transport throughout the Pacific, as they were along the coasts of Ecuador and northern Peru, that they were still being used during the colonial period and in the Gulf of Guayaquil at the beginning of the nineteenth century. Rafts were used all over the Pacific, and the ones which bore the greatest resemblance to the rafts which sailed along the American coast and which usually had a triangular sail, were the rafts used in Polynesia and the Fiji Islands. After the Kon-Tiki expedition it became clear that pre-Columbian craft were capable of making long voyages, and Thor Heyerdahl himself showed that pre-Columbian indigenous peoples, setting sail from the coast of Ecuador, had landed on the Galapagos Islands. But long boats, sometimes known as *piraguas*, were also used in America, principally for coastal navigation; they were speedy and could carry up to seventy persons. They are already mentioned in a document of 1525 which says that in pre-Hispanic times such canoes, probably from the coast of southern Colombia, Ecuador and northern Peru, sailed as far as the mouth of the Rio Balsas to the ancient Toltec city of Zacatula.

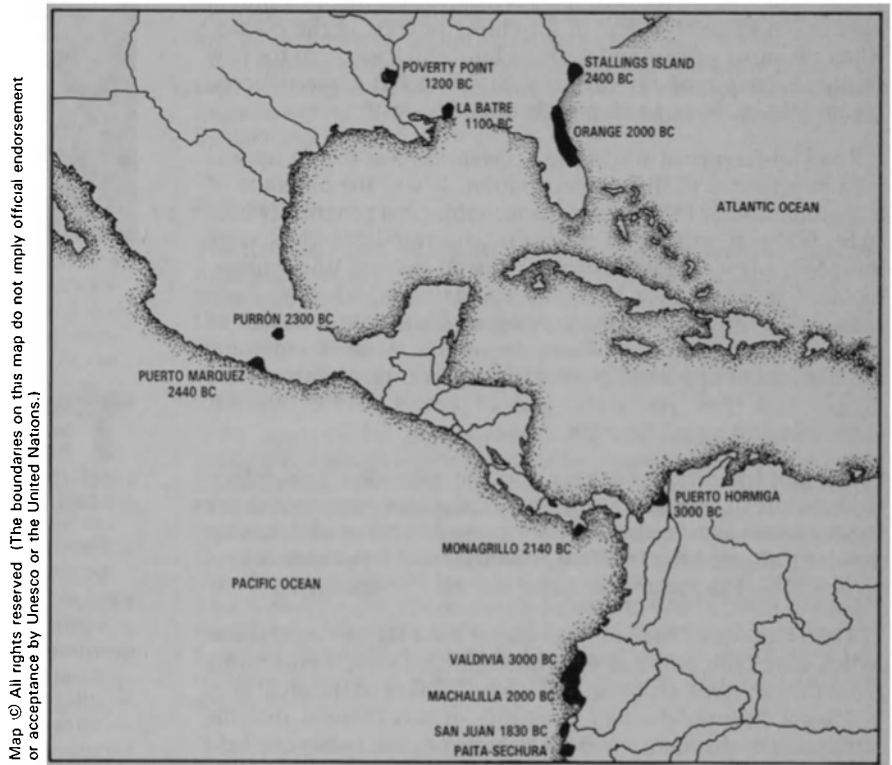
The maritime links between these regions, as well as links with Nicaragua, Costa Rica and Azuero in Panama, have been pointed out. It is because of such



Sailing rafts at Puerto Viejo (present-day Portoviejo), Manabí Province, Ecuador, from *Storia dil Mondo Nuovo* (History of the New World), by Benzoni, which dates from 1572.

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Map of the oldest Andean and Meso-American cultures according to an "historical reconstruction" in J.A. Ford's study *Formative Cultures in the Americas* (1969).



Map © All rights reserved. (The boundaries on this map do not imply official endorsement or acceptance by Unesco or the United Nations.)

links between Andine and central America that the art of copper metallurgy must have been brought from Peru to Zacatula, although not directly, around 750-800 AD.

It should also be remembered that the Spaniards who embarked on voyages across the Pacific soon began to use the Mexican ports of Navidad (near Chihuahua, on the borders of Chihuahua State and Jalisco State) and Zihuatanejo, perhaps because these ports had already enjoyed a certain importance in pre-Columbian times. The importance of Acapulco, further south, may go back even further, and it is in the nearby town of Puerto Marqués that Mexico's most ancient pottery (2000 BC) has been discovered, which must have been brought by sea. Ancient pottery dating from 1700 BC must also have reached Ocos and La Victoria by sea; it has strong affinities with the pottery of Ecuador's Guayas basin. Finally, between Ocos and La Victoria is Salina Cruz, the ancient

port where Cortes built ships and from which exploration of the Gulf of Mexico began. Near Salina Cruz live the Huave Indians who claim that they came from the south by sea, giving rise to the possibility that there may be an affinity between their language and that of the Yungas of the northern coast of Peru, where the Chimú empire and culture flourished. Finally, certain decorative motifs found on polychrome Mixtec ceramics are similar to motifs of Andine origin, from which it can be conjectured that influences from across the sea penetrated into Mexico up the Attoyac river which rises in the Oaxaca valley.

We have deliberately refrained from mentioning the theses regarding Chinese influences, some very old, others dating from the Han period, on the pottery and decorative motifs of Teotihuacan and El Tajin, or of Hindu and Buddhist influences in Maya art; these theses have been definitively refuted.

■ Wigberto Jiménez Moreno

The new Law of the Sea

by Maria Eduarda Gonçalves

ONE of the key events on the international scene in 1982 was the adoption of the United Nations Convention on the Law of the Sea. It is no coincidence that this should have taken place at a time of mounting interest in the oceans, when the rarity of raw materials on land and the search for new resources have pushed individual States and the international community at large to turn their attention to the sea.

The Conference at which the Convention was drawn up was held in response to this preoccupation. It was the outcome of a combination of factors, such as technological progress (which today makes it possible to explore marine resources which were unknown a few decades ago) and political changes (the achievement of independence by many countries) which have been reflected in the desire of the developing countries to dispose of a legal framework that would encourage a more equitable distribution of opportunities for the exploration and use of the oceans and their resources, and of access to the inherent economic and social benefits.

The new legal framework replaces the traditional principle of the freedom of the seas. Theoretically, the seas were open to use by any State, but in practice only a small number of maritime powers possessed the material, financial and human resources to navigate, fish, and even make war on one another.

The freedom of the seas was based on a set of foundations which were both political—the international society emanating from the maritime expansion which had followed the great geographical discoveries—and scientific—it was thought that the immensity of the oceans and the volume of their resources (held to be inexhaustible) were such that all kinds of uses could be made of them without seriously jeopardizing their conservation.

But when the basic facts of the situation were changed, the developing countries began to call for greater justice in the sharing of maritime areas and greater equity in relations between States. The Convention proposes to achieve these objectives through the attribution of sovereignty rights over different zones. This attribution has two main forms.

On the one hand, it is recognized that coastal States enjoy territorial sovereignty over “territorial seas” up to twelve nautical miles in breadth, and functional and practical sovereignty in 200-mile “exclusive economic zones” and on the continental shelf, the extent of which is dependent on the geological structure of the area concerned. In addition to sovereign rights for purposes of research, exploration, management and conservation of renewable and non-renewable resources in these zones, the coastal States will enjoy jurisdiction where marine scientific research and protection of the marine environment against pollution are concerned.

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MARIA EDUARDA GONCALVES, of Portugal, is a professor at the Universidad Nueva, Lisbon, and a member of the Portuguese National Council for Scientific and Technological Research. She was a member of the Portuguese delegation to the third U.N. Conference on the Law of the Sea, a subject on which she has published many articles and studies.



Sampling sea water for analysis during a marine pollution monitoring workshop in Bermuda.

Photos IOC

THE Intergovernmental Oceanographic Commission (IOC) was created by Unesco in 1960. It now has 140 Member States. Its principal governing body is the Assembly, supported by an Executive Council of 32 Member States including those of the Chairman and four Vice-Chairmen.

The functions of the Commission are, briefly:

to define those problems, the solution of which requires international co-operation in the field of oceanic research; and to develop, recommend and co-ordinate international oceanic programmes for

- scientific investigations of the oceans,
- related services
- strengthening education, training and assistance in marine science and its technology which call for concerted action

- by IOC Member States
- with interested international organizations.

Ocean science

The Commission has five major ocean science programmes.

The programme on Ocean Science in Relation to Living Resources (OSLR), which FAO was invited to co-sponsor, is aimed at identifying fields of ocean science that could lead to a better understanding of the relationship between fish stocks and ocean environmental variability, to provide the scientific basis for fishery development and management.

The programme of Ocean Science in Relation to Non-living Resources (OSNLR), which the UN, through its Ocean Economics and Technology Branch (OETB) co-sponsors, is aimed at the study of regional geology and geophysical problems so as to provide the scientific basis for mineral exploration and exploitation.

In the field of ocean mapping, the IOC and the International Hydrographic Organization (IHO) jointly published in 1982, the fifth edition of the General Bathymetric Chart of the Oceans (GEBCO). The International Bathymetric Chart of the Mediterranean (IBCM) was completed and printed in 1981, and the IBCM Group of Specialists on Overlay Sheets in Geology and Geophysics is preparing six geophysical overlay sheets. The Geological and Geophysical Atlases of the Pacific and Atlantic are in preparation. The preparation of specialized ocean maps for the Atlantic and Pacific coasts of Central America, eastern and western Africa, and the South Pacific, is under study.



The Intergovernmental Oceanographic Commission

The Global Investigation of Pollution in the Marine Environment (GIPME) includes marine pollution research, baseline studies and the development of a global marine pollution monitoring system, with a view to providing a sound scientific basis for regulatory action to protect the marine environment.

The IOC is responsible for co-ordinating the oceanic component of the World Climate Research Programme (WCRP), to improve our understanding of the ocean's role in climate change and variability. The design of an ocean-monitoring system is being undertaken in close collaboration with the IOC-WMO (World Meteorological Organization) Working Committee for the Integrated Global Ocean Services System (IGOSS), the IOC Working Committee for the International Oceanographic Data Exchange (IODE) and the ICSU Scientific Committee on Oceanic Research (SCOR).

Ocean services

The IOC provides three major ocean services to its Member States.

The Integrated Global Ocean Services System (IGOSS) is a joint IOC-WMO, world-wide, operational service system providing data and information on the state of the oceans for various marine users. These users are concerned with exploration and exploitation of biological and mineral resources of the ocean, shipping, weather and climate, recreation, search and rescue operations, oceanic and offshore engineering, harbour control and pollution abatement and control.

The major objective of the International Oceanographic Data Exchange (IODE) is to collect, process, archive, retrieve and exchange oceanographic data on a world-wide basis. These services are needed to be able to minimize the hazards of ocean and atmosphere, protect and develop coastal areas, improve weather forecasting and marine transport, safeguard the marine environment and make proper use of oceanic living and non-living resources.

A global network of National Oceanographic Data Centres (NODCs), co-ordinated by the Commission, has been established and is gradually expanding.

The IOC also co-ordinates the Marine Environmental Data Information Referral System (MEDl) and participates actively in the Joint FAO/IOC/UN (OETB) Aquatic Sciences and Fisheries Information System (ASFIS).

Within the coastal zones of the Pacific and the shores of the Pacific Islands, twenty-two nations are now members of the IOC International Co-ordination Group for the Tsunami Warning System in the Pacific (ITSU). Educational and publicity material has been published, and new and additional Tsunami Wave Travel Time charts are being computed and drafted.

Training, education and mutual assistance (TEMA)

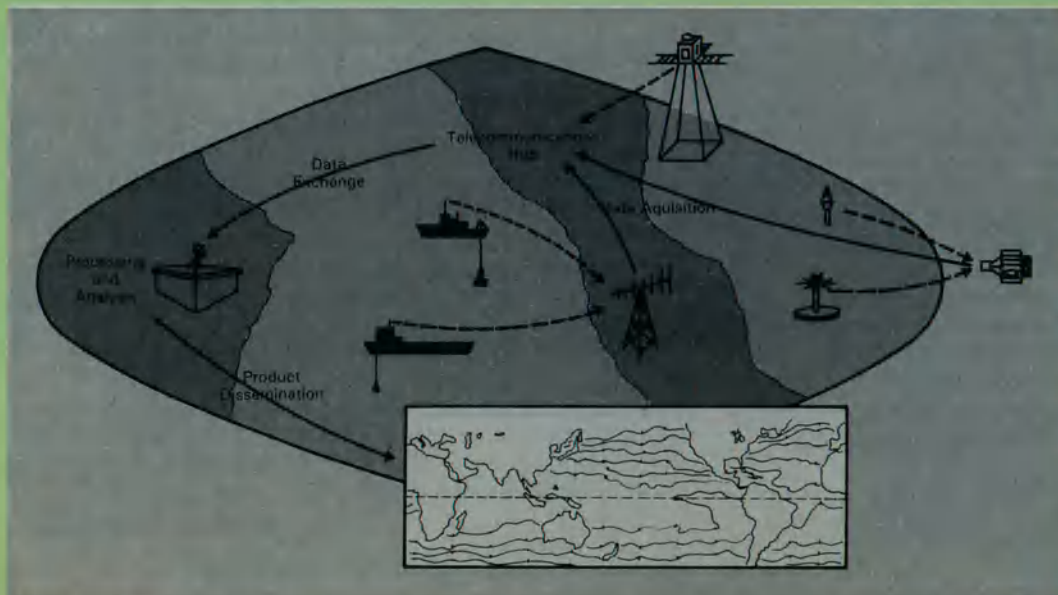
To support the Ocean Science and Ocean Service programmes of the Commission, the IOC organizes specific training, education and mutual assistance in the marine sciences. To meet the aspirations of the developing countries, the Commission has adopted a Comprehensive Plan for a Major Assistance Programme to Enhance the Marine Science Capabilities of Developing Countries.

Structures

The IOC also acts as a joint specialized mechanism of the UN organizations members of the Inter-secretariat Committee on Scientific Programmes Relating to Oceanography (ICSPRO): UN, Unesco, FAO, WMO and IHO. IOC assists them in the discharge of certain of their responsibilities in the field of ocean science, ocean services and related training, education and mutual assistance.

To execute its programmes, the IOC works, when appropriate, through regional subsidiary bodies; notably, the Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), the Programme Groups for the Western Pacific (WPAC), for the Co-operative Investigation in the North and Central Western Indian Ocean (CINCWIO), for the Central Indian Ocean (CINDIO) for the Southern Oceans (SOC), for the South-east Pacific (through the Joint IOC/WMO/CPPS (Permanent Commission for the South Pacific) Working Group on the Scientific Investigations of El Nino; and efforts are under way to form a regional subsidiary body for the Atlantic coast of Africa.

For its global programmes it works through specialized intergovernmental Working Committees for GIPME, IGOSS, IODE and TEMA, and other technical subsidiary bodies such as the SCOR-IOC Committee on Climatic Changes and the Oceans (CCCCO). ■



The Integrated Global Ocean Services System (IGOSS) in operation.

THE NEW LAW OF THE SEA

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On the other hand, seabed mineral resources located outside the limits of the national jurisdiction are declared to be "the common heritage of mankind", to be managed by the "International Seabed Authority", an organization to be created along new and innovative lines which will hold sovereign rights over the "Area" in the name of and in the interest of humanity. The powers of the Authority include those of organizing, directing and controlling exploration. The Authority will have a subsidiary, the "Enterprise", which will be directly concerned with exploration for and exploitation of minerals. It will also be responsible for distributing the fruits of such activities in accordance with equitable criteria, especially taking into consideration the interests and needs of developing countries.

Although the failings of the previous régime of almost total freedom have been recognized, the international community is not yet mentally prepared to accept a centralized system of international management for the oceans on a global scale. However, the régime for the Area [the seabed and ocean floor and subsoil thereof beyond the limits of national jurisdiction] constitutes an important, even revolutionary, step in this direction, in spite of the fact that exploration activities carried out by States and by public and private enterprises are allowed, under contract to the Authority, parallel to those carried out by the Enterprise.

Hence the ocean appears to be compartmentalized, whereas it could be claimed that a unitary juridical system would be better suited to the natural continuity of the marine environment.

In reply it might be argued that the obligations of the coastal States towards other States and the international community are written into the régime of zones under national jurisdiction and that, in a sense, these obligations offset the exclusivist tendencies of the system.

For example, the coastal State has a duty to respect freedom of navigation in its exclusive economic zone and is obliged both to co-operate with other States in whose waters the same species migrate as those which enter its own zone of jurisdiction, and to prevent, reduce, and control pollution which may have effects beyond the limits of this zone. A coastal State also has the obligation to concede the exploitation of those resources in its exclusive economic zone which it cannot fully harvest itself, to other, disadvantaged States which are either landlocked, or, because of special geographical characteristics, lack important coastal zones, or whose nationals have habitually fished in the zone in question.

But the attribution of rights is not enough. Conditions must also be created in which States, especially the least developed States, can effectively exercise their rights and fulfil their responsibilities. Accordingly, it is necessary for these countries to have access to scientific knowledge and to possess technologies for the rational administration and conservation of resources. This in turn presupposes the endogenous scientific and technological development that will enable them to participate in scientific research on equal terms. This preoccupation is apparent in the Convention when it prescribes duties relating to co-operation in the exchange of information and data, to training of personnel, and to participation in scientific programmes.

Thus international co-operation is presented as a necessary complement to the new rights. Paradoxical though it may seem,

the division of the oceans strengthens the need for collaboration between States. The importance attached to the role of the competent international organizations, notably the Specialized Agencies of the United Nations, should be seen in this context, as a framework for dialogue and rapprochement between States, and for the promotion of action to improve the infrastructures of developing countries, especially in the marine sciences and their applications.

The international community today has at its disposal a convention for the oceans which is global in its range and universal in its vocation. It should not be thought that achievement of final agreement of the text was an easy matter. It took five years non-stop work, prolonged debates, and the development of innovative negotiating techniques in which the Conference broke new ground.

The finalization of the Convention was only possible as a result of compromises that often gave rise to vague and ambiguous formulations. Consequently, there was a strong feeling that the régime which it established should be completed by a system of organs and procedures by which it could be interpreted and applied in the event of dispute. Provisions were made to this effect.

The Convention provides for the creation of a Tribunal for the Law of the Sea in which the representation of the principal legal systems of the world and equitable geographical distribution shall be assured. Members of the Tribunal will, of course, be persons of recognized competence in matters relating to the law of the sea.

As noted above, the Convention declared its vocation to be universal. Nevertheless, a number of States (including the USA and the Federal Republic of Germany, but also Turkey and Venezuela) have not signed it and show little intention of ratifying it or of acceding to it in the near future.

The reason for this is that the industrialized States find it hard to accept the obligations that would be incumbent on them if they were to accede to the Convention, especially insofar as the seabed régime is concerned, and specifically those relating to production limits and the transfer of technology to the Authority. Their greatest fear is that the solution that has been found, based on the principle of "the common heritage of mankind", constitutes a precedent which may be used in the future as a source of inspiration for régimes applicable to other spheres of international relations such as outer space and the Antarctic.

There are legitimate grounds for fearing that non-participation in the Convention, especially on the part of industrialized countries, may call into question the very effectiveness of the system whenever it appeals to those countries to provide the Authority with the capital and technologies it needs for the exploration of the mineral resources of the seabed.

Nevertheless, in spite of the compromises and the ambiguities, the Convention sets the objectives, defines the principles, and establishes the operating rules of a system of distribution of power and relations between States on which a new order of the oceans may be constructed. It differs from previous trends in that it presents a model and programmes of action that call into question values and principles rooted in liberalism in favour of greater democracy and participation in the international community.

■ Maria Eduarda Gonçalves

Ocean watch

EVERY so often a tragic accident occurs to remind the world that inadvertently or deliberately man is dumping significant quantities of potentially harmful substances into the oceans. The situation which probably received the widest publicity was the catastrophe which began in Minamata Bay, Japan, in the 1950s when methyl mercury chloride was released into the

scientists sponsored by Unesco and other United Nations Specialized Agencies drew a sharp distinction between what is happening in the open ocean, on the one hand, and in coastal areas and enclosed seas, on the other.

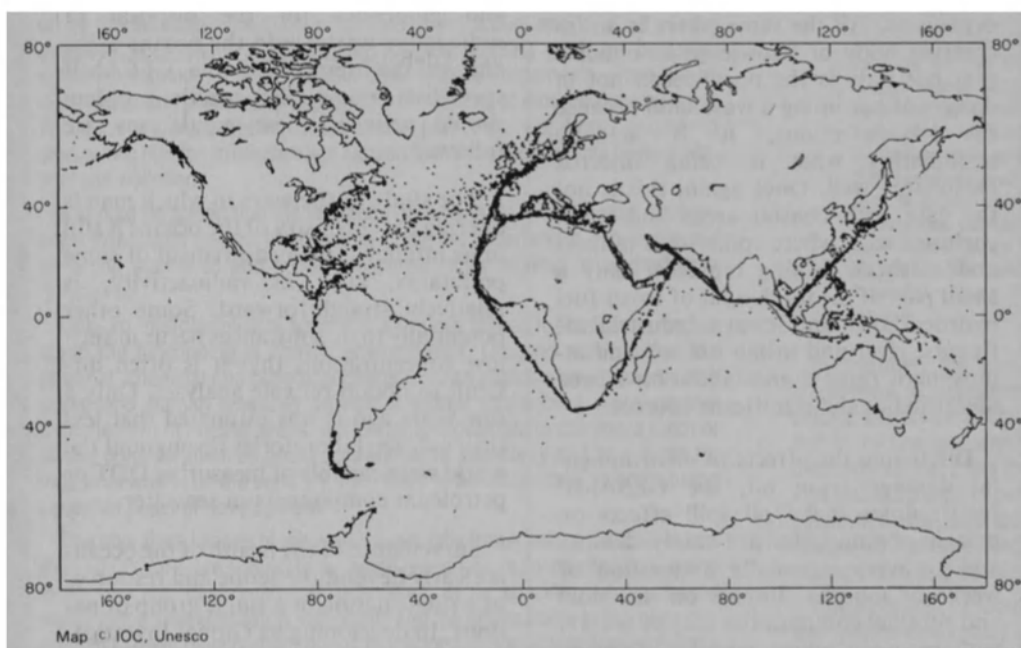
“In the open sea”, they noted, “we have not detected significant effects on the ecosystem. Trends have indeed been observed of the concentrations of several

concentration of industrial development in coastal areas. They are vitally important to man because it is in them (and to a much smaller extent in the upwelling areas of the oceans) that the vast bulk of marine fishery resources are located. Today, since the highest concentrations of metals, synthetic compounds such as DDT, petroleum hydrocarbons, suspended solids and litter are found in these waters, coastal fisheries are particularly exposed to the effects of pollution. In some cases “fisheries have been stopped in limited areas, sometimes leading to suspicion among consumers that fish caught elsewhere in adjacent areas may be contaminated, thus causing problems for the marketing of fish from whole regions”.

The scientists, whose report has appeared as “The Review of the Health of the Oceans” (GESAMP Reports and Studies, N° 15), were members of a working group set up by the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), an advisory body of specialists which provides scientific advice to its sponsoring organizations (1), including Unesco, and to its Intergovernmental Oceanographic Commission (IOC).

Through the IOC, Unesco has for some years played a leading role within the United Nations system in focusing attention on the scientific problems of marine pollution, especially as it affects the world ocean, and today the IOC through its Marine Pollution Monitoring (MARPOLMON) system, as part of its “Global Investigation of Pollution in the Marine Environment” (GIPME) is, through a network of regional and global activities, laying the basis for obtaining the data required to keep the health of the oceans under continuing review.

Defining pollution as “the introduction by man, directly or indirectly, of substances or energy into the marine environment resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairing of quality for use of sea-water, and reduction of amenities”, the GESAMP specialists examined the effects of five groups of potential contaminants: sewage; certain synthetic substances such as halogenated hydrocarbons (e.g., DDT and polychlorinated biphenyls—PCBs); petroleum; trace metals which, though naturally present in



During the four-year period 1975-1978, mariners and marine scientists made over 85,000 visual observations of oil slicks and other floating pollutants over much of the world ocean, as part of a Pilot Project on Marine Pollution (Petroleum) Monitoring (MAP-MOPP) sponsored by Unesco's Intergovernmental Oceanographic Commission (IOC) and the World Meteorological Organization (WMO). The map above shows the locations at which visible oil slicks were present at the time of observation.

bay from a chemical plant. Consumed in seafood by the local people, the mercury caused a disease of the central nervous system which claimed lives and left many permanently afflicted. More recently, in March 1978, the supertanker *Amoco Cadiz* made headline news when it ran aground off the French coast. Major pollution of beaches and coastal waters was the result of this navigational error.

Although such incidents are localized in their impact, they inevitably prompt people to ask the wider question—is man polluting the oceans to a dangerous and perhaps irrevocable degree, and thus destroying one of his last great natural resources?

In a recent attempt to assess the health of the marine environment, a group of

contaminants, some up, some down, but these are not reflected in environmental deterioration.

“On the other hand, effects can be seen in semi-enclosed seas, shelf seas and coastal zones. Semi-enclosed seas, like the Gulf of Mexico, the Mediterranean Sea, the North Sea and the Baltic, receive substantial contamination... In a number of local ‘hot spots’, the ecosystem balance has been disturbed. In one area of the North Sea (the Waddensee), and in the Baltic, pollution has been implicated in reducing the populations of some marine mammals.”

Coastal waters are under pressure because of the continued growth of human settlements along the coast, the increase in coastal recreation, and the

► sea-water in minute quantities, have significant adverse effects on organisms, when they exceed their natural level of concentration; and radionuclides or nuclear wastes.

Such substances reach the oceans in a variety of ways, ranging from dumping and spillage to discharge from factories or cities. They may be borne either directly or indirectly via rivers, which have been described as "the prime mover of materials from the continents to the oceans", or transported through the atmosphere and washed in by rain. Many materials enter the oceans through natural processes; geological weathering and volcanic activity, for instance, are important natural sources of the trace metals that are injected into the marine environment. All the natural elements are found in the ocean, and many of them, such as copper, when they occur at natural levels, are nutrients for marine flora and fauna. The challenge facing environmental scientists is to determine at what level these concentrations become toxic, in other words to establish when the limits of the ocean's tolerance are being reached.

• *Sewage.* The GESAMP report flashes a warning signal where sewage is concerned. It notes that "the use of the coastal zone for sewage disposal is worldwide and the input is increasing", but "problem areas are local rather than global, and coastal rather than oceanic. Sewage does present a direct risk of infections to humans on some beaches, especially during recreational seasons. Discharge on or near shellfish beds presents a greater risk to human health through the consumption of contaminated seafood."

• The *halogenated hydrocarbons*, including *polychlorinated biphenyls (PCBs)*. Here the picture is somewhat different. These compounds reach the oceans primarily in the form of vapour and, partly because of their world-wide transport by wind and ocean systems, can be detected at considerable distances from their sources. DDT, which has received wide attention because of the ecological damage it has caused, such as reproductive failure in birds due to egg shell thinning, toxicity and reproductive failure in fish and some marine mammals, is now virtually ubiquitous in the marine environment; it is found in plankton in every ocean from the Arctic to the Antarctic. It has been used primarily in agriculture as a biocide for the protection of cotton crops and as an anti-malarial agent. It is estimated that between 1971 and 1981 over 500,000 tons of DDT were used in anti-malaria programmes. Today, several countries have placed restrictions on its use because of its adverse effects on non-target organisms. The PCBs have a wide variety of uses ranging from dielectrics for transformers to the manufacture of paints and printing inks.

On the subject of PCBs, the GESAMP report notes that "There is no confirmed record of human illness having been caused by consumption of marine organisms due to their content of PCBs, although "PCBs residues in some marine organisms exceed the level set by some national authorities to safeguard human health." As for DDT, "its residues are not likely to place man at risk, but fear of contamination from this and other sources could damage the marketability of seafood."

• *Petroleum.* It has been estimated that over six million metric tons of petroleum hydrocarbons are injected annually into the world's oceans, and in the last decade several spills and oil-well blow-outs have occurred, discharging large amounts of oil that have contaminated the sea. Certain fractions of crude oil are highly toxic to marine organisms. All the same, there is an increasing body of knowledge to indicate that not only is the open ocean not in danger of becoming a wasteland because of oil infections, it is actually assimilating what is being injected reasonably well. Once again, this is not the case with coastal areas and semi-enclosed seas, where spills from tankers and offshore drilling represent only a small part of the total input of fossil-fuel hydrocarbons, and sewage, industrial effluents, river and urban run-off and atmospheric rainout and fallout have been identified as the significant sources.

Discussing the effects of environmental damage from oil, the GESAMP report notes that "oil spill effects on pelagic communities are rarely drastic, and recovery is usually a question of weeks or months. Impact on intertidal and subtidal communities may be severe, with recovery taking years or decades, particularly in shoreline communities where oil penetrates the sediments; and oil on beaches can seriously affect their amenity as recreational areas. Birds are particularly at risk, but there is no evidence that oil alone can threaten species survival."

However, the situation may change in the future, since "the extension of oil exploration into extremely hostile areas may give rise to major spills... and production is expected to increase in cold areas where oil degrades more slowly".

• *Metals.* Recent advance in analytical techniques for monitoring metals have in many cases resulted in a downward reassessment of the levels of metals in seawater in the open oceans. In inland waters, on the other hand, pollution by metals has been observed as a consequence of river, industrial and domestic sewage discharge or of direct dumping. The one exception to this pattern appears to be lead which, like DDT, is carried to the open oceans through the atmosphere after being used as an anti-knock agent in internal combustion engine fuel.

Increased concentrations of lead have been observed in some open ocean areas.

• *Radionuclides.* Since the very inception of atomic energy exploitation, it has been recognized that radionuclides, if released indiscriminately into the environment, can pose severe threats to human health as well as have detrimental effects on the environment. Man began injecting nuclear material into the oceans in the mid-1940s, a process which grew in importance over the next two decades, primarily as a result of the atmospheric testing of nuclear devices. Since the cessation of such testing by all but two countries, concern has shifted to the potentially adverse impact of effluents from nuclear reactors on the coastal environment. In addition, there is always the possibility of a massive release of nuclear material as the result of an accident. Various international instruments and guidelines for the disposal of radioactive wastes into the oceans exist, and in the opinion of the GESAMP specialists no public health problem should arise if these regulations are followed.

The study of the ways in which man is altering the chemistry of the oceans is still in its infancy. The measurement of some pollutants, such as radioactivity, is relatively straightforward. Some other potentially toxic substances occur in such low concentrations that it is often difficult to obtain reliable analyses. Only a few years ago it was estimated that less than a dozen laboratories throughout the world were capable of measuring DDT or petroleum components in seawater.

Surveillance of the health of the oceans is clearly beyond the scope and resources of a single nation or a single group of nations. In developing its Global Investigation of Pollution in the Marine Environment and the Marine Pollution Monitoring System (MARPOLMON), the IOC is collaborating with the leading United Nations Specialized Agencies and other relevant regional and international organizations. The overriding purpose of its work is to see that the global monitoring of the signals that foretell impending damage to the marine environment will be carried out using standardized methods of analysis so that data produced by scientists from the different world regions can be made comparable. This calls for extensive training for analysts and continual intercalibration exercises—the first steps in the global vigilance on which the health of the oceans depends—and for an active programme of mutual assistance with a view to creating the required marine research capabilities, particularly in the developing countries. ■

(1) The International Maritime Organization, the Food and Agriculture Organization of the United Nations, Unesco, the United Nations, the World Meteorological Organization, the World Health Organization, the International Atomic Energy Agency, and the United Nations Environment Programme.

Where land meets sea

TWO persons out of three today live in coastal regions, near the sea, on the shores of continents or on islands. This situation, which is the consequence of population growth and population movements as well as of economic development, concerns regions with a delicate balance, very often areas of ancient civilization whose prosperity was largely based on shipping and maritime trade and also on the relatively high productivity of the coastal environment.

The coastal environment is highly conducive to the establishment of human settlements, both permanent and seasonal, urban and industrial. Coastal zones, in particular, are affected by the scale of seasonal tourism. One-third of world tourism is thus concentrated on the coasts of the Mediterranean and the result is that in some areas the whole coastline is a sort of continuous built-up area.

The coastal environment is the product of the complementary effects of the terrestrial and marine environments and constitutes a complex system marked by the distinctive chemical properties of the waters and by a set of very evolutive ecosystems and geomorphological entities such as beaches, estuaries, lagoons, mangroves and coral reefs, environments which are all vulnerable, and particularly exposed, to the effects of modern development. Warnings are indeed being raised in one part of the world after another to alert public opinion to the damage caused to these environments by degradation and pollution.

It should be added that the influence of the sea on the terrestrial environment extends far beyond the coastline itself; the hinterland is, too, subjected to strong economic and social pressures, often tending in contradictory directions.

Only an interdisciplinary approach therefore makes it possible to understand the functioning of coastal environments. Coupled with data on the physical, chemical and biological characteristics of those environments, the social and human sciences provide a further basis for a more rational management of coastal areas. No longer is it possible to disregard them or simply consider them as being condemned to insalubrity and as a dump for industrial waste; on the contrary, they have to be recognized as constituting essential poles of development.

The countless islands of the world, especially those having an area of less than 10,000 km², are subject to the same pressures as continental coasts and moreover are confronted by difficulties of a specific nature. Island ecosystems are exceedingly vulnerable and the efforts made to increase production to meet development needs or respond to population pressure come up against especially acute spatial limitations. In the light of the limited size of islands and their isolation, the exploitation of local resources by the islanders takes on particular importance. In a large number of islands, terrestrial resources, especially agricultural resources, are no longer adequate to satisfy the needs of a growing population; the exploitation of coastal and marine resources thereupon becomes an economic imperative. This is a problem of concern to all countries that are responsible for managing more or less numerous groups of islands and of particular concern to island States.

Coastal wetlands and shallows, especially estuaries and mangrove swamps, provide rich and abundant nutrients on which an estimated two thirds of the world's fisheries depend. Today, coastal wetlands in many parts of the world are being degraded or destroyed by pollution and industrial development, while some tropical regions mangroves are being cut down for use as firewood. Below, mollusc-encrusted mangrove roots in a mangrove swamp at Elinkine, Senegal. Research on mangroves and other coastal marine ecosystems is promoted by Unesco's Division of Marine Sciences through the Major Inter-Regional Project on Research and Training leading to the Integrated Management of Coastal Systems (COMAR).

Photo Unesco



Unesco's interdisciplinary research programme on the minor islands of the Mediterranean is a research project on insular ecosystems which offers a unique opportunity to study in relatively controlled conditions the complete array of ecological, economic and social factors which influence the relationship between man and the biosphere. Launched by Unesco's Human Settlements and Socio-cultural Environment Division, the project is being carried out in collaboration with the Man and the Biosphere (MAB) National Committees of Greece, Italy, Malta and Tunis. In its first phase the project concerns the islands of Skiathos-Skopelos (Northern Sporades), Salina (Aeolian Islands), Gozo (Malta) and the Kerkennah Islands (Tunisia), above.

Furthermore, the island system and the conditions that define it lend themselves to population/resources/environment/development interaction studies with a view to obtaining precise information about the nature and extent of the changes wrought by human activities in environmental management operations. It has thus been maintained that islands, where the incomings and outgoings of persons and products can be readily measured, constitute veritable laboratories for interdisciplinary studies. This distinctive feature facilitates an integrated scientific approach to options concerning the management and development of these ecosystems.

Unesco's Major Programme X (*The Human Environment and Terrestrial and Marine Resources*) includes a programme specifically devoted to the *Management of Coastal and Island Regions*. The purpose of this programme is to promote the integrated management of coastal zones and islands. It is intended to foster international co-operation for the purpose of gaining a better understanding of the nature and functioning of coastal and island systems; to further effective collaboration between specialists in terrestrial, aquatic and marine environments and sociologists, economists and land-use planners within the framework of concrete field projects; and to facilitate the integration of scientific, socio-cultural and economic information for decision-making purposes.

In the various fields referred to, research programmes inevitably assume an international dimension. In addition, in the field of the marine sciences, particular requirements make themselves felt in respect of International co-operation, in view of the new order for the oceans as it emerges from the conclusions of the United Nations Conference on the Law of the Sea.

Unesco's international scientific programmes—the International Geological Correlation Programme (IGCP), the International Hydrological Programme (IHP) and the Man and the Biosphere programme (MAB), and those of the Intergovernmental Oceanographic Commission (IOC)—are thus particularly well adapted to the nature of the tasks to be performed: these programmes constitute a means of putting into effect a type of international co-operation which is shaped by the very nature of the fields of study and the problems to be solved. They contribute to a better understanding of world or regional phenomena, to the growth of knowledge about the natural resources that are available at the national level, and to the strengthening of the necessary scientific capabilities. They provide a means of exchanging knowledge and encourage bilateral, subregional or regional co-operation, with the result that the effort put into them undergoes a remarkable multiplier effect. These programmes also require an interdisciplinary approach and foster the establishment of working relations among research workers, decision-makers and operational personnel with a view to the identification of problems and the application of research findings. ■

Photo Arane Bailey, Unesco



UNESCO NEWSROOM

Unesco's General Conference

The 22nd session of Unesco's General Conference opened in Paris on 25 October 1983. Mr. Said M. Tell of Jordan was elected President of the Conference, which is composed of the government representatives of Unesco's Member States, whose number rose to 161 when St. Christopher-Nevis joined the Organization on 26 October. As we go to press, the Conference, which ends on 29 November, has not completed its work. An account of its proceedings will appear in a forthcoming issue of the *Unesco Courier*.

Rainbow days

In 1979, on the occasion of the International Year of the Child proclaimed by the United Nations, L'Association des Amis des Journées Arc en Ciel ("Association of Friends of Rainbow Days") was created in Toulouse, France. Its aim was to organize periodic gatherings at which children from different countries could take part in sports and cultural activities, and adults could meet to compare their ideas and experiences as educators. A first meeting was held in 1980. At the second, held in Toulouse from 29 August to 5 September 1982 with the support of numerous organizations including Unesco, 180 children from 18 countries enjoyed a variety of sporting and manual activities such as pottery-making, and followed road safety and first aid courses. They also discovered the artistic treasures of the region and learned more about the different cultures to which they belonged. From 1 to 3 September, 200 persons from 16 countries took part in an international symposium on the theme of "Games, Competition, Sport and the Child". The Association is preparing a third meeting which will be held in Toulouse in 1985.

World Poetry-Childhood Day

In 1976 a World Poetry-Childhood Day was founded at the International Poetry

Biennale at Knokke, Belgium. It is celebrated each year on 21 March, the first day of spring, by children under the age of 13. Held under the patronage of Unesco (in 1979) and leading world figures, the occasion has so far been devoted to the following themes: Myself and the others; Words to banish war; Words to build peace; The world is our home. The theme of World Poetry-Childhood Day for 1984 will be: Let's build a world without fear. Parents, educators and children who would like to know more about this event should write to: World Poetry-Childhood Day, Avenue des Ortolans 95, 1170 Brussels, Belgium.

UNICEF greeting cards

Thanks to the proceeds from the sale of its greeting cards, gifts and stationery, the United Nations Children's Fund (UNICEF) is today helping needy children and mothers in over 100 countries of Asia, Africa and Latin America by providing basic health care, safe drinking



water, improved nutrition and education. This year's cards are now on sale at UNICEF sales points throughout the world. The collections of standard, air-mail and mini-format cards feature a wide variety of designs donated by artists and museums in many countries. They include a 19th-century manuscript from Kashmir, Indonesian batik designs, and paintings from China, Japan and Senegal. Also on sale are a 1984 wall calendar for children and an engagement diary with 54 colour illustrations on the theme "Festivals and Celebrations". Shown here, card featuring a work by the Spanish painter Joan Miró.

BOOKSHELF

Recent Unesco publications

■ **Racism, Science and Pseudo-Science.** Eminent international scientists critically examine pseudo-scientific theories used to justify racial discrimination in relation to their respective fields: genetics, anthropology, psychology, sociology, and history. No. 8 in Unesco's "Insights" series. 1983, 162 pp. (38 F).

■ **Education in Latin America and the Caribbean: Trends and Prospects, 1970-2000,** by José Blat Gimeno, 1983, 190 pp. (45 F).

■ **The Transition from Technical and Vocational Schools to Work.** Reports from 17 countries. 1983, 100 pp. (20 F).

■ **Empirical Research in Education,** by G. De Landsheere. An overview of research techniques and information about research institutes world-wide. 1982, 113 pp. (30 F).

■ **Quality of Life: Problems of Assessment and Measurement.** 1983, 117 pp. (30 F).

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From nomad to fisherman

At an improvised, open-air school on the east coast of Somalia, near Brava, nomadic herds- men, survivors of the great drought and famine in Ogaden and Lower Juba, learn the arts of fishing. After the nomads have become acclimatized to the sea, the experienced fishermen of the region teach them the skills which enable them to start afresh in a new way of life.