

GENE AMMARELL

Knowing When to Set Sail Practical Knowledge and Simple Heuristics in Bugis Navigational Strategies

While state authorities and development specialists often view indigenous knowledge as backward and obstructive to modernization and progress, there is a growing awareness that such knowledge is more adaptable and better suited to decision making in the real world than is the more universalistic knowledge that is produced in a remote laboratory and introduced from the top down.¹ In an ongoing study of navigational knowledge and practice among a population of Bugis seafarers from South Sulawesi, Indonesia, I have recorded a body of environmental, psychological, social, and spiritual knowledge upon which local sea captains claim to have long relied in determining the appropriate moment to set sail aboard their tall ships. Before the relatively recent introduction of auxiliary engines and increased use of magnetic compasses, a thorough knowledge of patterns of winds, tides, currents, stars, and other physical features of the maritime environment was under-

¹ In acknowledging the contributions of others to this article, I would like to begin by expressing my deepest gratitude to my Bugis colleagues and friends on Balobaloang. Here I will single out three: my research associate, Pak Supriadi Daeng Matutu, who facilitated hours of interviews and worked tirelessly with me in the interpretation of their transcriptions; my teacher and 'father', Pak Haji Sima Daeng Pasolong, who has freely shared so much of his knowledge with me; and the young and gifted navigator Paq Hansar, with whom I hope to sail for many years to come. For the many hours of work transcribing interviews in both Bugis and Indonesian, I wish to thank Drs. Gusnawaty Anwar of Hasanuddin University. I would like to thank those who have read earlier drafts of this article and offered their insightful suggestions. These include Janet Dixon Keller and other members of the session on Pacific Seascapes at the 1999 and 2000 annual meetings of the Association for Social Anthropology in Oceania; Gerd Gigerenzer; and the anonymous reviewers of *Bijdragen tot de Taal-, Land- en Volkenkunde*. Finally, I would like to express my gratitude to the Ohio University Research Committee, the Southeast Asia Program, and the Center for International Studies, who have generously supported my research.

GENE AMMARELL obtained his PhD at Yale University. He is currently Associate Professor of Anthropology at Ohio University, specializing in cognitive anthropology and social change in Insular Southeast Asia. His recent publications include *Bugis navigation*, New Haven: Yale University Southeast Asia Studies Monograph Series, 1999, and 'Astronomy in the Indo-Malay Archipelago', in: Helaine Selin (ed.), *Encyclopedia of the history of science, technology, and medicine in non-western cultures*, Dordrecht: Kluwer, 1997. Dr. Ammarell can be reached at the Department of Sociology and Anthropology, Ohio University, Athens, Ohio 45701-2979, USA, and at ammarell@ohio.edu.

pinned by knowledge of ritual and magic, the practice of which was meant to ensure safe and speedy voyages. While elder navigators lament the passing of much of this knowledge, especially the ritual and magic that helped uphold their authority, some younger navigators continue to study and apply this knowledge even as they adapt it to economic and technological change. The question I address here concerns how Bugis captains decide, on the basis of culturally constructed interpretations of their physical, social, psychological, and spiritual environments, when it is time to set sail.

In this article I draw upon my own ethnographic data obtained through fieldwork in the Bugis island village of Balobaloang and aboard its ships, as well as upon comparative ethnographic and historical accounts from South Sulawesi and Micronesia and recent research in cognitive science to help explain the efficacy of this specialized knowledge. Along with Charles and Janet Keller (1996), I assume that such knowledge is emergent and that it is tied to purposeful action in a mutually constitutive manner; as such, it is both continuously reinvented and adaptive. This knowledge is not, however, idiosyncratic; it is shared within a subculture of navigators, who learn from one another as well as from individual practice. Following James Scott (1998) and Gerd Gigerenzer et al. (1999), I distinguish practical knowledge, based upon hands-on experience in a local setting, from scientific knowledge, which claims higher levels of abstraction and universality, and suggest how, within the natural, social, and religious environment in which Bugis navigators operate, such practical knowledge is, indeed, efficacious.

'When will the ship be leaving?'

Seeking passage aboard a Bugis trading ship, would-be passengers will, quite naturally, want to know the estimated day and time of departure. 'We'll leave once we've taken on a cargo', the captain assures them. 'Come back tomorrow.' Not wanting to miss the ship, passengers dutifully return the next day, only to be told that there is no cargo yet and that they should 'come back again tomorrow'. This sequence repeats itself, often for several days, until a cargo is, in fact, secured in the hold. This, however, is only the first and most transparent hurdle. Now, when asked again, the captain will be only marginally more specific, often advising passengers to come back ready to leave the next day at a certain time (for example, by mid afternoon for an early evening departure). Once again, the captain may postpone departure for one or more days. The reasons for these apparent 'delays' have come to light only after I myself repeatedly showed frustration as an impatient passenger on a number of Bugis ships.

There are several domains of activity that must be entered into and com-

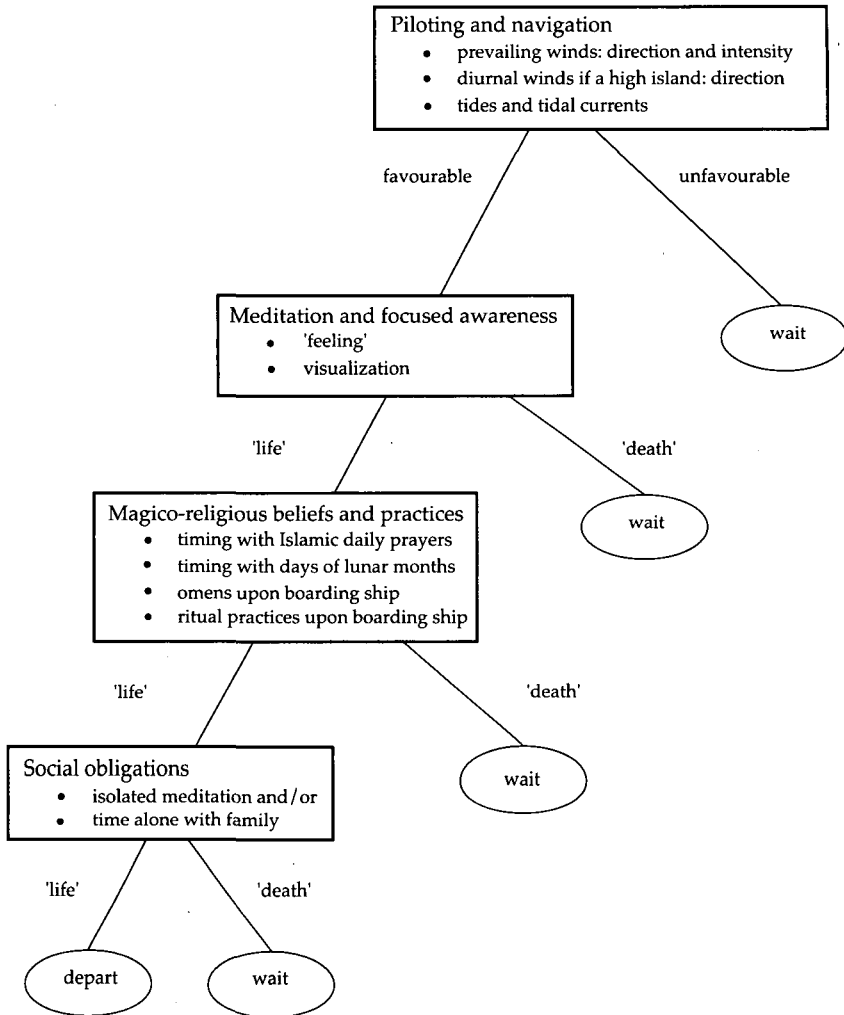


Figure 1. A decision tree illustrating the domains of activity that are entered into and completed before a ship can set sail once the cargo is loaded and the ship and crew are ready

pleted before any ship's captain will set sail (see figure 1). Already mentioned is the procurement and loading of the cargo; the transport of cargos, either for trade or on consignment, is, after all, the means by which Bugis and other seafaring peoples from Sulawesi have long made a living.² Most cargos car-

² See, for example, Ammarell 1999; Collins 1936, 1992; Crawford 1974; Forrest 1779; Raffles 1817; Southon 1995; Tobing 1961.

ried by Bugis ships are relatively non-perishable, and the main incentive for a speedy voyage is the desire to find and move yet another cargo as quickly as possible. The most common exception for the ships of Balobaloang, however, involves consigned cargos of shallots, which will begin to spoil in the warm hold of the ship after about three days. In this case, some of the practices described here are modified or even abandoned to ensure that no shallots, and hence no profits, are lost.

Ships must also, of course, be adequately provisioned. Before casting off, all the rigging and the engine must be in good repair, and there must be adequate fuel and drinking water on board to last till the next destination. Finally – and this may seem deceptively obvious – the captain and crew must be on board and ready to depart, the captain having adequate knowledge of the course he must follow to make the next port safely and speedily. Meanwhile, an experienced captain will also be attending to several other domains of activity.

Sailing with the wind

There are, according to the Bugis navigators I have interviewed, two critical features of the maritime environment which they must take into account as they prepare to set sail. These factors are winds and currents and their relative directions and intensities. While I have described Bugis knowledge and use of winds and currents in navigation and piloting in greater detail elsewhere (Ammarell 1995, 1999), here I show how it can be understood as a rational and efficient means in solving a particular problem in piloting.

For generations, Bugis ships, as well as those of other seafaring peoples of Insular Southeast Asia, have relied upon the monsoon winds to carry their tall ships from one end of the archipelago to the other. From the mid 1970s on, in a period of increased prosperity, Bugis shipowners, including those of Balobaloang, have begun installing auxiliary engines; today a ship without an engine would attract neither cargo nor crew (Ammarell 1999:223-6). Although a motorized sailing ship can make way when there is no wind, all but the very largest lack engines powerful enough to push against a strong headwind, and it is still considered common sense to take advantage of the wind to both maximize speed and conserve fuel. Moreover, there are times when, even for the largest ships (those between 100 and 200 tons), the wind is considered too strong, raising a sea that could endanger ship and crew. At such times, the captain will carefully study weather patterns to ensure a safe departure. Thus, even though auxiliary engines enable departures in calm air or even with a slight headwind, these are still mostly timed as if the ship were relying on wind alone.

Two types of wind that are recognized by Bugis navigators in this context are the prevailing winds at sea and the onshore and offshore winds encountered near land. The Bugis village of Balobaloang is situated on a tiny coral islet in the midst of the Flores Sea, approximately one hundred nautical miles from the nearest high islands and, therefore, is subject only to the prevailing monsoonal winds, blowing generally from the east and south-east from May through September and from the west and north-west from December through March. Most of the ports visited by the ships of Balobaloang, however, are located along coasts of high islands where diurnal changes in temperatures of land and sea create a cycle of daytime onshore and night-time offshore winds. Both prevailing and diurnal winds are fairly predictable as regards both direction and intensity, although both are subject to variation due to local and regional weather patterns. For example, in the Flores Sea, the prevailing wind during the west monsoon is observed to shift between west-south-west and north-west, while during the east monsoon it shifts between north-east and south-south-east, all with varying intensity. Moreover, the diurnal winds are often quite weak and sometimes fail to materialize at all. Bugis navigators are aware of a number of signs in nature, which help them to predict these variations, but these are far from precise, and surprises often occur. On the basis of what they have learned from their elders and their own experience, however, the navigators of Balobaloang have come to plan their voyages, including the timing of their departures, in such a way that they are most likely to gain advantage from the direction and intensity of the wind. For example, departure from a high island is timed to benefit from the expected onset of offshore winds, which is most often sometime between 8 and 10 p.m. – a practice noted also by G.E.P. Collins (1936:14) while awaiting the departure of a local ship from Makassar. Less often, ships will set sail around 5 a.m., giving them a head start before the time when offshore winds usually subside.

These windows of opportunity are also associated with the prescribed Islamic prayer times of *mangaribi* ('sunset', locally 6.20 p.m.) and *isa* (one hour after sunset, locally 7.20 p.m.) in the evening, and *subu* (locally 4.20 a.m.), just before the first light of dawn, and the captain will often announce that the ship will depart just after one of these prayer times, for example, *pura mangaribi* ('after *magrib*').³ In magico-religious terms this association is polysemous, with prayer and meditation being understood to be instrumental in

³ In transcribing Bugis terms, I distinguish six vowels: i, é, a, e (schwa), o, u; and 19 consonants: b, p, d, t, g, k, j, c, m, n, ny, ng, s, l, r, w, y, h, q (glottal stop). Difference in vowel length is non-phonemic, while contrastively long consonants are indicated by doubling; for example, *ita* 'see': *itta* 'long time'. Unless otherwise indicated, all italicized terms are Bugis as pronounced on the island of Balobaloang and in the homeland of Maros, north of Makassar, while place names follow current Indonesian usage. Brackets, (...) enclose glosses for cited forms.

ensuring a productive and trouble-free voyage. While this point will be elaborated below, it suffices here to point out that it is considered inauspicious not to depart immediately after prayer. Thus, it would be tempting fate and highly unusual to leave between 8 p.m. and 4 a.m., even though the offshore winds near a high island might still be favourable during that period of time.⁴ Also, since the low island of Balobaloang does not experience diurnal winds, one could, in principle, depart from that island at any time, day or night, as long as the wind was blowing. Here again, departures are most generally undertaken immediately following one of the five daily prayers and when the tide is high enough to paddle a dugout across the reef flat to the ship. Assuming that other conditions are favourable, it is considered particularly auspicious to set sail between *lohorō* ('noon prayers') and *assaraq* ('mid-afternoon prayers') on Friday. For Muslims this *lohorō* is the most important prayer time of the week, when all who are able are expected to come together at the mosque to pray. Among the Bugis it is designated by reference to the day of the week, *jumaq*. The most auspicious time to set sail, therefore, is *pura jumaq* (after Friday noon prayers). Once again, leaving a harbour of a high island, a Friday departure would necessarily await the development of offshore winds after dark.

Ethnographic studies from the central Micronesian islands of Puluwat (Gladwin 1970) and Satawal (Thomas 1988) reveal contrasting responses to parallel concerns by navigators from these geographically rather distant (from Sulawesi) but linguistically related (Austronesian) seafaring societies. Like Balobaloang, these islands are atolls, subject only to prevailing winds, which during certain seasons are either too strong or too weak for travelling in indigenous sailing canoes. According to both these researchers, the decision about when to depart is mostly reached only one or two days in advance, regardless of how far in advance the voyage was planned (Gladwin 1970:49-50; Thomas 1988:141-2). Gladwin points out, however, that preparations are not simple. Equipment required for sailing the canoe, plus food, trade items, gifts, and personal effects must be secured and stowed under the supervision of the navigator before he 'pronounces the canoe ready to leave'. Strikingly reminiscent of departures from Balobaloang, according to Gladwin (1970:51) on Puluwat 'canoes may leave at any time of the day, or even at night, but most depart during the morning or at midday [...] especially [...] those leaving on long voyages', thus providing time for the preparation of fresh food and the assembling of crew and well-wishers. Once the

⁴ Perishable goods like shallots come from high islands like Bima; they are normally taken on at night, when it is cooler, and the ship will set out as soon as it is loaded, usually about 3 a.m., regardless of prescribed Islamic prayer times. Coincidentally, a land breeze, considered favourable, may still be felt at this time of night.

anchored canoe is declared ready to depart,

there is a pause. The crew comes ashore and may share a cigarette or two, passed from hand to hand among themselves and the well-wishers who will remain behind. Often before a longer trip everyone goes to church for a prayer and a blessing. In a touching gesture the navigator, if his old navigation instructor is still alive, may go to ask his mentor's last-minute advice if he cannot physically lend his presence to the departure. Then without any formal farewells the men wade out through the shallow water to the canoe. (Gladwin 1970:52.)

Among the Bugis, as I have suggested, navigators most often pray at the mosque before departure. The practice of Islamic prayer among the Bugis, like that of Christian prayer on the said Micronesian islands, appears to have been added onto earlier animistic practices, transformed vestiges of which still survive in both societies. I will discuss this further on. On Balobaloang, as on Puluwat, social commitments grow in importance as the time of departure approaches, as I will emphasize below. Here I will note that on Balobaloang, when a departure appears to be imminent, a navigator will usually make it a point to visit elder retired navigators, who often question him on details of the planned voyage. Also, when a son or husband is about to depart, a woman spends several hours cooking fairly elaborate meals of rice and side dishes, which must be eaten within hours of departure to avoid spoilage. Then, as the passengers and crew are shuttled by dugout to the ship, family and friends gather on the beach, often lingering until the ship is well under way.

Before the departure of any sailing vessel, however, the wind must be seen to be favourable, and this can be established with any certainty only hours in advance. Thus Gladwin (1970:46) was told that 'the short lead time is necessary in order to be able to forecast favorable weather during the first leg of the trip'. Weather forecasting among these Micronesian navigators is based upon an almanac, committed to memory by them, as well as on observations of cloud patterns and other features of the maritime environment. Almanacs, described in detail by Thomas (1988:38-41), incorporate a combination lunar-solar calendar and information on the appearance of certain stars on the horizon from which predictions of the seasons and weather can be made. Certain lunar months and parts of months were known as either too calm or too stormy to sail, while others were considered good for voyaging, either in order to fish or to visit relatives and friends on nearby islands. In anticipation of a voyage, the navigator observed the sky at dusk and dawn to study both the stars and the cloud patterns. A favourable weather prediction for the next day and a specific reason to travel according to Thomas were the main determinants in the choice of a time at which to set sail.

When departing from their home island, the navigators of Balobaloang,

like their Micronesian counterparts, both make predictions about and carefully observe the strength of the prevailing winds before deciding to set sail. I will provide an example further on. Also like the navigators from Puluwat and Satawal, the Bugis have for many generations kept almanacs and used these, among other things, to make predictions about the weather on the basis partly of sightings of astronomical phenomena and partly of divination. Unlike those of the Micronesians, Bugis almanacs have been committed to writing since the 14th century (Pelras 1998:22). Much has been written about these Bugis almanacs, many of which are still in use among Bugis rice farmers on the mainland (see, for example, Pelras 1987; Robinson 1998). While they may still be relied upon by Bugis navigators elsewhere, I have no evidence that there are any extant on Balobaloang. Rather, navigators here commit to memory signs in nature that aid them in predicting the direction and strength of the prevailing and diurnal winds. Among these signs are the tilt of the crescent moon, the appearance and disappearance of named patterns of stars, the appearance of rainbows and clouds, and the activity of certain birds (Ammarell 1999:51-7, 109-11).

Although wind direction and intensity are understood to be the most significant physical cues around which to schedule a departure, the navigators of Balobaloang recognize tidal currents as critically important as well. In contrast to the diurnal winds just discussed, the tides and currents they generate are at once more predictable *and* more complicated to predict.⁵ To summarize, these navigators base their predictions of tidal currents – those that dominate close to land, and so are of the greatest concern in connection with departures and arrivals – on three observations. In ascending order of importance they are: (1) an elegant algorithm which relies upon knowledge of the synchronous relationship between tides and currents and the diurnal passage of the moon in the sky; (2) chop, a type of turbulence caused by the collision of wind and currents; and (3), if both the moon and chop are absent or unascertainable, the drift of the ship itself relative to stationary sea and land marks. Knowledge of each of these cues – lunar position, chop, and drift – and their complementary relationship is learned from the teachings of others and from personal experience, the position of the moon being clearly the most valuable of the three.⁶

⁵ Elsewhere I provide a detailed description of the means by which the people of Balobaloang predict the tides and tidal currents as they travel across the region (Ammarell 1999:154-68).

⁶ Drawing upon personal discussions with and observations of navigators in the United States and on classic works on international navigation (for example, Bowditch 1995; Maloney 1985), I suggest that this practice is in contrast with that of western navigators, who by and large rely on published tide tables (which also indicate the depths of the water at particular localities for any time and date desired) and, if in familiar waters, the general progression of the tides as

The effects of currents notwithstanding, wind direction and strength continue to be the primary cues in the physical environment by which the decision to set sail is guided. Bugis ships, I was told, have always been able to overcome weak currents, in the past with larger sails and today with auxiliary engines, even when offshore winds fail to materialize. Although Bugis sailors tell stories of times and places where especially strong tidal currents delayed departures for up to two weeks at a time,⁷ I personally, in my experience aboard ships with and without auxiliary power, never saw even the most seasoned navigator hesitate to depart from a bay as long as an offshore wind was due, even when he himself had predicted strong, unfavourable tidal currents. On the other hand, I have been party to voyages that were postponed for up to several days due to high winds and rough seas.

In summary, navigators from Balobaloang, not unlike those of Micronesia, have found through experience that, with or without auxiliary engines, departures are best gauged by a combination of predicted and observed winds, and that except under the extreme conditions such as are found in long, narrow estuaries, the expectation of adverse tidal currents, while important for safe and efficient piloting, is not a determinant in deciding when to set sail.

Signs and omens: A matter of 'life' and 'death'

While a knowledge of the physical environment is critical in deciding when to set sail, a body of more esoteric knowledge and practices has an equal bearing on the decision-making process of a Bugis navigator. This body of knowledge, referred to locally as *paddissengeng* and in Indonesian as *ilmu*, includes a knowledge of *tanra* ('signs or omens') that may be ignored only at the peril of the ship and its crew. Categorized as either *tuo* ('life') or *maté* ('death'), these signs are pinpointed primarily through a process of focused awareness that is cultivated through meditative practices, including martial arts. While signs may be found everywhere in nature, those which are connected with some internal feeling or visualization seem to carry the most weight, while many signs reside entirely within the body/mind of the individual. Feelings which come from within are referred to by the Bugis term *pakkasiaq* (Indonesian *perasaan*). One becomes aware of this feeling as it rises

they rise and fall approximately fifty minutes later each day. While they would be aware of the importance of the moon to the changing tides and realize that a full or new moon brings the most extreme tides and currents, very few appear to physically look to the moon for cues about current tidal conditions.

⁷ Due to the interplay of the lunar cycle and diurnal winds, two weeks is usually the longest one would have to wait for a favourable tide/wind combination (Ammarell 1999:259 n.12).

up with one's breath from one's diaphragm through one's chest cavity.⁸ The young navigator Hansar described it most vividly by tracing his fingers from his abdomen up past his sternum and chin as he first inhaled and then exhaled. If one's breath flows in a smooth and relaxed way, it is said to be *tuo*; if not, it is *maté*, and the object of one's meditation, such as an imminent departure by ship, must be put off and subjected to further meditation until the breath is *tuo*.

Michael Southon (1995:129-34) reports on a similar body of esoteric knowledge among the Butonese of Southeast Sulawesi, another of the region's major seafaring societies. He describes a contrasting form of meditation performed by Butonese navigators, of which he was informed by a ritual expert.

Much of this *ilmu* involves a kind of meditation in which decisions on where to sail and the length of a voyage are reached through awareness of the body. The issue to be decided is thought of as a choice between right and left. The practitioner then focuses his mind on different parts of the body; a feeling of warmth or cold in the left or right arm provides an indication of which course of action is appropriate. Another such practice involves inhaling and exhaling through alternate nostrils. (Southon 1995:130.)

Among the Bugis of Balobaloang, the second source of signs is known by the Bugis term *samannanita* ('as though already seen').⁹ I was first introduced to the concept of *samannanita* by Pak Haji Sima Daeng Pasolong during fieldwork carried out in 1991-1992 (Ammarell 1999:181-2). I have pursued it during subsequent visits in 1997 and 2000. Haji Sima, now in his eighties, is a highly respected village elder, woodworker, and retired navigator. He is perhaps best known and respected in the village and beyond as someone who practises powerful traditional magic and possesses other esoteric knowledge, including a knowledge of Bugis martial arts. While many Muslims regard magic as being inconsistent with their beliefs, Haji Sima considers himself a devout Muslim, who believes that all his knowledge and efficacy come from Allah.¹⁰

Although it may have been somewhat more widespread in the past, the esoteric knowledge that Haji Sima possesses is not shared to its full extent by many living seafarers. This knowledge is that of an expert, but, according to Haji Sima, is available to all who sincerely wish to make the effort to acquire

⁸ Although this requires further investigation, it seems to be related to the phenomenon of *chi* described in East Asian meditative and martial arts.

⁹ The term *samannanita* comprises the following underlying forms: *samang* ('as though', where the *g* is deleted due to regressive assimilation); *na* ('him/her/it'); *ni* (passive prefix, where the *i* is deleted due to regressive assimilation); and *ita* ('see').

¹⁰ For a recent discussion of the syncretic nature of Bugis ritual, see Robinson 1998:168 ff.

it. Haji Sima laments the fact that, with motorization, fewer younger men are motivated to study it today. He himself had several teachers in his lifetime, although one in particular seems to stand out in his mind. I felt very fortunate, therefore, to find myself, during a brief period of fieldwork in July 2000, on a ship skippered by the 25-year-old Hansar, a student of Haji Sima. I will return to Hansar's interpretations below. First, however, I will focus upon those aspects of esoteric knowledge that Haji Sima maintains have helped him negotiate the maritime environment all his life. Basing myself primarily on discussions between Haji Sima, Supriadi (his 'grandson' and my research associate), and myself, I describe the ways in which he claims to have readied himself, his crew, and his ship for departure from port.

The practice of *samannanita*¹¹ consists of meditative visualization. Haji Sima and others utilize it to ensure the safe and successful completion of a task or achievement of a goal, including, but not limited to, travel away from one's home. When I left Balobaloang to return to America in 1992, Haji Sima instructed me to visualize my entire journey before I set out. He also advised me, if any part of the visualized journey seemed problematic, to delay my departure until such time as it appeared successful. So when I asked him about this during a return visit in 1997, he began by asking Supriadi and me to repeat the process then and there, which we both did. Then he asked us if we could see the contents of our respective homes and the activity that was taking place there. He then reminded me, 'At the time you wished to depart, wished to return to America, you saw before you just what you now saw, then you left. Whenever you wish to depart, sit and visualize your house like this, then leave.'

Haji Sima then went on to explain that this practice, as well as the esoteric knowledge that underlies it, 'is not only to be used when we want to go to Ujung Pandang [Makassar] or Java, but constantly, even when we only want to go for a walk, want to go to someone's house'. He continued that the source of this kind of awareness is Allah, and that it is acquired by training oneself to centre one's thoughts on 'Allah the all-powerful'. To train ourselves to be aware, according to Haji Sima, is the most important thing we can do, 'because once we have this awareness, we always use it'.

He then turned the discussion to the use of this awareness by navigators, saying 'only when the ship is ready to sail should people come aboard: only when the ship is ready to leave should the anchor be raised. If all is not ready, do not go aboard and do not raise the anchor. To be aware of these things is among the qualifications of a ship's captain.'

¹¹ *Samannanita* also is described by the phrase *lettuq mémani nappa lao* ('arrival assured, then depart'), where the first and fourth terms may be substituted according to the objective, for example, 'completion assured, then begin'.

Shelly Errington points out that among Bugis 'in positions of leadership and responsibility' such meditative practices are quite common. In Luwu she learned that meditation and being in a state of conscious awareness are evidenced through 'perfect self-control, never showing anger or distress: the fact that they anticipate trouble and thus prevent its happening, which takes constant alertness; and that they are never caught off-guard, and are always calm and composed' (Errington 1989:50). Someone who is in this state is also able to protect his followers, even as they guard and increase their own potency (Errington 1983:558). 'The point of meditation', she was told, 'is to achieve a state of internal oneness [with Allah and His creation], a state of being perfectly undisturbed: no doubts, anxieties, appetites, or needs' (Errington 1989: 86-7). I suggest that it is this same sense of oneness with God that Haji Sima recognizes as underpinning his knowledge and practice.

Haji Sima explained that in the past, aspiring navigators such as himself had to learn all of this and more before they would be trusted by shipowners to captain their ships. 'Nowadays', he continued, as a result of increased prosperity and a breakdown of the traditional hierarchy and the introduction of engines that make navigation much easier, 'it is easy for young men to find ships, so they don't want to ask the elders for their knowledge anymore'. Moreover, he asked, 'How can you effectively navigate a ship if you think you are the one [and not God] who is navigating?', suggesting that on a more fundamental level he sees these younger men as being too ego-centred and less willing to submit to the knowledge and authority of their elders and of God. To underscore this point, he said accusingly, 'There are those who think that it is very easy to be a captain now, because anyone can become a captain, so that people who can't even blow their nose yet can become a captain!'

To this, Supriadi replied in agreement, 'But often what comes to us easily brings greater difficulties. Usually those captains have few passengers and cargos; perhaps that is why. There are also those who exaggerate about their accomplishments at sea. But the knowledge you describe cannot be dismissed, because it is all from God, not from us, and we can only seek or ask for it.' Three years later Hansar insisted repeatedly that this knowledge was, indeed, ignored by those who only thought of money, while following the teachings of the ancestors was much more difficult. Yes, Hansar asserted, people might ignore these teachings and their meaning, but 'we *cannot* not remember the teachings of our ancestors, because it is so much a part of who each of us is'.

It appears that there is a similar feeling among the Butonese navigators studied by Southon (1995:130) about both the social status associated with such knowledge and the position of those who put profit before spiritual and ethical concerns. Southon reports being told that even today all captains are expected to have a certain amount of *ilmu*, and that a captain's reputation in

the village is still based not so much on trading ability as on honesty and *ilmu*.¹² Captains nowadays are also said, however, to be 'captains in name only [...] skilled in dealing with port authorities but lacking supernatural powers'.

On another occasion, during my 1997 visit to Balobaloang, I asked Haji Sima what, in his opinion, was the most important thing a navigator must know before he can be relied upon. He responded by going into considerably more detail regarding the conscious awareness by which navigators should operate. The following, with only minor editing, was his rather detailed reply:

At the time a person first becomes a navigator, the moment we want to depart from our house we must visualize our destination, as if we had already arrived there, met friends, met our boss, and so on. I summarize the story: we see ourselves travelling, steering the ship ourselves, until finally we arrive at our destination, for example Ujung Pandang [Makassar]. We visualize ourselves along with our ship entering the harbour and mooring the ship. We visualize all we do according to custom, such as meeting those we usually meet, strangers or friends; finally, we are shaking hands with people who meet us. This is what we consider most important.

If one doesn't know how to do this, he cannot become a navigator. The first thing to which one must pay attention is: one must take care of oneself. So I will continue my story. When we are still at home, we visualize everything that will happen before we reach our destination. We visualize our ship full of cargo. Once we have visualized the cargo and the ship, we visualize returning home with our ship. We visualize all of it until we return home, meet those with whom we live, our wife, children, and others, as we are accustomed. That is what is meant by the words that a person is ready to depart. He remembers to visualize not only his departure, but also his return. Sometimes a person meets with disaster at his destination, because he didn't remember the return, only the departure. So when someone is going to depart, they must follow this practice: arrival assured, then depart; return assured, then underway. That is what I have always taught: don't move if the movement is not already completed. What I am telling you is real. If you believe me, I will explain this *ilmu* (esoteric knowledge) to you. As I just said, return assured, then underway. We must also utter a prayer – say '*bismillah*, *bismillah*' ('in the name of Allah') – as we go down from the house to the shore. When we have gone down to the shore, moved to the edge of the water, and friends and cargo are all aboard, then the captain goes aboard. When all are aboard, the captain counts all of the cargo and crew and passengers, for example five people. The navigator looks each one over, this one, this one [...] one by one, looks at each face. Oh, all are here, all whom we are to carry along have arrived.

Bugis houses, as those of other indigenous peoples of South Sulawesi, are ele-

¹² The qualifications of navigators among the Bugis are discussed in Ammarell 1994-95 and Tobing 1961.

vated above the ground and are seen as 'safe', and even 'sacred', spaces (Errington 1989:84-5; Robinson 1998:169). Errington points out that 'ascending and descending are clearly marked activities, brief periods of transition between the safer space inside the house and the dangerous space outside it'. Errington, to whose attention this was brought through its elaboration in a ritual ending the confinement of a woman and her newborn infant, found that the Bugis of Luwu acted out their concern about such transitions daily. Before leaving their houses, they *pabalo* to *paringngerreng* ('make good / correct consciousness/awareness') by saying 'a prayer surrendering themselves to the care of God while they are in the dangerous outside [...] The house, then, is treated as a place of relative safety. Descending from it and entering it are daily marked by minor acts that dissociate inside from outside, while major descents and ascents are ceremonialized.' (Errington 1989:85.)

Although Haji Sima never brought up the idea of 'dangerous transitions' as such, it appears that navigators of Balobaloang ritually elaborate their concern about such transitions in a like manner, that is, through meditation and prayer. On Balobaloang, these acts are formalized into a public ceremony only when a ship either is newly launched or is 'relaunched' after significant renovations, usually at the start of the east monsoon.¹³ At Bira, in addition to rituals surrounding the launching of a ship, Collins (1992:143-8) observed annual rites being conducted aboard local ships several days before they were due to set sail at the end of the west monsoon. This ritual, called *naung aseq* ('all go down' to the sea), was carried out in the deck house by a *dukun* (ritual expert, Indonesian) accompanied by the ship's master, his wife, and the crew. Whereas during the launching of a ship, the ship is the focus of attention, in this ritual the prayers recited by the ritual expert are directed at the people present, thus ensuring their safety during the coming voyage.¹⁴ Once the ritual was completed, the boats sailed up and down the coast and raced before departing several days hence, while the sailors all the while

¹³ Ammarell 1999:78-82; see also Horridge 1979:22-3; Pelly 1977:98-102; Southon 1995:101-7.

¹⁴ The importance of including the master's wife in this and other rituals is discussed in Collins (1992:154-5) and, more extensively, in Southon (1995:93 ff.). Collins (1992:143-4) also draws attention to the substances utilized by the ritual expert, including smoke, leaves, and water. The leaves were dipped into the water, and the water was splashed over those in attendance. When a boat is launched, water is ritually splashed over various parts of the ship. Interestingly, this is also a central part of a ceremony, referred to locally as *mappasili* though performed widely in Indonesia, which is held during the seventh month of pregnancy to ensure a safe delivery. In this case, both the woman and her husband are splashed with water by the ritual expert. Errington (1989:44-8) discusses the meanings attached by the Bugis to these ritual substances. For example, water is considered to be a medium through which the ritual expert conveys potency (*sumangeq*) to his followers. Apparently pre-Islamic in origin, among the Bugis of Balobaloang and elsewhere these rituals are syncretically interlaced with Islamic readings and prayers (see Robinson 1998:168 ff.).

'called the wind' with 'whistles and coos' and beat drums and gongs.¹⁵ While it may have been performed in the past, no such ceremony currently takes place on Balobaloang. I now continue with Haji Sima's account.

Yes. We go down to the ship. We go down. We who are last to go down, we carry on as I have explained. We visualize again the ship and its crew as if we have arrived at our destination. At the moment we come alongside the ship [in the dugout used to carry people to a moored ship] we *menjiwai* ('inspire') our ship-mates by focusing our awareness on understanding them and their various natures. Sometimes there are those who like to offend others, we understand all of it; here enters *ilmu*. We must take charge of our companions like that, as we approach the ship. Finally we approach the ship and we move from the *sampang* ('dugout') to the ship, we bring the dugout close to the ship in order to board [...]

We board on the right side. We take hold of the prow and we bring our ear close to it. If there is no problem, we recite a prayer; we introduce ourselves to the prow. This is the way we do it because it is hard to work on the left side. You, Supriadi, already know all of this. We take hold of the prow like this, near the surface of the water. Thus we introduce ourselves to the ship. We call it by its name. Then we introduce ourselves, caress the ship, and climb aboard. Three times we carry out things like that.

We look again at the position of the ship. Is it pointing upwind or turned? When the ship is pointing upwind, we climb aboard; but if turned, we do not board the ship; we must turn the ship upwind. At the moment we climb aboard, we say the name of the ship, the name of the bow, the name of the midship, the name of the stern. We move to the bow and hold on to the anchor line, and we instruct it. There is *ilmu*, *ilmu* that is used when we take hold of the anchor line. Once on board, we take hold of the anchor line right away and ask if it wants to depart from the land or not. After that we walk around the ship and treat it with herbs and other things. We do this everywhere above deck. We mention its name in the bow, amidships, and in the stern [...] We move to the stern, straight to the rudder. Formerly there were two rudders, one on each of the two quarters; now there is only one in the centre. After that, we move to the helm [usually a tiller] and take hold of it, pushing it outward. This is required.

After that, we go to the compass.¹⁶ Each of these has requirements and *ilmu*, for example, the position of the compass, the place of entry, and so on. At that moment we utter the name of the compass. After that we glance towards the bow, we point out the course, turn, and look in the direction of the ship's course. We visualize a course that is clear, and then order the crew to unfurl the sail. Occasionally, in our visualization, the ship's course is barely visible, obscure. We extricate ourselves from such conditions, extricate the ship from such a place; that

¹⁵ Collins (1936:18) claims that drums and gongs were used both at departure and at sea to 'make sea-monsters think that land is near, that the booming is the roar of surf on reef or rocks'. For a discussion of 'calling the wind', see Ammarell 1999:111-2.

¹⁶ The use of the magnetic compass among the Bugis dates to at least the fourteenth century. Even though they are found aboard most Bugis ships today, they are generally not relied upon in the same way as in international navigation (Ammarell 1999:116-21; Pelras 1996:263-4).

is, we get clear in the visualization. This is part of the *ilmu* of the navigator; the navigator must know all of that. Before he orders the crew to unfurl the sail and pull out the ties – before that moment – all has to be ready. Then, when the navigator says 'pull', all must pull to raise the sail! At the moment of pulling we have already seen our destination. Yes, we have seen our destination, then all pull, pull to raise the sail.

Haji Sima's instructions for boarding a ship resonate with those given in an earlier work on ships in a nineteenth-century Bugis manuscript, translated and discussed by Macknight and Mukhlis. Apparently directed at anyone boarding a ship, the instructions are to climb aboard

in the bows of the foredeck, on the starboard side, [and] you wet your feet beforehand. After climbing up, you stand on the foredeck [and] read prayers three times. Then you give greetings three times *Al-salām 'alaykum yā t.w.b.y.*, that being an expression of your name before Allah Taala. You move around on deck on the starboard side. (Macknight and Mukhlis 1979:280.)

Passengers are then instructed to recite prayers three times each in the direction of the bilge, the main rudder beams, and the foredeck.

This emphasis on approaching the ship and any of its parts from the right appears to go back to an old, widespread practice. It has survived not only among the Bugis, but also among the navigators of Buton, who have their own variant. According to Southon (1995:110-1), at the time of departure a 'ritual expert is paddled out to the ship in a dugout, approaching the ship from the right hand side. From the dugout he splashes seawater on the right side of the hull three times.' Then he 'boards the ship with his right foot first, goes to the after deck, sits cross-legged, and draws the Arabic sign *alif* on the deck'. Next he bows and 'recites an invocation for the raising of the anchor, after which the captain raises the anchor'. No explanation is given for the drawing of the Arabic sign. Nor does it become clear to what extent the captain and the ritual expert are one and the same person or, if they are not, if and how the ritual expert disembarks from the ship before it departs. What is apposite to this discussion, however, are the continuities over time and space of the ritualized concern with approaching the ship and its parts from the right side, as well as with repeating each prayer recitation three times.

These concerns appear to have been shared by the Konjo-speaking shipbuilders of South Sulawesi as well. G. Adrian Horridge reports that, prior to the deforestation of the coastal areas near the shipbuilding areas east of Bulukumba, the shipbuilder and his crew would go into the nearby forest to carefully gather timbers for their ships. Rituals were conducted as they entered the forest and at the cutting of the first tree (Horridge 1979:11). Before striking the first blow with his axe, the shipbuilder walked around the tree 'three times from right to left, chanting a Konjo spell'. Each day of the week

was associated with an inauspicious cardinal point, and the shipbuilder positioned himself so as not to face that direction when looking at the tree (Horridge 1979:12).¹⁷

Haji Sima concluded with a brief description of the proper procedure for raising the sail and weighing the anchor:

In former times *tanjaq* ('lateen') sails were used, and the *ilmu* was different from now. Now, with a *lambo* ('gunter') rig, it is turned around: now we take the ties aloft. We yank quickly. When the sail is raised, we wait for orders from the captain. Then we pull on the anchor line and raise the anchor. Right away the captain orders the crew to pull on the anchor. Yes, after the ship is ready to leave, the anchor is raised according to our [the captain's] wishes. When the ship has begun to move forward [under sail], then the anchor line slackens, and it is only then that we want it to be raised. That is, we don't wait until the rope is taut again, because if we do, the ship will not want to move, so our ancestors said.

On an earlier occasion, Haji Sima had discussed this stage of the departure in the context of technological and social changes, suggesting that more efficient technologies have reduced the need for direct involvement, and thus power, of the captain. He continued:

In former times, only after the captain told them to raise the anchor did the crew get to raise it, but it is all different now. Now the captain's control has been surrendered, because crews don't believe in these things anymore. Formerly, however, it had to be done as I have described. So when the captain shouted from the stern 'pull' [the anchor], it was pulled with a '*bismillahi*'. The crew pulled, and so the anchor was raised after the line was taken hold of as I have described. Also, at the time the anchor was raised, the crew raised the jib; then, when all the sails were raised, the ship was well and on its way. Now things are more relaxed, because in former times the *tanjaq* sail had to be raised slowly, while modern sails can be raised quickly; the former required the captain to maintain control and give specific orders, the latter does not.

If the ship moved smoothly and quickly through the water, we offered a prayer of thanks, *bismillahi*. Then, just as we do after the ship has been repaired, we returned to the bow to recite a prayer. In the prayer, repeated three times, we surrendered ourselves and the ship to God. This was a procedure observed before

¹⁷ The inauspicious direction, according to Horridge (1979:12), was associated with the head of a dragon that was believed to face a different direction each day. According to Robinson (1998:176), a form of divination based upon the movements of just such a mythical serpent, or *naga*, is widespread across Southeast Asia. Commonly, its position relative to the earth over time is noted, and in Indonesia 'the presentation of its head, stomach, back and tail are related to the months of the Islamic calendar'. Robinson, contrary to Horridge, claims that these *naga* are believed to rotate ninety degrees every three months. Just as among the Konjo, however, Bugis manuscripts warn that 'If you are going to another place [...] or if there is some business you wish to attend to, don't face its head. We must always know where its head is facing.'

engines. We recited the prayer three times, restoring composure to the ship and its *jitwa* ('soul/spirit') [just as a human being finds composure through focused awareness]. Who sails a ship? I sail the ship and the ship sails me. After we thus inspired the ship and its contents, all was well, we had everything, and all was completed. When the sail was well set and the ship moved well through the water, the responsibility of the captain ended.

Upon further questioning, Haji Sima stated that there is much more that the captain must attend to during the voyage, but my own observations have revealed that the involvement of the captain with procedures while the ship is at sea varies widely. In some cases, as on the ship of Haji Sima's son Najamuddin, the captain will often turn the ship over to the helmsman and retire below deck once the ship is safely under way, emerging only to check on changing conditions or to socialize with the crew and passengers. In other cases captains tend to maintain a high level of involvement.

Hansar and the Darma Jaya: A case study

Among those captains who remain involved during the entire voyage is the young Hansar, with whom I had the privilege to sail to and from Balobaloang in July 2000. Serendipitously, these voyages provided opportunities for a highly productive case study in relation to the central question of this article: how does a Bugis captain know when it is time to set sail?

Travelling the 112 nautical miles from Paotéré Harbour, in the capital city of Makassar, to the island aboard the 125-ton *Darma Jaya* at the peak of the east monsoon gave me a good taste of the high winds and seas that can occur at this time of year. After a rough but otherwise uneventful trip to Balobaloang, we disembarked and Hansar sailed on to Flores to deliver his cargo of restaurant supplies and to seek out another cargo, this time of cement, to deliver to Makassar. When we received word from other ships that the *Darma Jaya* would soon be leaving Bima for Balobaloang, we began to prepare for our departure from the island.

In the meantime, as Hansar approached Balobaloang, the wind shifted to the south-east and increased in intensity, raising the sea to about three metres. Thus, by the time Hansar arrived at Balobaloang, he and his crew were ready for a break. This provided me with the opportunity to experience, once again, the delays inherent in Bugis ship departures and, moreover, to learn hour by hour how the captain made his decision about when to cast off.

Hansar had risen to the position of captain quickly. His unusual talent had attracted the attention of the village head, Haji Sagir, who had given him the responsibility for one of the largest and most profitable ships from the village. On our trip to Balobaloang, Hansar's ability to handle such a large ship

in the rough seas of the east monsoon had been quite evident. Now, however, he kept delaying our departure, citing adverse and potentially dangerous conditions beyond the reef. Equipped, like all Bugis navigators, with the knowledge of winds and tides I have already described, Hansar had initially intended to leave on Thursday before noon on a rising tide¹⁸, thus before the taboo period between Thursday noon and Friday noon. The intensity of the south-east winds, however, was a warning to him that the sea would be unusually rough out beyond the reef. He therefore postponed the departure until Friday after prayers. Now, the waning crescent moon brought with it an extremely low tide in the afternoon, making it impossible to paddle the dugout to the ship, which was anchored beyond the tidal flat, until near dusk. Meanwhile, continuing high south-easterly winds made Hansar change his mind about leaving late in the afternoon. As he explained, once beyond the reef, this wind and the accompanying high seas would make a night-time passage between Balobaloang and a reef called Taka Rewataya, located about thirty nautical miles to the north-north-east, extremely uncomfortable, if not dangerous, for both crew and passengers.¹⁹ So he decided that we should depart on the rising tide on Saturday morning.²⁰ As he explained all this to me, Hansar repeatedly emphasized the captain's very serious duty to balance profits and the favour of shipping agents with the safety and well-being of his crew and ship. On this particular voyage there would be women and small children aboard, including my own wife and stepson and Supriadi's wife and two youngsters.

During this time I also had the opportunity to learn from Hansar and another navigator about the esoteric *tanra* ('signs') of which Haji Sima had so often spoken. Nawir, a shipowner and part-time captain, agreed that the practice of *samannanita* as Haji Sima had described it was critical at every stage in the process of determining when to set sail, but most important when leaving home, that is, Balobaloang. In addition to sailing only after prayer, Nawir only sets sail on certain days of the Islamic lunar month, there

¹⁸ Technically, that day the higher of the two low tides, or 'higher low water', occurred at about 5.30 a.m., and the lower of the two daily high tides, or 'lower high water', just before 11 a.m. This would have provided adequate depth to carry passengers and their belongings to the small, motorized boat from the pier.

¹⁹ South-easterly winds, according to Bugis navigators, are often quite strong. Reaching their peak during the months of July and August, they force ships to sail below (in this case, to the south of) the reef to avoid being carried onto it by prevailing winds and currents (see Ammarell 1999). For unmotorized ships, sailing below the reef meant extra days of tacking to the north-east on the trip to Makassar, and even modern motorized ships try to sail above the reef to avoid losing time and wasting fuel. Moreover, at this time of year ships generally avoid sailing fully loaded, those that do often being forced to throw cargo overboard to prevent flooding.

²⁰ This was the day of the new moon. In the vicinity of Balobaloang the lower of the two high tides on this day occurs at noon, and the lower of the two low tides, or 'lower low water', at 6 p.m.

being 'good' and 'bad' days in each month. When leaving from another port, he continued, a shipping agent would not look kindly on someone who delayed departure for this kind of reason, and it was enough to wait until after prayer.²¹

Nawir's discussion of 'good' and 'bad' days calls to mind the extent to which divination based upon time cycles has informed decision making across Southeast Asia.²² It appears that the Bugis, too, have a long tradition of this kind of divination, information regarding which, as I have already noted, is given in almanacs and other manuscripts. One category of such manuscripts is known as *kutika* (*pitika* in Makassar), a term which, according to R. Winstedt (1951), comes from Sanskrit and refers to the division of the day into five periods, each named after a Hindu deity (see Robinson 1998:173). These *kutika* manuscripts 'contain techniques for identifying auspicious and inauspicious times for worldly activities', including house building, shipbuilding, agriculture, weddings, and departures on journeys, and are 'consulted before specific undertakings'. Included are auspicious and inauspicious days and months of the Islamic calendar, as well as times of day (Robinson 1998:173-5).

Southon, who discusses the use of divination by the Buton for determining auspicious times for shipbuilding and departures, notes that 'complex calendars based on the phases of the moon are used to set the time and date for events such as the departure of perahu ["proa"], the raising of the first house-post', and other important events (Southon 1995:134). According to Collins the Konjo shipbuilders of Ara, South Sulawesi, also practised a form of divination. There each day was understood to possess its own unique character and thereby to be auspicious or inauspicious for certain activities. For example, the second day in the cycle was said to be 'bad for building prahus but good for starting a voyage' (Collins 1936:213). Horridge, in more recent work among the Konjo, found that divination was particularly important in determining the proper day to set out into the forest to begin gathering timbers for a new ship. In this case, the first Wednesday of the Islamic month was said to be particularly favourable. After the timbers were gathered, divination was also used to fix the proper day for the laying of the keel (Horridge 1979:11).

Hansar, as I have shown, is also guided by Islamic prayer times. Although, like his colleagues, he prefers to cast off after Friday prayers, when

²¹ This provides an interesting example of the relative tolerance shown towards local beliefs and ritual practices by social 'outsiders'. Here shipping agents who may not be Bugis, or even Muslim, remain respectful towards Islam in spite of their own priority, namely a timely departure ensuring minimal cargo spoilage and reasonable profits. Nevertheless, while it seems to be acceptable to delay departure for a few hours in deference to Islam, apparently it is not to do so for a day or more in consideration of what might be regarded by outsiders as 'mere superstition'.

²² See, for example, Covarrubias 1937:282-5; Geertz 1960:30-5; Nasir 1985:89-94.

in Makassar he and others most often leave in the evening, after *mangaribi*. Because other ports, however, have their own piloting conditions – among them diurnal wind patterns, tidal currents, and overall size – Hansar gave different times for different ports. For example, he usually leaves Ende on Flores just after *assaraq*, or mid-afternoon prayer.

Hansar, as I have said, also practises *samannanita* – something he, like Haji Sima before him, sees as part of his obligation to his crew and ship. As captain, Hansar explained, he is the 'father' of his crew, and as such responsible for each member.²³ He agreed with Nawir and Haji Sima that *samannanita* must be practised continually, but that one must think primarily in terms of both arriving at one's destination safely *and* returning home safely. Like the others, he explained that there are many signs that one must watch for, signs that suggest either *tuo* ('life') or *maté* ('death'). Again, the primary signs to which Hansar attends emanate from within himself through a focused awareness, both as *pakkasiaq*, or a feeling in his body and breath as it wells up from his physical and spiritual centre, and as *samannanita*, or the visualization of one's journey successfully completed. If, in a moment of focused awareness, a feeling of satisfaction or contentment and/or a clear vision of completion arises, this is considered *tuo*, if it does not, *maté*. Like Haji Sima, Hansar emphasized that for himself as captain this sense of focused awareness must be continuous. That is, when he embarks on a voyage, like Haji Sima and his teachers before him he observes a number of ritualized practices, all of which are meant to evoke feelings of impending success or difficulty, life or death. For example, like Haji Sima, Hansar takes hold of the prow of the ship before boarding and tugs on the anchor line once aboard, in order to gain awareness both of the readiness of the ship to depart and of the chances of a smooth voyage. Thus, according to Hansar, if the anchor is hard to raise, the voyage will be difficult. Without further explanation, he also stated that the ship tells the captain when it has enough cargo (where it should be borne in mind that an overloaded ship risks being flooded in high seas). Finally, he revealed that in the dark, when one cannot see rocks that might sink a ship, he faces the bow and feels his testicles: if one drops it is a sign that there are in all likelihood rocks on that side of the ship.

Although the knowledge that these men shared with me is, indeed, that of expert navigators, it is knowledge that is also common to others. Thus, one evening when I was looking over my notes with Supriadi (who is a school-

²³ This theme runs deep in Bugis maritime history and tradition (see, for example, Tobing 1961:152 and Ammarell 1999:199-207), as well as in those of neighbouring societies (see, for example, Southon 1995:113-4). It is interesting to note that Hansar, at 25, is much younger than many of his crew and that the Bugis principle of hierarchy based upon age here is overridden by his social rank as ship's captain.

teacher but also has extensive experience at sea), Wahida, one of the women of the house and the daughter and wife of navigators, joined the conversation. Between the two of them, they came up with a list of ritual practices that are meant to ensure the sustenance of life (*tuo*) on the voyage and which captains are seen to observe as they leave land and board their ships:

- In order to honour the water upon which the ship will travel, the captain may step over the waves as he moves from the shore to the dugout that will take him to the ship. This is called *waé tuo* ('water of life').
- The captain may pick a green leaf (a sign of life) and carry it aboard the ship.
- The captain may pull on a tuft of hair on the back of his head as the sail is raised. If it comes out, this is a bad or *maté* omen. (My friends laughed at this point, explaining that the tuft of hair never does come out!)
- The captain's dugout, as Haji Sima had said, always approaches the ship from the 'right' [as one is facing the bow] or 'starboard' side of the ship. He may grab the prow with his right hand in an act of focused awareness and then move all around the ship in a counter-clockwise direction before climbing aboard on the right side.
- The captain walks counter-clockwise around the deck of the ship and may hold onto one or more parts – including the mast, the anchor line, the shrouds, the backstays, and the rudder – again in an act of focused awareness, 'feeling' for 'life' or 'death' each time.
- When raising the sail, the captain will use his breath to influence the wind. If there is too little wind, he will inhale and exhale quickly; if there is too much wind, he will breathe slowly.

In practice, individual captains choose which of these practices to perform. On our voyage back to Makassar, Hansar performed some but not all of these acts, while those he did perform were carried out in rather a rapid but nonetheless thorough manner. While the others looked on, he moved quickly about the ship, pausing attentively and, I would add, with an air of authority as he took hold of, in turns, the anchor line, mast, and helm. And yes, he did pull at a tuft of hair as the sail was raised, and no, no hair came out!

Social commitments

Tied directly to the ritual knowledge and practices I have described here is a body of social knowledge and practices which also covers the captain's relationship not only with his crew, but also with his friends and family. I have regularly observed how on the night or morning before a ship is due to leave the island, family and friends gather in the captain's home to socialize in a

relaxed, informal manner. But I wondered if captains set aside any particular period of time in which they go off to practise *samannanita* alone. Nawir explained that some captains do, in fact, isolate themselves for a period of time just before departure in order to focus their attention on the ensuing voyage. He also noted, however, that others choose to spend this time with their close friends and relatives, especially their wives and children.²⁴ Early in the morning of our last day on Balobaloang, Hansar must have arrived at a feeling of 'life' with regard to our journey to Makassar, for he dropped in at the house where we were staying to announce a mid-morning departure. Once the crew was aboard the *Darma Jaya* and Hansar was sure that the ship was ready, he returned to his in-laws' house to share a meal and a few final moments with his wife and children. Then, after all the passengers were on board and their belongings stowed, Hansar was paddled by dugout to the right side of the ship and climbed aboard with full authority.

I have described the several domains of activity in which Bugis navigators engage in coming to a decision about when to set sail in some detail here. In the next section I would like to suggest what implications all of this may have for our understanding of task-oriented, practical knowledge and how that knowledge is used in decision making.

'Knowledge for action'

'Knowledge for action' is the phrase by which Keller and Keller (1996) describe the mutually constitutive emergent processes by which human beings combine learning and practical experience in order to achieve certain goals. Such knowledge – whether of Keller and Keller's American blacksmiths or of Bugis navigators – is 'organized for doing rather than abstracted into various formal arrangements on purely logical or topological grounds'. Keller and Keller suggest that we should 'expect a stock of knowledge "sedimented" from experience, which, in turn, serves as the basis for future acts' (Keller and Keller 1996:22).²⁵ Furthermore, this knowledge is sedimented in

²⁴ Southon (1995:111) discovered that among the Butonese, a man must have the permission of his wife to embark on a voyage or any kind of trip to the *rantau* ('beyond the village or homeland', Indonesian). According to Southon, 'This reflects the great emphasis placed upon harmony between husband and wife [...] specifically, men believe they are protected by their wives while they are at sea but such protection might be less effective if a man were to leave without his wife's blessing'. I have no evidence that this is, or is not, the case on Balobaloang, but the matter is clearly worthy of further exploration.

²⁵ Keller and Keller draw upon Alfred Schutz's definition of the stock of knowledge that each of us relies upon as we go about the activities of life. According to Schutz, this stock of knowledge is 'The sedimentation of previous experiencing acts together with their generalizations, formalizations, and idealizations. It is at hand, actually or potentially, recollected or retained, and as such

the form of principles and schemata. Guided by principles, a schema may, by itself or in association with other schemata, become an 'umbrella plan', a kind of mental model or 'representation of the overarching goal for production and rough procedural sequence for its attainment [...] a schema for goal attainment' (Keller and Keller 1996:119). Umbrella plans, according to Keller and Keller, are 'open to revision and reflection in practice, providing a conceptual framework for correction and accommodation to unanticipated problems' (Keller and Keller 1996:90). I suggest that among Bugis navigators from Balobaloang the umbrella plan for any trading voyage includes the overarching goal of both the well-being and the safe return of ship and crew and the realization of a profit for the shipowner, captain, and crew.²⁶ Focusing on the former, there appears to be a 'rough procedural sequence' for the attainment of this goal, a sequence that is followed by many of the navigators of Balobaloang. I suggest that this sequence covers the four previously described domains of activity that the Bugis engage in as part of an overall umbrella plan for departure from ports.

Each of these domains of activity is at once informed by and generative of certain principles which, following Keller and Keller (1996:52), I understand to 'constitute a set of cultural premises that define the domain' of the practitioner, in this case the navigator. These are not rules but general premises, which are constructed by the practitioners as 'axioms of a folk theory of their craft'. As 'significant conceptual structures for activity', these premises or principles at once guide the navigator's decision-making process and 'constitute a foundation for the acquisition of more specific schematic knowledge' pertinent to his task. Moreover, as Keller and Keller point out, such principles 'represent ideals of the community'.

In the Bugis community on Balobaloang there are a number of principles that 'define the domain' of navigators, whose position carries great prestige in Bugis society (Ammarell 1994-1995). I consider here only examples of those apposite to the subject of knowing when to set sail.²⁷ Corresponding to the domains of activity described above, they include: 'think winds and cur-

the ground of all our protentions and anticipations' (Schutz 1971:146 in Keller and Keller 1996:61).

²⁶ Although profit is the motive behind inter-island shipping and trade, I have never sailed with a captain who, I felt, would not throw cargo overboard or delay the arrival of a cargo to safeguard his ship and crew. There are, however, stories of captains who have made such compromises as to have found it difficult or impossible to recruit and retain crew or to be given the responsibility for a ship by owners.

²⁷ Additional principles that define the domain of the navigator among the Bugis are described in Tobing (1961:152, 190-1) and Ammarell (1994-95:39-41; 1999:199-207). One of the most important ethical principles which guides Bugis life, particularly for powerful people like navigators, appears to be that of *siriq* – a concept which encompasses the English ideas of honour, dignity, shame. For further discussions of *siriq*, see Marzuki's book on the subject (1995), as well as Andaya (1981:15-7), Errington (1989:144-54), and Pelras (1996:206-13).

rents', 'think Islam', 'think *tuo* and *maté*', and 'think togetherness'. I will now suggest how these principles can be understood to both embody ideals shared with other members of the community and constitute 'significant conceptual structures' in the determination of a proper time to set sail.

Think winds and currents. Navigators and, to a great extent, their crews and even their families on shore, maintain a constant awareness of winds and tidal currents. Every adult in the village – whether they sail, fish, are gatherers along the reef, or benefit from such work – knows the general direction and strength of the wind and the movement of the tides (Ammarell 1999). On board ship these key environmental features are constantly on the navigator's mind, along with the direction of travel and the time elapsed between ports. When considering the best time to leave port, as I have described above, knowledge of offshore winds and tidal currents is essential. Although they are, perhaps, of universal concern to navigators of sailing ships preparing to take leave of the land, it is the locally shared, continual cognitive construction of these physical phenomena and their relationship to one another, the technology of the ship, and other principles that help define the culture of Bugis navigators as it is renegotiated over time and space. Borrowing from Keller and Keller, I would argue that to 'think wind and currents', that is, to be constantly aware of these features of the maritime environment, is axiomatic to Bugis models of navigation and piloting.

Think Islam. The Bugis have a reputation as one of the most devoutly Muslim of Indonesia's many ethnic groups, while the practice of Islam in Indonesia has been strongly influenced by the animistic and Hindu-Buddhist practices that were in place upon the arrival of this religion in the archipelago. Of the dozens of Balobaloang ships I have observed leave port, not one violated the principle that, unless it is carrying perishable goods, a ship should depart only after one of the established prayer times. In fact, when discussing an imminent departure, navigators and others consistently make reference to prayer times, as I have already pointed out. Furthermore, when people on the island discuss the return of a ship to the village, they often formulate hypotheses such as: 'If the ship leaves from Bima after *mangaribi*, then we can expect it tomorrow after *lohorog*. And everyone on the island old enough to understand knows that a ship will never leave port between noon prayers on Thursday and Friday. Beyond this, the words of Haji Sima make the role of faith in Allah and the importance of recognizing His power and beneficence in the worldview of the Bugis navigator quite evident.

*Think *tuo* and *maté*.* As I have already explained, Bugis as well as Butonese and Micronesian navigators entertain a general notion that one can, and

indeed should, avoid problems at sea through focused attention to the details of an impending voyage and to the signs and omens provided by the sea and ship. Since the responsibility for the lives of the crew and passengers rests with the captain, his failing to learn these signs and their meanings is not only foolish, but also altogether irresponsible. Furthermore, as Muslims, people understand that these signs and the ability to recognize them do not come to one through one's own power, but through Allah's, and so are accessible to all who take the trouble to look for them. Thus, *pakkasiaq* and *saman-nanita* are appealed to and cultivated not only by Bugis navigators at every stage of their voyage, but also by carpenters building ships and houses and by practitioners of the Indonesian martial art of *panca silat* as they engage in combat. This is knowledge which, as Hansar insisted, as a Bugis he 'cannot not know', and as Haji Sima pointed out, once learned, cannot be ignored.

Think 'togetherness'. There is one element in the navigator's decision-making process that remains to be discussed here. It is the element that is often referred to in Indonesian as *kebersamaan* ('togetherness'). The value of togetherness stands in sharp contrast to that of 'individualism', especially as observed in American culture. Thus, the Bugis, like members of other Indo-Malay societies, are consciously enculturated to place the interests of the social unit, especially the family and the village, above their own in order to maintain harmony and bring prosperity and blessings to all. Another, perhaps more pragmatic, way of looking at it – which is consistent with Haji Sima's comments about those who turn away from the teachings of their elders – is by realizing that we are all dependent on one another and, ultimately, upon God for our well-being.

Anthropologist Renato Rosaldo (1989), who writes about 'tempo' across cultures, claims that 'time' is a subset of 'tempo', observed and naturalized by members of Euro-American societies. Among the Illongot, a Philippine hill people, 'time' is dysfunctional, the Illongot operating in quite a different tempo based upon the fulfilment of social commitments. Similarly, the Bugis, in the conduct of their temporal lives, place far less emphasis on punctuality than on the fulfilment of social commitments, broadly construed, before they move to the next socio-cultural 'place', whether it be on a visit to a next-door neighbour or on an extended voyage across the sea. These commitments, which the Bugis themselves take for granted but which so confuse and frustrate outsiders to their culture, are clearly in evidence when the navigator is preparing for the departure of his ship. They include spending time with relatives just prior to departure, as I have observed, and subjecting passengers and crew to a careful scrutiny before departure, as described by Haji Sima.

An umbrella plan for knowing when to set sail

As I have described them, the principles of 'think winds and currents', 'think Islam', 'think *tuo* and *maté*', and 'think togetherness' reflect deeper Bugis cultural values. These include active engagement with Islam and belief in Allah, the related ability to read and interpret the signs in His creation, the importance of social commitments, and the more pragmatic value of observing winds and currents. Taken together they help define the domain of the navigator while providing a basis for action and the acquisition of an increasingly efficacious stock of knowledge.

As I have shown, there is an overall procedural plan that is anterior to and guides every departure, including the procurement of cargoes and provisions, the preparation of the ship, captain, and crew for the voyage, and, more particularly, the four domains of activity described above. Taken by itself, the procedural plan for departure constitutes an 'umbrella plan', which is at once routine and unique, being developed for the specific purpose of ensuring the safety of the ship and crew, as well as harmony in one's immediate circle, but is also vague enough to allow for changing environmental, spiritual, psychological, and social conditions as the ship departs from the land. Each voyage is, of course, different, in both foreseeable and unforeseeable ways. Thus, Bugis navigators, like Keller and Keller's blacksmiths, must develop procedural plans for each departure, requiring 'selective review of the stock of knowledge representing procedures, past productive experiences, and anticipated future possibilities' (Keller and Keller 1996:119).²⁸ As Keller and Keller point out, however, these plans must be accompanied by 'strategies or heuristics for problem solving' which enable people to bring mental and material components of their work environments 'successively into closer and closer approximation of one another' (Keller and Keller 1996:160). It is the utilization of such heuristics among Bugis navigators to which I now turn.

Simple heuristics and ecological rationality

In *Simple heuristics that make us smart* (1999), Gigerenzer et al. discuss the ubiquitous use and remarkable efficacy of the kind of practical knowledge that I describe in this paper. Inspired by Herbert A. Simon's earlier work on bounded rationality, they use real-world examples to show how, on a cognit-

²⁸ This theme is echoed in Scott's claim that one of the virtues of practical knowledge is its relative vagueness, matched with its expectation of the emergence of new information as conditions change and situations vary. It likewise emerges in Gigerenzer et al.'s understanding of what they call the 'ecological rationality' of practical knowledge.

ive level, people routinely make rational and adaptive decisions through the effective use of limited knowledge and heuristics.

A heuristic, according to these authors, is 'a useful; even indispensable cognitive process for solving problems that *cannot* be handled by logic and probability theory' (Gigerenzer et al. 1999:25).²⁹ Because the use of formal logic and probability theory requires unrealistic amounts of information and computational power for day-to-day decision making, people rely upon simple heuristics or rules of thumb, which are formulated from experience and are well adapted to the environmental structures in which they are put to use, environments that are ever in flux.³⁰ Thus, people use heuristics to make rational and adaptive decisions with limited information.

Similarly political scientist James C. Scott (1998), in his recent critique of high modernist development strategies, underlines the importance of recognizing and honouring local forms of practical knowledge, which he refers to as *mētis*. *Mētis*, as he describes it, 'represents a wide array of practical skills and acquired intelligence in responding to a constantly changing natural and human environment' (Scott 1998:313). It is comprised of rules of thumb plus skills and the knowledge of 'how and when to apply them *in a concrete situation*', all gained through hands-on experience in the local environment and sedimented into memory over time (Scott 1998:316). Like Gigerenzer et al., Scott argues that 'the environments in which *mētis* is exercised are so complex and nonrepeatable that formal procedures of rational decision making are impossible to apply'. Moreover, according to both Scott (1998:316) and Gigerenzer et al. (1999:316) it is only through experience that people learn when and how to apply specific heuristics or rules of thumb. As a result, according to Scott, the rules of thumb and other skills that contribute to *mētis* are 'largely acquired through practice [...] and a developed feel or knack for strategy'.

Gigerenzer et al. describe four categories of heuristics which, they argue, represent the fastest, most frugal, and, therefore, the most fundamental and purest forms of bounded rationality found in nature.³¹ Of the four, I will demonstrate how 'satisficing' – a term coined by Herbert Simon – can help us

²⁹ For a refutation of the popular misconception that human thought and behaviour are guided by 'formal logic and unbounded knowledge', see also Philippe Van Parijs (1981) and his concept of 'local optimization'.

³⁰ In their investigations, Gigerenzer et al. (1999:9) found that real people do, in fact, make decisions *as if* they were boundedly rational. That is, they recognize that they *do not* possess 'infinite mental capabilities' and that the search for further information cannot go on indefinitely.

³¹ According to Gigerenzer et al. (1999:14), 'fast and frugal heuristics employ a minimum of time, knowledge, and computation to make adaptive choices in real environments'. They include heuristics based upon simple recognition, single reasons ('minimalist', 'take the last', 'take the best', and so on), elimination, and satisficing (see Gigerenzer et al. 1999:358-60 for a summary).

understand Bugis decision making. Before doing so, however, I wish to turn briefly to a second contribution of Simon's, promoting awareness of the critical role of knowledge of environmental structures in human reasoning.

Ecological rationality. According to Gigerenzer et al. (1999), and contrary to the usual definitions of rationality, which focus on internal coherence of beliefs and inferences,

real organisms spend most of their time dealing with the external disorder of their environment, trying to make the decisions that will allow them to survive and reproduce. To behave adaptively in the face of environmental challenges, organisms must be able to make inferences that are fast, frugal, and accurate. (Gigerenzer et al. 1999:18.)

They thus call for a new conception of what proper reasoning itself is and label this 'ecological rationality'. Simply put, 'A heuristic is ecologically rational to the degree that it is adapted to the structure of an environment' (Gigerenzer et al. 1999:13).³² Or, to turn back to Scott's argument, a person is successful to the degree that his or her 'practical skills and acquired intelligence' respond adaptively 'to a constantly changing natural and human environment' (Scott 1998:313), where simple heuristics (or rules of thumb) are a fundamental component of such intelligence.

How is it that simple heuristics based on bounded rationality work as well as they do? Gigerenzer et al. argue that they are successful primarily because, rather than trying to generalize across domains, they opt for speed and accuracy within specific domains of activity, while different domains demand different heuristics. In other words, simple heuristics are not *too* specific, making them both more robust and more adaptable to new and changing environments, or, as Scott (1998:312) argues, such knowledge, 'despite its specificity [...] travels remarkably well'.

Moreover, as the studies of Gigerenzer et al. repeatedly illustrate, simple strategies that rely on a few important cues can yield robustness, while 'important cues are likely to remain important' (Gigerenzer et al. 1999:20). That is, 'the informative relationships in the environment are likely to hold true when the environment changes'. For example, as I have shown, Bugis navigators have devised a set of heuristics that rely on cues – time of day and phase and altitude of the moon for reckoning tides and currents, signs accessed through focused attention, and so on – which operate over a variety

³² Gigerenzer et al. (1999:12) describe Herbert Spencer as the 'father of bounded rationality'. Simon, according to these authors, was not the first to suggest the critical importance of environmental structure in understanding the effectiveness of simple heuristics in decision making; he was, however, instrumental in calling attention to it.

of geographical locations and under varying social, psychological, spiritual, and environmental conditions. 'In contrast, the random fluctuation of noise and even the effects of smaller systematic factors may well frequently alter' (Gigerenzer et al. 1999:20). As I have also explained, local weather patterns are seen as temporary by Bugis navigators and, except when severe and expected to produce dangerously high seas, are all but ignored in decisions about departure. 'Because of this pattern, fast and frugal heuristics that pay attention to systematic informative cues while overlooking more variable uninformative cues can ride out environmental change without suffering much decrement in performance' (Gigerenzer et al. 1999:20). So construed, 'cognition is the art of focussing on the relevant and deliberately ignoring the rest' (Gigerenzer et al. 1999:21).

Satisficing. First conceptualized by Simon, 'satisficing'

is a method for making a choice from a set of alternatives encountered sequentially when one does not know much about the possibilities ahead of time. In such situations there may be no optimal solution for when to stop searching for further alternatives [...] Satisficing takes the shortcut of setting an adjustable aspiration level and ending the search for alternatives as soon as one is encountered that exceeds the aspiration level. (Gigerenzer et al. 1999:13.)

Of the heuristics described by Gigerenzer et al., satisficing in my view best explains important aspects of the type of decision making Bugis navigators engage in when determining when to set sail. In many ways similar to the other heuristics they discuss, satisficing differs from these in that it allows for protracted deliberation on the part of the decision maker. Bugis navigators take some time, from several hours to several days, to determine an acceptable minimum of conditions and to search the physical, psychological, social, and spiritual environment for a few simple cues indicating that that minimum is met. Unable to know if better, 'more optimal', conditions will eventually present themselves, they set sail when their aspiration level is reached. To wait any longer, even if it looks as if even better conditions may materialize, is to take an unacceptable risk of unnecessary delay of the projected voyage. Satisficing thus is 'risk-averse', in the same way as the risk of loss is minimized by Scott's practitioners of *mētis* (Scott 1998:324). Recognizing the limitations of his knowledge, a 'satisficer is concerned with doing well enough, while an optimizer is concerned with doing the best it can' (Gigerenzer et al. 1999:339).

Summary

I began with an ethnographic account that resulted from my own initial frustration as a prospective passenger aboard a Bugis cargo ship who could not understand why the captain could not provide me with a more precise indication of the day and time of departure. How, I asked myself, did these captains actually decide when it was time for the ship to leave port and what were the factors and processes informing this decision? It was, of course, no surprise to find that the direction and intensity of winds and tidal currents played a central role. It did, however, take a considerable effort to begin to identify and clarify the additional features of the physical, social, psychological and spiritual environment which are also important in the decision-making processes of Bugis navigators about when to set sail.

Although I am wary of reading too deeply into the similarities of the decision-making practices of the Bugis navigators of Balobaloang with those of other Bugis and Austronesian-speaking peoples, I have drawn upon descriptions of the latter in the literature in order to contextualize what I have learned about Balobaloang within scholarly discussions of local forms of practical knowledge and decision making as found across Southeast Asia and the Pacific.

Relying upon the analytical approaches offered by Keller and Keller (1996) and Gigerenzer et al. (1999), I have suggested ways in which these processes operate and how they make sense to navigators and other members of the community on Balobaloang. Here I further suggest that the decision-making processes that I have described and the practical knowledge upon which they are based provides further evidence for the efficacy of practical knowledge and its relevance to sound development strategies, as argued by Scott (1998). Thus to argue for the efficacy of practical knowledge in an intellectual and moral environment which elevates more abstract, formal and unbounded forms of knowledge is at once both radical and, in my view, reasonable.

REFERENCES

- Ammarell, Gene, 1994-95, 'Who are the navigators? Changing patterns of power among the Bugis seafarers of South Sulawesi, Indonesia', *Yale Graduate Journal of Anthropology* 6:29-47.
- , 1995, 'Navigation practices of the Bugis of South Sulawesi, Indonesia', in: Richard Feinberg (ed.), *Seafaring in the contemporary Pacific Islands; Studies in continuity and change*, pp. 196-218. Dekalb: University of Northern Illinois Press.
- , 1999, *Bugis navigation*. New Haven: Yale University. [Southeast Asia Studies Monograph 48.]

- Andaya, Leonard, 1981, *The heritage of Arung Palakka; A history of South Sulawesi in the seventeenth century*. The Hague: Nijhoff.
- Bowditch, Nathaniel, 1995, *American practical navigator; An epitome of navigation and nautical astronomy*. Washington, D.C.: United States Hydrographic Office. [First impression 1914.]
- Collins, G.E.P., 1936, *East monsoon*. London: Jonathon Cape.
- , 1992, *Makassar sailing*. Singapore: Oxford University Press. [First impression 1937, London: Jonathon Cape.]
- Covarrubias, Miguel, 1937, *Island of Bali*. New York: Knopf.
- Crawfurd, John, 1974, *A descriptive dictionary of the Indian islands and adjacent countries*. Varanasi: Chaukhamba Orientalia. [First impression 1856, London: Bradbury and Evans.]
- Errington, Shelly, 1983, 'Embodied sumange' in Luwu', *Journal of Asian Studies* 42:545-70.
- , 1989, *Meaning and power in a Southeast Asian realm*. Princeton: Princeton University Press.
- Forrest, Thomas, 1779, *A Voyage to New Guinea and the Moluccas from Balambangan*. London: G. Scott.
- Geertz, Clifford, 1960, *The religion of Java*. Chicago: University of Chicago Press.
- Gigerenzer, Gerd, Peter M. Todd, and the ABC Research Group (eds), 1999, *Simple heuristics that make us smart*. New York: Oxford University Press.
- Gladwin, Thomas, 1970, *East is a big bird; Navigation and logic on Puluwat Atoll*. Cambridge: Harvard University Press.
- Horridge, G. Adrian, 1979, *The Konjo boatbuilders and the Bugis prahus of South Sulawesi*. Greenwich: National Maritime Museum. [Monograph No. 40.]
- Keller, Charles M., and Janet Dixon Keller, 1996, *Cognition and tool use; The blacksmith at work*. Cambridge: Cambridge University Press.
- Macknight, Campbell, and Mukhlis, 1979, 'A Bugis manuscript about praus', *Archipel* 18:225-82.
- Maloney, Elbert S., 1985, *Dutton's navigation and piloting*. Annapolis: United States Naval Institute.
- Marzuki, H.M. Laica, 1995, *Siri'; Bagian kesadaran hukum rakyat Bugis-Makassar; Sebuah telaah filsafat hukum*. Ujung Pandang: Hasanuddin University Press.
- Nasir, Abdul Halim, 1985, *Pengenalannya rumah tradisional Melayu semenanjung Malaysia*. Kuala Lumpur: Loyal Press.
- Pelly, Usman, 1977, 'Symbolic aspects of the Bugis ship and shipbuilding', *Journal of the Steward Anthropological Society* 8:87-106.
- Pelras, Christian, 1987, 'Le ciel et les jours; Constellations et calendriers agraires chez les Bugis (Célèbes, Indonésie)', in: B. Koechlin et al. (eds), *De la voûte céleste au terroir, du jardin au foyer*, pp. 19-39. Paris: École des Hautes Études en Sciences Sociales.
- , 1996, *The Bugis*. Oxford: Blackwell.
- , 1998, 'Bugis culture; A tradition of modernity', in: Kathryn Robinson and Mukhlis Paeni (eds), *Living through histories; Culture, history, and social life in South Sulawesi*. Canberra: Australian National University.
- Raffles, T.S., 1817, *The History of Java*. London: Black, Parbury, and Allen.

- Robinson, Kathryn, 1998, 'Traditions of house-building in South Sulawesi', in: Kathryn Robinson and Mukhlis Paeni (eds), *Living through histories; Culture, history, and social life in South Sulawesi*. Canberra: Australian National University.
- Rosaldo, Renato, 1989, *Culture and truth; The remaking of social analysis*. Boston: Beacon Press.
- Scott, James C., 1998, *Seeing like a state; How certain schemes to improve the human condition have failed*. New Haven: Yale University Press.
- Simon, H.A., 1990, 'Invariants of human behaviour', *Annual Review of Psychology* 41:1-19.
- Southon, Michael, 1995, *The navel of the perahu*. Canberra: Australian National University Press.
- Thomas, Stephen D., 1988 [1987], *The last navigator*. New York: Ballantine.
- Tobing, Ph.L., 1961, *Hukum pelayaran Amanna Gappa*. Ujung Pandang: Yayasan Kebudayaan Sulawesi Selatan dan Tenggara.
- Van Parijs, Philippe, 1981, *Evolutionary explanation in the social sciences*. Totowa, New Jersey: Rowman and Littlefield.
- Winstedt, Richard, 1951, *The Malay magician*. London: Routledge and Kegan Paul.