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SPAFA OBJECTIVES

The objectives of SPAFA are:

– To promote awareness and appreciation of the Cultural heritage of the Southeast Asian countries through the preservation of archaeological and historical artifacts as well as the traditional arts;

– To help enrich cultural activities in the region;

– To strengthen professional competence in the fields of archaeology and fine arts through sharing of resources and experiences on a regional basis;

– To promote better understanding among the countries of Southeast Asia through joint programmes in archaeology and fine arts.

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The Cover:...

One of carved stelae to be found on Padang Lawas Sumatra, Indonesia.

Preventive Conservation in Storage of Collections

by Colin Pearson

INTRODUCTION

Once acquired by a Museum, a work of art or artefact will then spend the majority of its life in storage. It may be examined from time to time and may even be placed on display, hopefully if of a sensitive nature, for not too long. The remainder of the time will be spent sitting on a shelf or in a cupboard or box, or hanging on a frame or roller. It is during this storage life that many of the works housed in our museums and galleries have deteriorated over the years due to adverse storage environments, overcrowding, the presence of insects and rodants, mould growth, harmful vapours emitted by storage containers, etc. Works are often not examined in detail and sometimes never even looked at for long periods of time, and there are well documented cases of entire collections having been eaten by insects or rodants, damaged by excessive light levels or corroded by organic acid vapours from wooden shelving.

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The preservation of a work does not finish once it has left the Conservation Laboratory, it must continue throughout the remainder of its life, including the periods spent under examination and handling, storage and display. In fact, it is a great waste of time and money to conserve and restore a work for it subsequently to be allowed to deteriorate. Remember also, during storage the work is the responsibility of the curator or the registrar of collections. Inspection of all items in the collection is required on a regular basis, and the conservation staff should be involved in matters of preventive conservation. It is important, therefore, to consider what are the basic guidelines that should be followed to ensure the safe storage of a work of art or artefact.

POLICY FOR STORAGE OF COLLECTIONS

The majority of museums are situated on prime real estate. As a large part of each museum must be allocated to the storage of its collections, then the museum must have a firm policy for both the acquisition and storage of its collections, otherwise on the one extreme, extra space will be required for items not really suited to the collections of the museum - costing a lot of money. On the other hand, poor preplanning often means that even new storage systems are full before they are even built. The result is overcrowding to the detriment of the works of art and artefacts.

The preservation of a work does not finish once it has left the Conservation Laboratory ....

In the report of the Committee of Inquiry into Museums and National Collections in 1975,[1] of the 16 institutions listed, 13 had fully used all of their storage space and the remainder between 80 to 90%. Although a number of new museum and gallery buildings have been completed over the past few years, the situation has probably not changed very much, and even for these new institutions, do they have sufficient storage space for the next ten years or until additional storage space will become available?

It is imperative, therefore, that each institution does have a well defined policy, planned well in advance, for the safe storage of its collections.

GENERAL STORAGE DESIGN REQUIREMENTS

With the assumption that the museum has designed adequate sized storage facilities for its current and future collections, and that the storeroom has also been located with consideration to users of the collections, i.e. curators and conservators, there are a number of general considerations to be taken into account whatever the type of collection.

Security. The storage area must be high security as the value of works stored will far exceed collections held elsewhere on display. There are obviously a number of ways of achieving this which is outside the brief of this paper, but keep in mind that storerooms should be used for storing works, not areas which become permanent work stations for curators or their assistants. This use of storerooms for other functions is significant when we discuss the control of the environment and illumination levels (see Storage Environment and Lighting)

Fire Safety: Each storeroom must have a fire detection system and depending on the works housed there, also a fire suppression system. Again, the choice of the system is outside the scope of this paper and the level of sophistication will often depend as much on the funds available as on the type of collection being stored. This is definitely a job that requires expert advice.

Water Safety: Water causes as much damage in storage areas as fire. In fact, it can often cause more damage. Literature indicating what to do in the event of and following a disaster in a cultural institution concentrates on water damage, probably as fire damage is irreversible whereas water damage can often be restored.

Water may come from fire fighting equipment, overhead pipes, floods, etc. Most of these can be avoided with preplanning. There should, if possible, be no overhead pipes in the storeroom, and any services in floors above should be ducted along the perimeters. If water sprinkler systems are installed for fire suppression, they must be of the type that are specific to a given area, i.e. if one is activated, that alone will spray water on the fire and the neighbouring ones remain closed until they also are activated. In addition, once the fire is extinguished, the sprinkler will automatically turn itself off. If such sprinklers are used or if there are unavoidable overhead water pipes, it is advisable to provide all storage units in the room with a slight pitched roof plus overhang. This will prevent overhead water from dripping down through the storage units soaking everything in its way.

> ...each institution (should) have a well defined policy, planned in advance, for the safe storage of its collections.

Many storage units are in basements of buildings. If so, they must be well sealed against rising damp and extra precautions are necessary if the area is prone to flooding. Such systems as an alarm activated water pump should be installed if water enters the storeroom to a depth of 2cm or more. The other design feature that must be followed is that no item should be stored (or left) on the floor, and all storage units should be at least 10 cm off the floor. Remember, water can soak its way upwards, particularly if the storage unit is constructed of wood.

Storage Environment: The environment for storage must be controlled to provide clean air at a constant set temperature and relative humidity. The levels of the latter two requirements will depend to some extent on the material type of the works in storage.[2] The general specification for a mixed collection is 20±2° C and 50±3% relative humidity. Some museums provide secondary air conditioning systems for storage areas, however, the requirement for these must be carefully investigated. Remember, air conditioning units can malfunction and produce a very adverse environment. If the storage room is buffered by other rooms, it is well insulated, and is used only as a store and not a work room, i.e. staff should not be continuously using the room, then the environment will remain quite stable within the storeroom. This obviously requires monitoring. If the case is proven, it will be a significant saving in equipment purchase, running and maintenance costs, and also avoid the problems of malfunction in the secondary airconditioning system.

Lighting: If the store is used correctly, ther should be no requirements for lights to be left on in the storeroom except during the brief visits of museum staff. If this is the case, then there is not the necessity for the low controlled levels of illumination required for works of art and artefacts, i.e. 50 lux for very sensitive objects and 150 lux for sensitive objects. There is, however, still the necessity to remove all ultra violet radiation from the light sources to below 30 μwatt/lumen (1500 μwatt/m^2) for very sensitive, and 80μwatt/lumen (12,000 μwatt/m^2) for sensitive objects. It is recommended therefore that illumination (but with no UV output) levels are high enough to enable detailed examination of an object to be carried out in the storeroom, if not in front of the storage container, at an examination table in the storeroom. Objects

should be moved and handled as little as possible and should not need to be transported to a curator's office for examination.

Insect and Rodant Control These can be two of the most damaging agents in a storeroom, particularly if it is rarely entered and there is no regular inspection of the collections. Rodants can usually be controlled by the conventional poisons, which must obviously be kept away from objects. The control of insects, however, is more difficult. There is a large range of insects that can attack museum collections.[3] and the dark, undisturbed stable environment of a storeroom is ideal for insects.

There are two basic systems for dealing with the problem. The first is to enable fumigation of the entire storeroom to be carried out in case of an insect infestation. If this is small it can possibly be treated within the storage units, or the works removed for treatment elsewhere. If the infestation is extensive,it will be necessary to treat the whole storeroom. The fumigant must be chosen such that it does not cause any damage to works in storage, but at the same time, it must have good penetration and be capable of killing all stages of the insect (i.e. egg through to adult). Insectigas (CIG) which is based on DDVP (dichlorvos) is suitable for this purpose as is methyl bromide for some collections. It is necessary in all cases for the work to be done by a licensed operator. In addition, to facilitate the requirement for fumigating a storeroom, an independent room air exhaust system should be installed, and provision made for the airconditioning system to be switched off during the fumigation process. However, remember, gaseous fumigation will kill only what is alive at that time, it has no residual effect. The storeroom can be readily reinfested shortly after fumigation if no other precautions are taken.

> It is often said that museum personnel cause more damage to objects than any other hazards

As a basic preventive conservation procedure, an insecticide should be used that has a reasonable residual effect. Nothing on the current market is residual for more than about 3 months, therefore, regular maintenance is necessary. The principle of this procedure is one of isolating the storage units, i.e. by spraying the skirting and corners of the room and then around the bases of each storage unit. As most of the insect pests in museums move by crawling, then this method will (a) prevent insects getting into a storage unit, or (b) prevent insects that have managed to get into the unit (perhaps brought in on unit object) from moving from one unit to another, i.e. retaining the infestation. A suitable residual insecticide is the carbamate range, e.g. Multamat (Schering), known previously as Ficam W.

Mould Control: Mould will break out in any storage area if the relative humidity is allowed to remain above 65% for a period of time. Therefore, control of the RH (See storage Environment) is the main way of controlling any mould growth If there is a mould infestation then objects should either be treated elsewhere, e.g. by ethylene oxide (such as Fumigas 10) in a fumigation chamber, or treated locally with a fungicide such as Thymol vapour.

Vibration Control: The storeroom must not be subject to vibration, such as from a nearby railway line or main road. In addition, storage units must run smoothly on runners or tracks. Mobile units such as Compactus, should be dampened so that there is no jaring when the units close.

People Control: It is often said that museum personnel cause more damage to objects than any other hazard. This may or may not be true but a lot of damage can be avoided by care in handling objects. The use of gloves,the use of correctly designed transport devices (trolleys etc.) for different types of objects, sufficient illumination to enable examination in situ (and also to avoid stumbling in the dark), the careful arrangements of objects so that they do not touch a neighbour, the correct and clear labelling of storage units and also objects. All of this will help to cut down damage caused by handling.

Storage Units: There is a whole range of storage units and materials available and also used for storing works of art and artefacts. It will be normal, however, to have a range of modular storage units available as most collections have both large and small items necessitating high and low density storage. In addition, the units must be large enough and also designed such that no one work will be touching another.

Materials of Construction of Storage Units: Over the past few years, there has been concern about the damage caused to works from harmful chemicals released by a range of construction materials used for storage (and also display) units. Chipboard and polyvinyl acetate (PVA) glue, for example, are very common materials of construction and both can release vapours damaging to objects. If they must be used then the curator must be aware of the dangers. It is possible, however, to treat chipboard with urea (i.e. a mixture of 50 gm of urea to 75 ml of water brushed on to each. m^2 of wood surface[4]) to prevent the release of harmful formaldelyde vapour. If in doubt, test the materials of construction - before construction begins, i.e. in the design stage, otherwise it gets expensive. There

are a number of simple methods available for testing such materials and these have recently been reviewed by Padfield and others[5]. In addition, the following list of harmful and safe materials of construction for storage units is taken from their paper. Note, however, whichever paint system or adhesive system is used, it should be allowed plenty of time to cure thoroughly before objects are placed in the storage units.

SOME MATERIALS KNOWN TO RELEASE HARMFUL VAPOURS AT ROOM TEMPERATURE[5]

Wood, particularly hardwood, releases organic acids, alcohols, aldehydes, esters and hydrocarbons. Protein-based glues and wool can release volatile sulphides (refined, photographic quality gelatin is sulphur-free). Cellulose nitrate releases oxides of nitrogen. Cellulose diacetate can release acetic acid. Polyvinyl chloride releases hydrogen chloride. Polyvinyl alcohol is made by hydrolyzing polyvinyl acetate and may continue to release traces of acetic acid. Polyvinyl acetate and its copolymers are generally regarded as forming very stable films but it certainly releases acetio acid. Polyurethanes contain voltile additives. Dyes. Some dyes contain labile sulphur.

MATERIALS THAT ARE SAFER[5]

Metals
Glass
Ceramics
Inorganic pigments
Polyethylene
Acrylic polymers (solutions rather than emulsions).
Polycarbonates
Polystyrene
Polyester fibres
Cotton
Linen

> ... works of art and artifacts spend the majority of their lives in storage.

One area of current disagreement is the basic choice between the use of metals or wood for thematerials of construction of the storage units. The advantages of wood include its relative humidity buffering effect, and it is safer in the case of fire. Metal storage units do not have the problem of releasing harmful vapours but they can be the cause of condensation with a sudden drop in temperature, and also can create an oven effect in the case of a fire, resulting in damage to the contents even if flames never reach inside the unit.

CONSERVATION FACTORS AFFECTING THE SELECTION OF STORAGE SYSTEMS

The following factors should be considered when designing a storage system and also storage units for a particular type of material, type of metals or wood for the materials questions to be asked are, how sensitive is the work to the effects of:

- light (illumination and UV levels)
- temperature and relative humidity (levels & fluctuations)
- dust and air pollutants (including harmful vapours from materials of construction)
- insect, rodant and mould attack
- fire and water
- vibration
- frequency of handling
- stresses in storage (requirement of special support systems).

Also, what is the significance of the monetary, historical or rarity value of the work as regards security. If these are considered, then with the basic guidelines in mind,it should be possible to design a suitable storage system.

CONCLUSIONS

As works of art and artefacts spend the majority of their lives in storage, particular attention should be given to ensure that they are well looked after while in this state. Careful thought must be given to the requirements of the work and its sensitivity to agents of deterioration. With this in mind and considering the need to provide a safe storage area, it is possible to design storage units which will ensure the preservation of the works.

> Careful thought must be given to the requirements of the work and its sensitivity to agents of deterioration.

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The Theatre and Visual Arts: Southeast Asia with Reference to India.

by Jukka Miettenen

One must begin a study of Southeast Asian art with an introduction of Indian art. Indian culture spread out to Southeast Asia, creating the Foundation on which the local cultures developed. Indian theatre and dance have had a decisive influence on the dramatic arts elsewhere in Asia. The grand epics Ramayana and Mahabharata are known almost throughout Asia, and reflections of Indian dance techniques are to be found all over Southeast Asia.

In this series of articles I attempt to chart some paralles between the theatre and the visual arts, and show how knowledge of theatrical conventions is useful in the iconographical interpretation of the visual arts. The previous article expounded on some general parallelisms between the theatre and the visual arts.

Within the sphere of Indian culture the close relationship between the theatre and the visual arts is very evident, and is by no means a chance occurance. There are several reasons for this close relationship between the arts. In India all traditional forms of art serve religion. Furthermore, India probably has the most nuanced aesthetic theories in the world, which consistently cover all forms of art.

RELIGION AND THE ARTS

According to the Indian way of thinking art is basically a religious sacrifice (yajna). Art is also yoga and a discipline (sadhana). Through the creation of a work of art the artist strives to evoke a state of pure joy (ananda)[1]. This point of view naturally sets the requirements of sacral art on all forms of art.

Fig. 1 The Ninth rasa, the Tranquil dancer: Swapnasundari photo: Sakari Viika.

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As a rule religious art is conservative in character. Sudden changes in style or subject matter are rare. The individuality of the artist is not emphasized. Traditional Indian art faithfully reflects collective beliefs and conceptions of the world and cosmos. Since both the theatre and the visual arts in India are closely connected with religion they form a somewhat coherent tradition, which aids the comparative study of different forms of art.

BHAVA AND RASA

Besides religion it is the aesthetic theory of bhava and rasa that provides the underlying unity to the art forms in India. The theory is complicated and it has developed during several hundred years. In this context it is not feasible to treat it more than superficialy[2] .

Bhava means mental state or mood, and rasa could be translated as sentiment. The task of the artist — irrespective of the art form — is to represent the bhava. Rasa is the expression of the bhava as experienced by the spectator. Thus the bhavas produce corresponding rasas.

There are nine rasas. They are:
1. The Erotic (Srngara)
2. The Comic (Hasya)
3. The Pathetic (Karuna)
4. The Furious (Raudra)
5. The Heroic (Vira)
6. The Terrible (Bhayanaka)
7. The Odious (Bibhatsa)
8. The Marvellous (Abhuta)
9. The Tranquil (Santa) (Fig.1)

The ninth rasa was added to the others at a later stage. The rasas can be conveyed by all forms of art.

The bhava-rasa theory is presented in the treatise *Natyasastra*[3] (The Art of the Theatre), a work attributed to the legendary sage Bharata, but probably compiled by several authors 100(?) - 500 A.D. It is an enormous theatre directors' or producers' manual, and its thirty-six volumes contain advice on every aspect of the theatre. All the necessary information about stage, props, scenery, costume, music, use of voice, acting and dancing is given.

For our purposes the most interesting aspects of Natyasastra, besides the bhava-rasa theory, are the instructions concerning the dance, its movements and symbolic gestures. All the bodily poses (karana) and hand gestures (mudra, hasta) are described; and they have also been adapted by the visual arts. Thus the dance instructions in the Natyasastra form a basis for painters and sculptors when they portray the human body and its movements. The canons of sculpture were recorded in instruction manuals called silpasastras.

Although the Natyasastra is pri-

Fig. 2 A standing Buddha. The Gupta period, 5th Century, Sarnath. The sculpture depicts the Lord Buddha in the 9th bhava. Indian Museum, Calcutta.

marily a manual for the theatre its influence is strongly reflected in the visual arts. V. Raghavan has written: "Natya, or theatre, is also the mother of other visual arts,..... It is on the states of beings in different moods and the consequent attitudes and poses as seen in natya that comprehension of both sculpture and painting is based, a piece of sculpture or a drawing being but the artist's capture of a moment in the moving sequence of natya. It is to Bharata and his Natyasastra that we have to go for a full appreciation of this conception of natya".[4]

DANCING SCULPTURES

Dance and the theatre were closely connected to the Indian visual arts from the very beginning. A well-known miniature sculpture from the Indus culture period (2500 - 1500 B.C.) depicts a dancing woman and a fragment of a sculpture form the same period depicts a dancing man.

In early Buddhist sculpture there are many figures that have been depicted in dance-poses defined in the Natyasastra. During the Gupta period (320 - 510) the Buddha sculpture attained its perfection. Although sculptures depicting the Buddha seemingly have no connection to dance or the theatre, as regards the iconography: his pacific expression, harmonic pose and symbolic gestures can be explained with the aid of Santa, the ninth rasa (Figs. 1 and 2).

Thousands of examples of medieval Indian sculpture depicting dance have been preserved. Large temple areas are richly covered with ornamental sculptures. The sculptures on the walls frequently depict temple dancers (devadasis) and dancing deities (nrttamurtis) (Fig.3).

Sculpture transmits irreplaceable information about the history of Indian dance and theatre. With the aid of the sculptures it is possible to reconstruct the history of

Fig. 3 Nrttamurti i.e. Dancing God (Vishnu), The Keshava Temple; Somnathpar 13th century A.D.

Indian theatre. Dr. Kapila Vatsyayan has noted that the information contained in the sculptures is so exact that differences of local dance styles are clearly reflected in the temple sculptures of different regions[5].

THEATRE IN PAINTING

Paintings are less durable than sculptures. Extant early murals do, however, present information about the history of dance and the theatre. The most important paintings in this respect are the Buddhist and Jain murals of western and southern India, and the temple and palace murals in Kerala.

Fig. 4 Two Kathak dancers. Mogul art, 17th Century. Indian Museum, Calcutta.

The era of the monumental Hindu temples came to an end when Islam spread to India. Miniature painting became an important medium for artistic creativity. The minatures of the Mogul period often depict scenes from Kathak dances. The poses of the Kathak dances of Islamic India accentuate soft flowing lines, and thus painting, rather than three dimensional sculpture, therefore, is a more appropriate way of depicting the beauty of the Kathak (Fig. 4).

The Hindu miniatures also repeatedly depict scenes from dances. The Ragamala[6] paintings often show scences from dances (e.g. Va-

Fig. 5 **The Ras Dance,** *a western Indian Painting on canvas. The Lord Krisna is dancing the mythical Ras circle dance with shepherdesses. A corresponding dance is the central theme in many pilgrimage dramas. Etnografiska Museet, Stockholm.*

Fig. 6 Southern Indian Siva Nataraja sculpture. (courtesy : Madras Museum)

Fig. 7 Composite photograph, which combines (two) dance poses representing Siva. (dancer: Swapasundari, photo: Sakari Viika)

santa Ragini) and the deity Krishna is depicted in innumerable miniatures as taking part in a mythical circle dance (Ras) with shepherdesses (Fig. 5).

THE DANCE OF SIVA

The best example of the close relationship between dance and sculpture is the typical sculpture Siva Nataraja, depicting Siva as a devine dancer (Fig. 6). Its iconography utilizes in many ways the dance poses and symbolic gestures of the Natyasastra. Moreover, the sculpture has become the emblem of Indian dance and theatre since the sculpture depicts Siva as a destructive and creative, mythical Lord of Dance.

The development of the Siva Nataraja sculpture began in the fifth century A.D. and it attained[7] its perfection in the southern Indian bronze sculptures of the Chola dynasty (846 - 1173 A.D.). At that time the cire perdue casting technique had been fully developed and the pliable wax made it easy to depict the complicated poses and gestures of the classical dance.

It is extremely interesting to compare a dynamic usually four-handed sculpture with a dancer portraying Lord Siva. Two of the four hands in the sculpture are posed in symbolic gestures and two hands hold attributes: the drum, which represents the pulse of life, and the destructive flame. The multiple hands of the deity emphasize his omnipotence and immanence. The multiple hands also accentuate the impression of movement, and they make it possible to present with gestures and attributes several characteristics of the deity.

The dancer must act within the limits set by human anatomy, but he can, however, utilize movement and time. He can use individual still poses to portray the characteristics of Siva that are depicted in the sculpture. If two dance poses that protray Siva are combined in a composite photograph the result is the figure of the Siva Nataraja sculpture (Fig. 7).

Basically, the "idea" of Siva is the same in the theatre and in the visual arts. Both forms of art manifest it from their own technical premises. this is a simple but fundamental reason for the close relations between the visual arts and the theatre in India. In both the theatre and the visual arts there is, in the background of the creative process, an unchanging image created by religion and myths — collective imagination or "collective unconscious", as C.G. Jung would call it [8].

CONCLUSION

The parallels between the theatre and the visual arts in India are extremely clear. There are two reasons for it:

1. Traditional art serves religion and all forms of art are basically sacral art. Thus all forms of art illustrate a common set of themes, and the different forms of art form a uniform tradition.
2. The Natyasastra manual defines the fundamentals of Indian aesthetic philosophy. It presents the most central aesthetic theory in India, the theory of bhava and rasa. The Natyasastra also presents the basic poses and symbolic hand gestures of classical Indian dance, which were also utilized in the visual arts.

In the traditional art of Southeast Asia the parallels between the theatre and the visual arts are similar to those in India, although basic aesthetic writings similar to the Natyasastra do not exist. In Indian the parallellisms have been studied fairly thoroughly. In her treatise "Classical Indian Dance in Literature and the Arts" Dr. Kapila Vatsyayan has charted the phenomena extensively. Her treatise could well serve as a model for similar research in Southeast Asia.

FOOTNOTE

1 **Kapila Vatsyayan,** *Classical Indian Dance in Literature and the Arts,* **p.5.**

2 **For a more detailed description see e.g. G.H. Tarlekar,** *Studies in the Natyasastra with Special Reference to the Sanskrit Drama in Performance,* **pp. 53-66.**

3 **Rasa is also a central subject in later aesthetic speculations. It has been treated by Dandini, Lollata, Bhatta Nayaka, Abhinavagupta, Udhata and Anandavardhana, among others. A. Parpola,** *Intialaisesta maailman kuvasta ja estetiikasta,* **pp. 197-199.**

5 **Vatsyayan,** *op. cit.,* **p. 237.**

6 **"Ragamala painting is, as its name implies, inspired by the Raga system specular to Indian music. The paintings are, in effect, illustrations of poems which in turn describe or evoke the mood of Raga. Thus three arts are ultimately involved in the production of these paintings— music, poetry and painting itself".**
Pratapaditya Pal, *Ragamala Paintings in the Museum of Fine Arts Boston,* **p.7.**

7 **Vatsyayan,** *op cit.,* **p.**

8 **C.G. Jung,** *The Archtypes and the Collective Unconscious. Collected Works Vol. 9.i, pars. 87-100.*

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Sailing Instructions for Southeast Asian Seas

(15th–17th Century) A Virtually Untapped Historical Source

by Pierre-Yves Manguin

Nautical literature of a technical nature – Asian as well as European – has so far been left practically untapped by historians of Southeast Asia. Among these texts, sailing instructions are by far the more common. They cannot, indeed, be directly read and used by non-specialists, but they in fact require a minimal knowledge of navigational practices. Whatever the language in which they are written, the general pattern remains, with few variations and additions: "From place A to place B, you steer x° for Y miles (or hours)". However, as we shall see, there is much more to it than just these very dry statements.

Only two Asian languages are so far known to have been used in the period considered to record sailing instructions in a written from, i.e. Arabic and Chinese. We know from various sources that such sailing instructions were used by navigators from all over Asia, but the major part of it would have remained in oral form. Indian nautical knowledge about latitudes, winds and so forth, is for instance often referred to in Arabic texts, but none of it seems to have been preserved in written form. Similary, it seems that Malays or Javanese only exceptionally wrote down their sea-pilots: the only known example is that of the so-called 'Javanese map', a copy of which was made by the Portuguese pilot Francisco Rodrigues in the early 16th century (and then unfortunately lost when Albuquerque's ship the 'Flor de la Mar' foundered off the Sumatran coast in 1511 (Ferrand 1918; Winter (1949). The present very brief introductory survey of this specific literary genre will thus only deal with Arabic, Chinese and European texts.

Nautical literature of a technical nature–Asian as well as European–has so far been left practically untapped by historians of Southeast Asia.

Arabic sailing instructions have been known for a long time. A 16th century Turkish translation of earlier Arabic texts was translated into German at the end of the last century, but Gabriel Ferrand was responsible for finding the original Arabic texts, the authors of which were the pilots Sulaiman al-Mahri and Ahmad ibn-Majid. He published the Arabic texts and later translated and annotated them (Ferrand 1913-14). But his translations of these 15th and early 16th century authors are now outdated by Tibbetts' works. The latter carefully collected all the known manuscripts, translated them into English (Tibbetts 1971) and extensively commented upon their contents on Southeast Asia in a later book (Tibbetts (1979).

One small reservation on the use of these Arabic texts is the fact that they provide only scant information on the routes East of the Straits of Malacca, which were no longer used by the Arabs at this late date.

Reversely, Chinese sailing instructions deal principally with Southeast Asian waters. Apart from a few unreliable technical data on actual sea-routes that may

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...the bare, factual statements about routes leading from one named place to another...provide concrete data on toponyms.

be found in scattered earlier historical sources and in travelogues, all that has been preserved in written form again dates back to the 15th century onwards. It appears that these sea-pilots were first put down into writings in the wake of the Ming expeditions of Zheng He; but the earliest extant manuscripts or editions only date back to the 17th century — or later —, and do all contain later interpolations. There is no need here to provide an account of the half-dozen such texts that have now been published, as this can be found in J.V. Mills' article (1979) in the ***Selected Readings from Archipel 18*** (SPAFA 1985). The latter author provides a somehow sketchy outline translation of these Chinese texts. One may also refers to Mills' edition of Ma Huan's ***Ying Yai shenglan*** (Mills 1970), where further comments on these texts are given, together with a complete translation of these famous 'Mao Kun map' (which contains sailing instructions) and a gazeteer of most of the place names that are to be found in these texts.

The third category, which is that of the European — mostly Portuguese — texts, is so far the least known. The Portuguese, as soon as they started sailing in Southeast Asian waters in 1511, transcribed in their 'roteiros' (or sea-rutters) the information they at first got from local pilots (seemingly Malay for the most part) and later on they acquired by them selves during a century and a half of continuous presence in the area.

Spanish 'roteiro' literature, to the best of my knowledge, has little on Southeast Asia that is not translated from Portuguese. The first Dutch sea-pilot was compiled and printed in 1595 by Linschoten under the title ***Reys Gheschrift.*** Linschoten had served the Portuguese for many years before turning over all the information he had gathered to the Dutch, and his book is thus nothing but a translation of Portuguese 'roteiros' (most of the originals have by now been found; this, in turn, allows one to provide a ***terminus ad quem*** for their writing).

Most Portuguese 'roteiros', with very few exceptions as far as Southeast Asia is concerned, remained in manuscript from and are now dispersed in public and private collections all over the world. A few of them, mostly 16th century texts, have been published in Portugal by Brito Rebello (1903), Fontoura da Costa (1940) and by Cortesao (1944; together with the famous ***Suma Oriental*** by Tome Pires). The most interesting of these manuscripts, as far as Southeast Asia is concerned, is that known as the ***Codex Castello Melhor*** (after the name of the family who owns it; the present author is preparing a Portuguese edition of this text). This is an original mid-seventeenth century compilation of about one hundred different 'roteiros', ranging from India to Japan, with abut two-thirds of them dealing with Southeast Asia. This kind of manuscript volume, as may be gathered from the wide variety of papers and watermarks, of hand-writings, and from the many water stains, would have been passed from hand to hand by the Portuguese pilots plying the Asian waters, each one of them adding a few new 'roteiros' correcting the proceeding ones after they themselves had a chance to sail on a particular route, etc. The earliest text complied in the ***Codex Castello Melhor*** are earlier than 1595 (they were translated in Linschoten's ***Rey Gheschrift).***

After this brief survey of the available sources, I will now discuss the validity and usefulness of such sailing instructions as historical sources. I must however start by stating that this is not as yet the result of a completed work, but merely the outline of an on-going, long term research project. I base myself on the experience acquired while collecting in public archives and private collections the totality — as far as this can be achieved — of the available Portuguese manuscripts containing 'roteiros', while using the latter for a study of the historical geography of the coasts of Campa and Vietnam (Manguin 1972); and while preparing the edition of the ***Cotex Castello Melhor.***

In what way would a systematic edition and analysis of the available 15th to 17th century sailing instructions, and the subsequent preparation of an historical atlas of Southeast Asian sea-routes, help the historian of Southeast Asia?

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Historical geography has obvously the most to gain from such a study. To start with, the bare, factual statements about routes

Sailing instructions are precise enough to provide information on the positon of a coastline at a certain period of time, and thus to compare it with that of modern times.

leading from one named place to another do provide concrete data on toponyms. As sailing instructions are usually precise enough to plot the actual sea-route on a nautical chart, this will normally help in the location of otherwise unreported or unidentified place names with considerably more accuracy than the usual non-technical sources would allow for.

Winds, currents, geo-morphology of the Southeast Asian seas would have remained unchanged – with very few exceptions – during historical times. Thus sailing routes plied by navigators of various nationalities, at various epoches, would have basically remained the same (allowing, of course, for progress made in navigational techniques). Because of this stability, I believe that a pattern will emerge when all known sea-routes will have been plotted on nautical charts, that will clearly show major and secondary routes. Blank areas will also no doubt appear on such maps, which will result either from navigational impossibilities, or from the fact that a route is of strictly local interest (and is consequently not described by the international shippers).

These data would in turn provide historians with a solid base that should be helpful in discussing and evaluating information gathered from less precise, non-technical sources.

Careful extrapolations into earlier times, again with the help of other historical sources may thus be made possible as noted by Mrs. S. Suleiman in her paper, the mere fact that the South China Sea could not be crossed in a straight line from the Straits of Singapore to Canton-- a fact established through the analysis of sailing instructions (Manguin 1976) – is of considerable importance in assessing the role of Campa in controlling the essential route leading from Insular South east Asia to China.

One last topical example of how these sources may be used is in defining the coastline of Sumatra in the vicinity of Palembang. Sailing instructions are precise enough to provide information on the position of a coastline at a certain period in time, and thus to compare it with that of modern times. This is how O.W. Wolters and the present writer – basing themselves on respectively Chinese and Portuguese nautical texts – were able to disprove earlier theories about the coastline near Palembang in Srivijayan times (Wolters 1979; Manguin 1982).

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Boat–Building and Seamanship in Classic Philippine Society.

by Wiliam Henry Scott

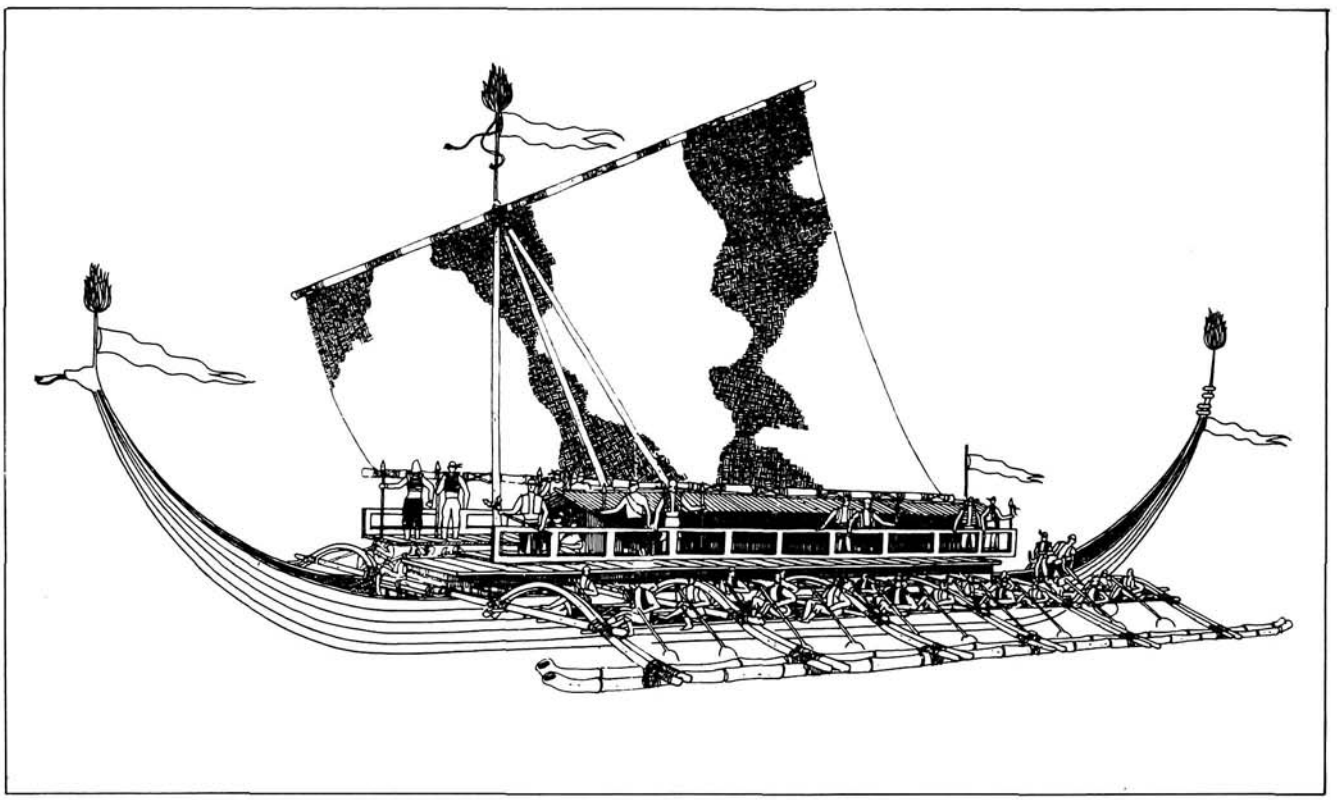

Fig. 1 Artist's reconstruction of classic Philippine caracoa, by Raoul Castro.

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PLANK-BUILT BOATS IN THE PHILIPPINES[1]

In October 1976, Butuan City Engineer Proceso S. Gonzales excavated four planks of an ancient Philippine boat in sitio Ambangan of barrio Libertad, which had been discovered by unauthorized "pot-hunters" looking for marketable Chinese trade porcelain. The find was promptly announced in the public press, using Antonio Pigafetta's early sixteenth-century Italian

spelling, ***balanghai*** for ***barangay,*** presumably because that author mentions one that belonged to the Rajah of Butuan's brother. Dr. Jesus Peralta, Curator of the Anthropology Division of the National Museum, then took charge of salvage archaeology at the site, and Research Assistant Leonard Alegre subsequently removed the planks for chemical treatment and preservation. Just one year later, nine planks from another vessel of the same type were discovered a kilometer to the southeast of the first find, and were systematically salvaged and removed to Manila by National Museum researcher Cecilio Salcedo. There they have been treated by a preservative process known as PEG — i.e., polythyline glycol — and will eventually be reassembled for public display.

> ...the Butuan discoveries (are) one of the most significant events in Philippine archaeology...(and) marine archaeology as well.

The location of the two finds appears to be a former shoreline — even a harbor waterfront — subject to the strong currents of one of the mouths of the Butuan River which evidently washed away all the disintegrating parts of the vessels except the hull planks, which presumably survived because they collapsed flat on to the clay bottom and so presented no resistance to the current. Other than these planks, nothing was recovered except a short piece of one rib and three small pieces of what was probably a mast. It is therefore impossible to reconstruct whatever interior fittings, thwarts, or superstructure the vessels may have had, or even to determine whether they had outriggers or not. On the other hand, the configuration of the planks themselves is recognizable as a distinctive style of marine architecture which once extended from Scandinavia to the South Pacific, from the third century B.C. until the present time in a few remote corners of the South Seas. These facts, taken together with a Carbon-14 date of the thirteenth and fourteenth centuries for the second find, determined by the University of Tokyo from wood samples, make the Butuan discoveries one of the most significant events in Philippine archaeology. Moreover, an even earlier date for the first find — it lay more than a meter below a layer of midden materials containing Sung porcelain — makes the discovery an important event in marine archaeology as well. Happily, too, comparison with other Southeast Asian vessels built in this tradition makes it possible to describe the sort of boat these Philippine specimens must have been and moreover, by recourse to Spanish records, to describe their role and significance for Philippine social life and progress.

The planks of the older vessel run the full length of the hull in one continuous piece — almost fifteen meters — and thus constitute what nautical jargon calls strakes. Those of the second boat are made of two sections of ***doongon*** wood ***(Heretiera litorales)*** joined by Z-shaped scarfs, and those next to the keel — i.e., the garboard strakes— are twenty cm. wide, three cm. thick, and pegged to the keel every twelve cm. by hardwood pins or dowels nineteen cm. long, driven into holes in the edge of each board. The pegs fastening the other boards together are shorter — twelve cm. — and those which have come loose are 1.5 cm. in diameter and pointed at one end. The keel itself is hardly worthy of that designation — it is simply a plank one to two cm. thicker than the other planks, though forty-five cm. wide amidships and tapering to a point at both ends, thinning slightly to about 2.25 cm. The most distinctive feature of the planks is a series of flat, rectangular protrusions or lugs carved out of the surface of the wood on the upper side of each plank — that is, the inside of the boat. They are seventy-eight cm. apart, exactly opposite one another on each strake, average 30.7 cm. long, 16.5 cm. wide, and 2.5 cm. thicker than the planks themselves, and have four holes along their edges through which cords or lashings can be passed. The purpose of both the lugs and the holes is made clear by the fact that

a fragment of transverse ribbing was found securely bound to the lugs of the several planks it crossed by cordage of *cabo negro* palm fibers. These lugs are called *tambuko* in Visayan and Maguindanao, as well as in many of the languages spoken in the maritime cultures to the south of the Philippines. Their presence is the earmark of this older ship-building technique.

In the more familiar modern ship-building technique, developed in both China and Europe as long ago as the Middle Ages but still in use, a rigid framework of keel and ribs is first constructed, not unlike the spine and ribs of a whale or carabao in appearance and function, and the wooden planking of the hull is then nailed to it with metal spikes or wooden trenails. The older technique was to build the hull like a shell first, plank by plank carved to fit, and to fasten the ribs in afterwards. This technique is probably a natural development of the one-log dugout canoe by adding one board to each side to obtain higher freeboard. The prototype seems to have survived in Taiwan to be described in the eighteenth century by Huang Shu-ching in the following terms:

> ***A mangka** is a single tree-trunk hollowed out, with wooden planks fastened on both sides with rattan; since they have no putty for caulking and water easily enters, the barbarians keep bailing with a ladle.*[2]

By incrasing the number of such additional planks, a fully developed boat or ship is produced. But as the sides of the canoe, or banca, are thinned, some transverse strengthening is required, and this can be provided by running strut-like thwarth across the vessel, securing them to the sides without nails by means of tambukos and lashing. Similarly, as the number of strakes is increased, not only is such transverse reinforcement necessary, but the planks themselves must be firmly attached to one another. For this purpose, a flexible rib can be pressed down across all of them and lashed securely to the matching tambukos carved on each plank. Finally, a combination of such thwarts and ribs lashed together, and even tightened by tourniquet action in the lashings themselves, produces a sturdy vessel whose hull and other structural parts are held firm under prestressed tension. This is the sort of hull the Butuan boats must have had.

Of course, since this technique provides no solid ribs to fasten the planks to, they cannot be steamed, bent to shape, and held in place by nails. Instead, they must be carved to shape in advance, no mean feat of carpentry in a boat the size of the Butuan examples. It is because of the essential nautre of this feature that boats constructed by this technique are called "plank-built boats." On the testimony. of Spanish records, Philippine plank-built boats usually had strakes hewn of one piece from stem to stern, even in twentyfive-meter warships manned by crews of over 200. Each of these planks was literally hand-carved out of half a tree-trunk with an adze. Saws, had they been available, would have been of little use for such shaping, especially considering the projecting tambukos along one surface. Although these adzes were made of metal during the Spanish period, it is worth noting that the same results could have been attained with neolithic tools. Indeed, there is an elegant nephritejade chisel in the National Museum which could perform such work.

Historically, thereare two methods by which the planks in plank-built boats are fastened together — sewing and edgepegging. Sewing — or, better said, lacing — the boards together is done by drilling a matching row of holes through the two boards near their adjoining edges, and running rattan strips through them in the manner of lacing up a shoe or basketball. This is the older technique and it can be performed with even a simple stone or bone drill, as was still being done

Historically, there are two methods by which the planks in plank–built boats are fastened together–sewing and edge–pegging.

in modern times in remote Pacific islands. Sewing boats was a Luzon technique noted in the San Buenaventura Tagalog-Spanish dictionary of 1613, which continued in use into the present century. ***Barangayans*** or ***cascos*** with a capacity of two or three thousand cavans of rice for loading and unioading ocean-going steamers were being constructed in Cagayan by this method in the 1920s. The timbers were cut in the Sierra Madres and floated downstream to Aparri where they were reduced to baords, and then carpenters working in teams of two, one inside the hull and one outside, drilled the holes, laced them with ***barrid*** rattan, and caulked them at the rate of ₱ 15 per hole. During the preceding decade, the turtle-eating, seafaring Dumagats of Ambos Camarines were constructing nine-meter ***benitans*** by sewing overlapping strakes together on a keel thirty cm. thick, plugging up all the openings afterwards with coconut coir and ***pili*** resin. On the rare occasions when they lived ashore, they simply took their boats apart and stored them under the house, ready to reassemble whenever they had reason to take to the sea again.

Stone tools are probably inadequate for drilling deep holes in the thin edges of boards, and it is therefore not surprising that edge-pegging does not appear in those distant Pacific islands whose inhabitants presumably migrated there

without metal. Edge pegs do not provide much strength for binding strakes together — for that, tambuko lashing is necessary — though seventeenth-century Spanish accounts indicate that Philippine edge pegs were secured within the planks by having hardwood nails run through them, planks and all, after they were in place. But pegs prevent the planks from sliding lengthwise and thus resist the shearing forces exerted on a vessel as it twists in heavy seas, and are therefore sometimes found in ships built on rigid frames in the modern manner. Edge-pegged plank-built boats are still being constructed in the Batanes Islands with solid futtocks and ribs inserted afterwards with nails or trenails instead of tambukos, and a Vietnamese specimen with a completely nailess hull of handhewn planks arrived in Lubang Island in July of 1981 with thirty-five refugees aboard. But tambukos survived the introduction of saws and nails right into this century: an old boat-builder in barrio Katuli of Cotabato City recalls ***kinalawong*** bancas built in this manner with a five-piece hull — that is, a dugout canoe base with two boards pegged to each side, with thwarts called ***tang*** or ***balawog*** lashed to them. And the force of tradition is such that tambukos still show up anachronistically in handhewn bancas in Butuan where they serve no functional purpose whatever, not even having holes in them.

THE PLANK-BUILT MAN-O-WAR

By the time of the European arrival in Southeast Asia in the sixteenth century, the plank-built boat had been developed into a highly refined man-o-war, nicely adjusted to the tools, techniques, and materials available, and local political and commercial needs. They were called ***korakora*** in Indonesia, but ***caracoas*** by the Spaniards in the Philippines. They were sleek, double-ended warships of low freeboard and light draft with a keel in one continuous curve, steered by quarter rudders, and carrying one or more tripod masts mounting a square sail of matting on yards both above and below, with double outriggers on which multiple banks of paddlers could provide speed for battle conditions, and a raised platform amidships for a warrior contigent for ship-to-ship contact. Their tripod masts and characteristic S-shaped outtrigger supports show up in the ninth-century stone carvings of Borobudur, and their other features appear in Chinese, Portuguese, Italian, Dutch, Spanish and English accounts over a period of half a millenium.

Wang Ta - yuan a medieval Chinese author, recognized the essential features of the plank- built boat — i.e., light, flexible and nailless — in Madura in the early fourteenth century. Writing at a time when the second Butuan boat might still have been afloat, he says:

> ***They make boats of wooden boards and fasten them with split rattan, and cotton wadding to plug up the seams. The hull is very flexible, and rides up and down on the waves, and they row them with oars made of wood, too. None of them have ever been known to break up.3***

Pigafetta noted the wooden dowels and bamboo outriggers in 1521, and Urdaneta gives the dimensions of the outriggers five years later: they are six meters shorter than the hull, their supports are three and a half meters long, and the inner-most row of paddlers sit about a half meter outside the hull. An Italian pilot with Villalobos in 1543 reported a ship with Negro oarsmen in the Visayas, and the anonymous account of the 1565 Legazpi expedition says of a Bornean three-master taken in Bohol, "It was a ship for sailing anyplace they wanted."[4] Longer and more detailed accounts were given, in almost identical terms, by Portuguese Governor Antonio Galvano of the Moluccas in 1544, Dutch Admiral Jacob van Neck in 1598, and Mindanao missionary Francisco Combe's, S.J., in 1667, while Manila Auditor Antonio de Morga's famous 1609 ***Sucesos*** includes a shorter but perceptive description. But it was Combes's brother of the cloth, Francisco Alcina, who recorded the most valuable description of all in his unpublished 1668 ***Historia de las Islas e Indios de las Bisayas*** — three capters in which the construction of the plank-built warship is set down step by step by a man who had actually built some.

To the casual observer familiar with the great Chinese war junks of the Ming Dynasty or the Spanish galleons towering over the native caracoas, the plank-built man-o-war looks like a primitive and flimsy craft indeed. Its planking seems skin thin and its bamboo tripods a sorry substitute for those oaken masts which are almost symbols of strength and security in western literature. Their low freeboard and wide-spreading outriggers crowded with seamen outside the hull make them hardly recognizable as ships at all. A careful observer like. Pigafetta realized that their hulls were "very well made of boards with wooden pegs [though] above this they are nothing but very large bamboos,"[5] but Ch'uan-chow, Superintendent of Trade Chao Jukua, thought they were simply bamboo rafts. Their paddles with blades like dinner plates or elephant ears show up in Chang Hsieh's 1613 *sailing directions as being "shaped* like a gourd cut in half and left hollow as waterbailers."[6] Caracoa seamanship was also inexplicable; the sailors were often in the water outside the boat. To bail out a swamped vessel, for example, they went over the side to rock it and slosh out the water with paddles; and when emergency speed was needed, the paddiers on the outrigger floats were literally in the water. Chang confuses these two actions in the following terms; "On occasion, the men with these bailers jump

into the water to rock the boat and the speed is doubled."[7] And who could imagine that a warship could be launched by the simple manoeuver of picking it up and running into the surf with it? This outlandish detail reached the remote mainland study of scholarly Superintendent Chao to be expressed in his 1225 comment on Visayan mariners as follows:

They do not travel in boats or use oar, but only take bamboo rafts for their trips; they can fold them up like door-screens, so when hard-pressed they all pick them up and escape by swimming off with them.[8]

But the comparisons are gratuitous. The caracoa was not designed to cross high seas in any weather before any winds, out of sight of land and provisions for months at a time, carrying heavy cargos financed by international banking houses, and even heavier artillery for slugging it out with competitors of their kind. Rather, they were intended to carry warriors at high speeds before seasonal winds through dangerous currents on interisland raids and high-profit ventures mounted by harbor princelings with limited capital. For this purpose they were superbly fitted. If a fair comparison is desired, it may be found in the Viking ships of Scandinavia. A third-century example excavated in Nydam, Schleswig-Holstein, has a double-ended hull like the Butuan finds, with one-piece strakes lashed to flexible ribs by cleat-lugs. But by the time of the later Butuan boat, the Viking ship had developed along its own line of specialization into a heavy, rigid-ribbed, deepsea vessel capable of withstanding the buffeting of some of the roughest waters in the world — those of the North Atlantic between Europe and America. In Southeast Asia, on the other hand, specialization ran to speed and manoeuverability in shallow coastal waters.

The flexible hull, curved keel, shallow draft, quarter rudders, and protective outriggers give the caracoa life-saving advantages in waters entailing a high risk of banging on coral reefs, grounding on rocky coasts, or beaching on sandy shores. The force of direct underwater blows that would stave in the hull of a rigid vessels, or at least loosen its nails, is instantly redistributed to other parts of the prestressed plank-built hull, and rattan lashing that comes loose can easily be tightened again or replaced. Nails entail a special disavantage of their own: they loosen as they rust and induce rot into the surrounding wood in the process. Quarter rudders are actually large steering oars on one or both quarters that can be raised on a moment's notice to avoid underwater obstructions, and outriggers effectively act as fenders against contacts at water level. Nor is the presence of the tripod mast on the plank-built hull mere coincidence. The pliant caracoa hull precludes the stepping of a tall mast into a rigid keel on which it would exert the strain of great leverage: instead, the more agile tripod can safely shift its burden with the movements within the hull itself.

Outriggers serve a half dozen distinct functions in sailing caracoas. Their most obvious purpose is to prevent rolling. They run just above the surface on a well-trimmed ship — "kissing the water," as Morga says — and are slanted upwards at the ends to lessen water resistance. (The seventeenth-century Mindanao equivalent of keel-hauling was to tie the culprit to one of the outrigger floats.) They add the necessary bouyancy to keep a swamped vessel afloat, and missionary accounts contain grateful tales of friars being brought safely to port by Filipino crews working in water up to their necks. Outriggers receive the first force of heavy seas on the beam and, if worse comes to worst, come apart first and so give a vessel time to seek shelter before breaking up. Thus an anti-Moro task force dropped anchor of Panay in 1618 when its port outriggers began to be strained by strong northeasterly ***brisas.*** Outrigger beams also provide support for as many as four banks of paddlers for high speed in battle, and the whole outrigger structure provides the handles by which the crew picks up a caracoa for beaching and launching. (A hundred men can easily carry a five-ton vessel if they can get ahold of it.) Speed in launching was an essential feature of self defense for coastal villages exposed to raiding attacks, for boats were regularly beached high and dry at night. Encumbering and destructive marine weeds accumulate on an exposed hull in tropical waters in one or two weeks' time, and shipworms — according to Hernando de Los Rios Coronel in 1619 — could eat up the hull of a galley anchored in the Pasig River in just twelve months.

The fact that the caracoa was double-ended made it extremely manoeuverable in battle: its paddlers could back it down as rapidly as drive it forward simply by turning around in their places and shifting the helm to the other end. Paddles have the advantage of giving direct control of the depth, length, and frequency of stroke — as Fr. Combés said, "Their paddling is precise because they strike directly with the paddles right in their hands without being fastened to anything."[9] It is the use of paddles, of course, which requires such low freeboard. Oars permit greater length and leverage, and can generally be worked longer than paddles without tiring, though Fr. Alcina testifies that Visayans born and raised to the task can be relied on to paddle from sunrise to sunset.

The caracoa's shallow draft makes it less responsive than deeper vessels to the vicious currents of the narrow channels and interisland passages of the Philippine archipelago whcih were the constant bane, and frequent undoing, of Spanish galleons. But it is a distinct disadvantage for sailing in any wind other than one dead astern — for which reason Southeast Asian trade-raiding was strictly seasonal. With no keel, center-or

lee-boards, or large, deep center rudder, and very little hull beneath the water, the caracoa was easily blown sideways on a smooth sea and impeded by a choppy one. When running before the wind, its speed was proverbial — probably twelve to fifteen knots to a galleon's five or six — and a factor in the Sulu Sultanate's survival as an independent maritime principality until the advent of steam. But with a wind on the beam, the caracoa was already close-hauled, and it performed poorly in rough water in even a quartering wind, and could hardly tack under any conditions. Thus when Commander Morga sailed out of Mariveles Bay in October 1600 in a fresh northwester with choppy seas and headed due south to intercept Dutch Admiral Oliver van Noordt off the Batangas coast, he had to leave his two caracoas behind to cross over to Cavite inside Corregidor Island.

This same shallow draft, however, was an essential feature of the fine lines of a hull of such hydrodynamic excellence the caracoa actually planed with a following wind — that is, lifted up in the water. The common Philippine barangay shared this design, and its performance was praised in such a pleasant and informative paean by Fr. Alcina that it is worth quoting at length:

***Let us say something about the speed of these ancient boats of the Visayans, which was certainly great in a* baranggay *of one encomendero of these islands called Pedro Mendez, which — though I did not see it, I heard about it from many who embarked on it many times — was so fast that nobody in it could keep his footing when they were rowing; even though it had no more than two banks of paddlers, one on each side, it was of low freeboard and long, so they struck the water well with their paddles. It used to travel by paddling between sunrise and sunset from the town of Paranas — where many of these* barangays *are made, and the same Filipino expert who made them made me a little one — to the City of Cebu, where the said Pedro Mendez had his house, this being a distance of more than forty leagues between leaving the one town as the sun was rising and reaching the other before it set, which seems unbelievable since they were traveling at more than four leagues an hour, but the number of withnesses leaves no room for doubt. And I experienced practically the same thing in this little* barangay *which was made in the same town, for I never met another boat and made* romba *— which is what the Filipinos call* recateado *in Spain, which, for those who do not know it, is to race — that could keep up with me, and oftentimes when I was sailing near the edge of the sea or some river, I noticed that no man could keep up with me no matter how long he ran along the beach following me.*[10]

European explorers had the good sense to use native vessels from the very beginning of their invasion of Southeast Asia. The ship Magellan's friend Francisco Serrano ran aground in 1511 had been purchased in Banda, and when Governor Gonzalo Pereira sent some Portuguese officers to threaten Legazpi in Cebu in 1567, they made the trip from Ternate in two caracoas. So, too, when Spanish Governor Acuna attacked the Dutch in that island forty years later, they escaped with their families in four *joangas,* a sort of king-sized caracoa. Legazpi himself used Filipino-built and Filipino-manned vessels for exploring the Visayas, and sent Martin de Goiti to Luzon with fifteen of them in 1570. Smaller craft called *biroco* formed part of the Spanish fleet sent to Borneo in 1579, and more of them were stationed below Manila during a Japanese threat in 1592. Morga regularly used caracoas as dispatch boat and tenders, and by 1609 they were in such common use the Spanish King was moved to order some improvement in their design to protect their overworked *indio* crews from inclement weather. In the seventeenth century, whole fleets of them were being built to fight fire with fire as Moro Filipinos contested Spanish control of the Visayas. All the major naval engagements joined during Sultan Kudarat's long lifetime were fought by opposed fleets of plank-built men-o-war with a thousand-year pedigree. And the six boats Captain Francisco de Atienza carried up to Marawi in pieces in 1639 and reassembled on Lake Lanao were genuine Philippine pre-fabs, too.

Hernando de los Rios Conronel once remarked that a caracoa was a boat that could be sunk with one oar of a galley. As a matter of strict fact, Spanish galleys did not often get the chance. As Fr. Combés accurately said, "The care and technique with which they build them makes their ships sail like birds, while ours are like lead in comparison."[11]

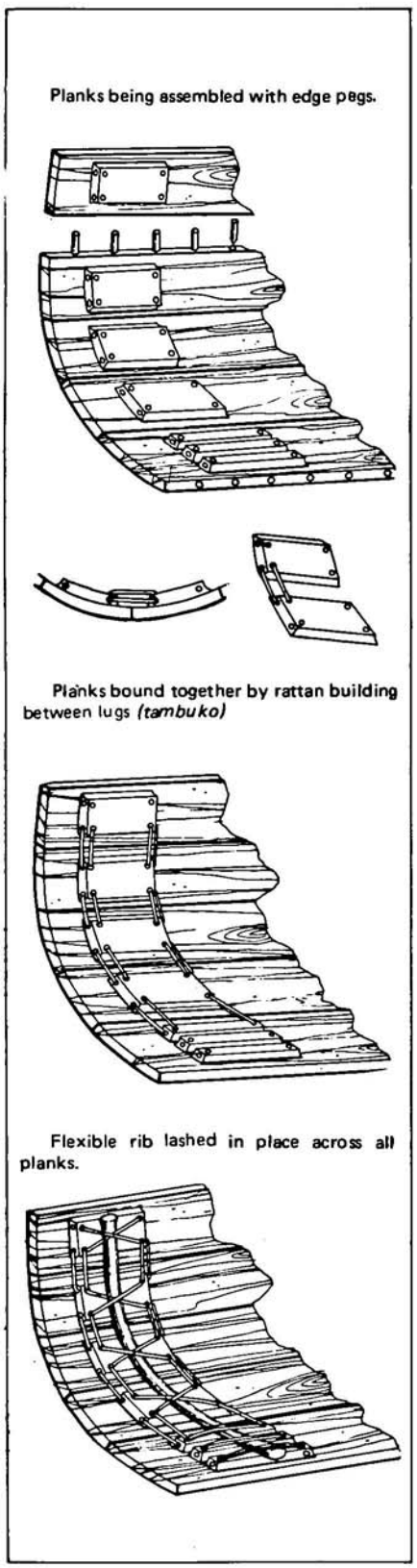
European explorers had the good sense to use native vessels from the beginning of their invasion of Southeast Asia.

CONSTRUCTION OF THE PLANK-BUILT BOAT

Chapters 8-10 of Book 3 of Part I of Francisco Alcina's unpublished *Historia de las Islas e Indios de las Bisayas* are a detailed description of Visayan ship-building techniques in the first half of the seventeenth century. Fr. Alcina was eminently qualified to write such a description. He was a master ship-wright of the first class himself when he arrived in the Philippines in 1632, and by the time he wrote his four-volume *Historia* in 1668, he had built several Philippine vessels himself and traveled thousands of kilometers along the coasts of Leyte and Samar and other Visayan Islands. He was a keen observer of everything he saw from flora and fauna to natural phenomena and human behavior. He spoke the people's language, learned their sea chanteys and folklore, and more than once saved galleons from grounding in San Bernardino Straits by the expertise he had acquired. And he admired Filipino ship-building skills warmly and entrusted his life to their seamanship gladly. His description of their methods of constructing plank-built boats is as follows.

The master shipwright is called a *panday,* a title he shares with

Fig 2. Construction details of plank -built edge-pegs hull.



other craftsmen like iron-workers and goldsmiths. He goes to the forest with his ax, a straight adze called a ***dallag,*** a curved one called a ***bintong,*** and a spoon-bit called a ***lokob*** about twenty cm. long with a wooden handle across it, and selects his tree. ***Lawaan*** is preferred because it is a strong hardwood which grows large enough for a canoe 120 cm. wide to be hewn out of a single trunk. In the Philippines, tropical trees generally have a punky center – the Visayans called it ***bokag*** – caused by a fungous infection which enters through the root system and eventually rots and splits the trunk. The center must therefore be rejected, though the two halfs will be solid timber if the tree is carefully selected. the outer four or five centimeters are also rejected as being ***aramay*** – soft, spongey, or fibrous – and liable to grubs and wood-lice. (Fr. Alcina accepts the Filipino belief that if a tree is cut during the dark of the moon – say, after the 22nd of the month – the aramay will crumble to dust in three days, but that if the tree is cut in the moonlight, even the worst-infested aramay will not infect the rest of the trunk.) Since the tree is too large to be moved conveniently on the ground, it is felled in just the position the panday wants. Then he marks out straight guidelines along it with a cord called a ***kutur,*** and sets to work.

The entire outer form of the hull is adzed to shape before hollowing out the inside – sharp at the bottom like a keel, pointed at both ends, and V-shaped amidships with sides no thicker than a board. (The adze is evidently sometimes used like a chisel, for Fr Alcina says it is hammered with a mallet called a ***pakang.***) to check the progress of the thinning process as he works, the panday keeps boring holes through the sides with the ***lokob,*** all of which will be plugged up water-tight later. Then the interior is hollowed out, leaving the necessary tambukos projecting for seating thwarts or ribs called ***agars*** with rattan. A good panday can make such a hull nine or ten meters long and a meter and a half wide working by himself in just eight or ten days.

Such a boat carved out of a single piece of wood is called a ***baroto*** – what the Tagalogs call a ***banca,*** Fr. Alcina says – or a ***balasiyan.*** (Some are small enough for one man to lift.) Usually a baroto or banca has one board added to each side – indeed, this may be the basic meaning of ***bangka,*** for Taiwanese boats of this build observed by Fukienese coast guard officer Chu Wen-ping in 1662 were called ***mangkas*** or ***vangkas.*** Since the boards themselves are called ***timbaw,*** the baroto is now technically ***tinimbaw.*** To increase freeboard, from twenty to forty cm. of ***opak*** or ***dagpak*** bark may be added to the gunwales and secured with thin stips and nails of rattan, or plaited palm leaves may be added as washboards called ***dolopi.*** But if the sides themselves are raised high enough for cargo-carrying purposes to require oars instead of paddles, the boat is called a ***birok*** or ***biroco.*** In Fr. Alcina's day, these birocos were being replaced by ***champans*** of Chinese design, except for short trips in local waters. It is impractical, however, to build larger vessels on dugout canoe bases, so those above ten meters or so are constructed on squared keels as real edge-pegged, plank-built boats. This is the size and style which was known by the famous name of barangay or balangay, although the Tagalog version was sewed or laced, not edge-pegged. Largest of all are the full-fledged warships called caracoas, among which the joanga appears as an oversized model for special duty, the term itself probably deriving from the huge, triple-planked Malay ***jong.*** A joanga that retired up the Pasig River with a crew of more than 300 in the face of Goiti's attack in 1570 was

probably a royal flagship providing maximum security for the person of rajah Solayman or Rajah Acheh Matanda.

It is to be noted that the flat- or round-bottomed Butuan boats, lacking either a real keel or a canoe base, do not fit any of these categories, though they are within the barangay size range. In addition, they display another unique feature — the center plank which serves as a keel has two or three thin tambukos parallel to one another instead of the broad ones appearing on the adjoining planks, though of the same length and thickness. This special feature has not been encountered elsewhere — invessels with true keels, that is — and may therefore be intended to facilitate additional lashings at the critical point where the ribs cross the keelplank.

Construction of the caracoa begins with a keel of hard, red ***barayong*** or ***tugas*** wood. Since this may be more than twenty-five meters long and has a gentle curve in profile — both Combes and English privateer William Dampier call Philippine warships "half-moon shaped" — its product demands considerable skill and manpower. It is small wonder that Filipino shipwrights could handily lay out and construct and thirty-meter mast ten meters in circumference for a Manila galleon with no more Spanish assistance than a few soldiers to keep them working without pay. The keel is extended at both ends about a meter by stems of the same wood mortised into it, which continue its graceful lines into serpent-like projections at both prow and stern which are gaily decorated for full-dress occasions. Because of this curve, as much as a fifth of the total length of the vessel may be out of the water.

Next comes the carving of the first two boards to be fitted to the keel on either side, the most crucial stage in the entire construction because it is their flare and curvature which will determine the final contour of the hull and the consequent speed of the vessel. For this reason, they are distinguished by special terms: the garboard strake is called ***dokot*** and the next one ***lonor.*** The curvature itself is called ***lubag*** and the skill to produce it is the hallmark of the master panday. Additional planks are then added with ***mangle, bahe*** (the trunk of the ***anahawis*** plam) or brazilwood dowels every twenty cm. to a total of six or more boards on a side, depending on the size of the boat. (Three to five appear to be normal for a barangay.) The tambukos have already been carved out, of course — twenty cm. long and six to seven cm. thick on top but flush with the surface of the plank below, and a meter to a meter and a half apart. (They are therefore thicker, shorter, and farther apart than the Butuan specimens.)

Now the shell is left to season for a month or two, carefully elevated to avoid infestation by termites. When it is sufficiently dried out, the planks are removed one by one and all the broken pegs — 'which are many" — removed and replaced. Then it is reassembled in three distinct stages called ***sugi*** (' matching"), ***os-os*** ("tightening"), and ***pamota*** ("closing"). Sugi is accomplished with a little wooden tool that acts like a scribe: it has a sharp iron point two to three mm. above a projecting tongue or lip, and is small enough to fit in the palm of the hand. After the planks have been put together again but not hammered tight, a carpenter with a strong grip places the little lip on the upper edge of a board with the point biting into the side of the board above. Then he runs it from stem to stern both inside and out, applying enough pressure to incise a sharp line along the upper board near its lower edge. This mark naturally reproduces whatever irregularities the original adzing may have left in the upper edge of the lower board. The wood below this line can now be removed to leave a chink between the two planks of constant thickness from one end to the other. This chink is then stuffed with *pugahan-* or *idiok*-palm fibers called ***barok,*** as fine as goat's hair, and the planks are ready for os-os tightening.

Os-os means to prevent something from sliding up or down by pulling against it with cords: the belt a weaver uses with the backstrap loom to keep tension on the warp threads is called an ***os-osan.*** In boat-building, the term means to run stout rattan lines under the hull, fastening them securely at both ends to logs laid across the gunwales. Wedges are then driven into the ends of each log, splitting them enough to increase their dimension and so draw the rattan lines tight. While the planks are under this tension, their "eyelids are closed" ***(napirnga)*** by pamota. This is done by driving holes through the pegs in each plank, locating them by marks inscribed on the planks beforehand, by the use of a little tool like a nail punch with square cross section. The nails themselves are square pins four cm. long of ***ipil,*** a strong wood which produces a resin in salt water which remains so sticky the pegs may break off but the pins themselves never loosen. Then the os-os equipment is removed and the planks are left so tight you can hardly see the joints between them, Fr. Alcina says, and the whole hull is as strong as if carved from a single block of wood.

Now, the shell having been finished, the hull itself is completed by the insertion of ribs and thwarts. The thwarts are smoothed branches of wood chosen for its strength, toughness, and light weight, with one or two holes at each end. By means of these holes they are lashed across the boat between matching pairs of tambukos in corresponding strakes, seated on

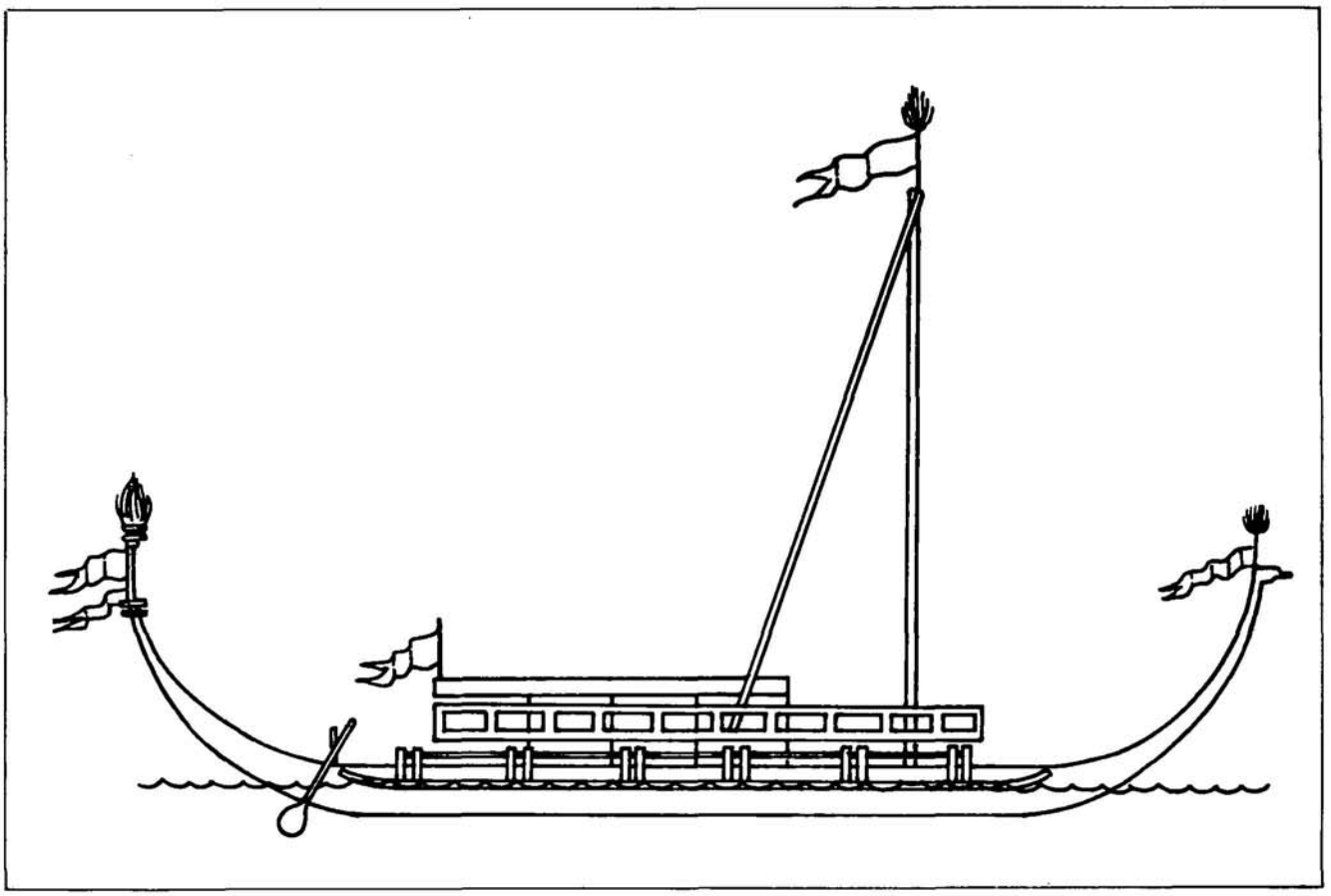
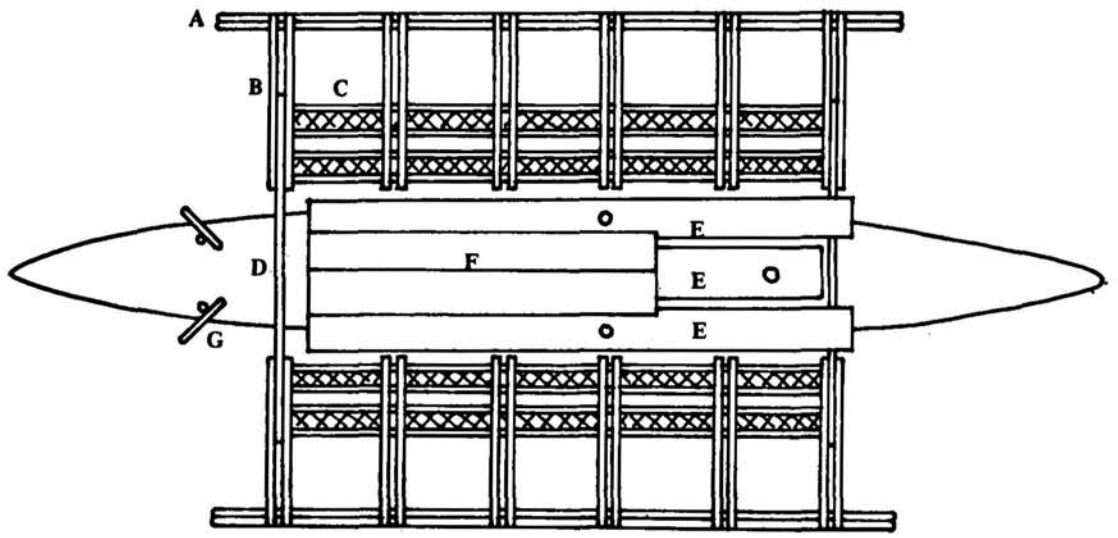


Fig 3. Superstructure of a Visayan caracoa.

the tambukos themselves. Fr. Alcina says they look like the rungs of a ladder running from stem to stern – as the tambukos themselves look like a little flight of steps up the inside of the hull from keel to gunwale. On the uppermost of these thwarts the paddlers sit, and to all of them the longitudinal and upright elements of the superstructure are lashed. The ribs also have holes in both ends, by which they are lashed to the uppermost tambukos opposite one another after they have been forced down in an arc and lashed to each plank they cross by braided rattan bindings – or palm fibers, in the case of the Butuan boat – which pass though the tambuko holes and over the ribs. The caracoa hull generally has a very narrow beam-to-length ratio of one to eight, or even one to ten, and this interior bracing enables it to resist shearing and twisting forces which a more rigid vessel of these proportions could hardly endure, But since these thwarts are only a meter or so apart down the whole length of the boat, and occur between each set of strakes from keel to gunwale, the hold has little space for cargo. This configuration calls attention to the fact that the caracoa is a man-o-war, not a merchantman.

The caracoa hull is shallow enough in contour to draw very little water and to assure low enough freeboard for four-foot paddles to reach the waves. This shallow draft not only gives the caracoa a vital advantage over the Spanish galley, but in the seventeenth century guaranteed the Maguindanaoans almost complete freedom of action in the labyrinthine estuaries of the Pulangi River delta during their defense of that territory against foreign invasion. All European observers comment that Filipino mariners are willing to sail with only one plank above the water, or even "three fingers" in the case of small boats, or with bark or palmleaf washboards half submerged. Yet the caracoa carries a considerable load of superstructure. The one taken in Bohol in 1565 "had three decks, although there was little space between one deck and another,"[12] and some observed in the Visayas in 1543 were "well wrought and nicely adorned, and the lords were seated above and down below some negroes with kinky hair, according to their stations."[13]

The superstructure begins with the outrigger supports. Four or more crossbeams called ***batangan,*** square or round in cross section and extending at least a meter beyond each gunwale, are lashed to thwarths. Fastened to both ends of each of these with large square pegs and rattan bindings are one or



A. *Kate* (outrigger floats)
B. *Tadik* (outrigger supports)
C. *Daramba* (paddlers' platform)
D. *Batangan* (crossbeam)
E. *Burulan* (decks)
F. *Kayang* (awning)
G. Quarter-rudder

two outrigger supports of mangle wood called ***tadik*** — parallel to each other with the batangan in between, if there are two. These tadiks are shaped like a letter-S lying on its side, with the middle of the S crossing the end of the batangan, the inner arm rising above it and fastened to it nearer the hull, the outer arm curving downward to hold the outrigger floats at water level. The floats themselves — ***kates*** — are two, three, or four thick bamboos extending to within two or three meters of both prow and stern at least two meters away from the hull, slightly raised forward to reduce water resistance. The batangans carry one or two ***darambas,*** bamboo or split-bamboo seats running fore-and-aft for additional banks of paddlers — or actual oarsmen if an inner daramba is too high for the use of paddles. Inboard, the batangans carry three cane-decked platforms or catwalks running the length of the vessel called ***burulan.*** The middle one serves as an actual deck for the sailors handling the rigging and the persons and cargo of important passengers like the master himself, or a rajah with his entourage of ladies — seated on a still higher platform — and is just enough narrower than the full beam of the vessel to leave room for the paddlers. The other two burulans are narrower (though still wide enough to sleep on), far enough outboard to overhang the hull, and high enough to clear the heads of the paddlers when they stand up to enter, leave, or handle cargo. Because of this configuration, the two outboard burulans are called ***pagguray*** — "eyebrows." All three burulans serve as fighting platforms for the ship's marines, but especially the two paggurays, and all have planks standing on edge like strakes along the side, or decoratively carved railings. Such railings, covered with canvas guards, saved Spanish soldiers from poisoned arrows in 1570 when Juan de Salcedo was attacking a Batangas ***kota*** in Balayan from the deck of a Panay caracoa.

A tripod mast is technically not a mast at all but what nautical terminology — and Dr. Morga — call shares — two poles fastened together like an inverted letter-V for use as a derrick. In caracoas they are made either of wood or bamboo, and their legs stand on the darambas pivoted on a pin which permits them to be lowered to decrease wind resistance in adverse weather. The third leg stands on the centerline, forward. (What is probably the foot of such a mast recovered at Butuan is fifteen cm. in diameter and has a 2.5 hole running through it.) The caracoa carries two, or sometimes, three, such tripods, each mounting

one huge rectangular sail wider than high, kept taut between two bamboo yardarms, a shape Fr. Alcina considers an advantage in sailing close to the wind. Running rigging is simple – a block and tackle *(bognoson)* for raising and lowering the sail, and braces of rattan rope at the ends of the yards. The sail itself is made of matting woven of *gaong, buri,* or *nipa* fibers, or the burlap-like growth called *gonot* which forms between the fronds of certain palms. Filipinos seem not to have used cloth for their sails, although the Manila galleons were regularly propelled across the Pacific on Ilocano canvas woven on backstrap looms. Such matting is also used for an awning called a *kayang* which covers the whole working space of the vessel and elicits admiring praise from European observers: sun and rain, Fr. Alcina aphorizes, "are the two great enemies of sailors."[14]

Paddles are called *bugsey* and are about a meter or 120 cm. long, with a leaf-shaped blade twenty by forty cm. – sometimes used as a chopping board for preparing meals – and a cross-bar handle at the top. Sailors take pride in the manufacture of their own paddles, and carve out pony-sized ones for their sons as soon as they are old enough to hold one. Good paddling requires athletic coordination and long practice, and the outcome of naval engagements can be decided by the discipline of precise timing to the rhythm of sea chanteys or the beat of a brass gong. Longer paddles called *gaors* for use in birocos or from the "upper deck" of caracoas are actually oars, with thole-pins in the gunwales slanted toward the stern, a feature Fr. Alcina considers an improvement over the European model which permits a careless oar to slip off. The blade of a gaor is shaped like a large dinner plate and fashioned from a separate piece of wood. In addition, the foreign-style oar with long slender blade was coming into use in the seventeenth century and was called a *gayong.* So, too, the center rudder beneath a raised stern was replacing the one or two quarter-rudder steering oars – or four in joangas – as early as Morga's time, and the western-type ram was being constructed on Philippine bows before 1600.

The caracoa carries four to six banks of paddlers of twelve to twenty men each, and can add two more by manning the bamboo outrigger floats for emergency manoeuvers like outdistancing pursuers. Galvano reports royal joangas in the Moluccas with 200 oarsmen to a side in addition to 100 men-at-arms, and four joangas which attacked Fort Gazang, Marinduque, as late as 1754 were reported – somewhat hysterically, perhaps – to be carrying 500 Moros each. But such large crews must have reached or exceeded the optimum point between manpower and dead weight, for the ordinary Philippine man-o-war rarely carried more than a hundred. A Bohol Chieftain was buried in the early 1560s with seventy slaves as crewmen for his voyage into the afterlife, Procurator Rios Coronel thought eighty to a hundred was normal in 1619, and Italian Jesuit Marcelo Mastrilli traveled in a caracoa with ninety oars in 1637. The Spaniards used still smaller ones in their Moro Wars: a fleet of thirty to forty outfitted in Cebu and Oton in 1627 carried only, 1,600 Filipinos and 200 Spaniards. The fighting elite who manned the burulan decks in these warships counted less than a quarter of the ship's total complement. But hte whole crew, oarsmen and all, were fighters in shore raids and were promoted from outboard to inboard in recognition of their valor in action. And they enjoyed the prestige of knights or samurai in prehispanic Philippine society. They were called *timawa* – a term which quickly degenerated under Spanish domination into "commoner."

SEVENTEENTH-CENTURY FILIPINO SEAMANSHIP

It need hardly be said that the two or three thousand Spaniards who occupied the Philippines at any one time could not have done so without the Filipino manpower and skill to build their galleons, teach their pilots how to get them in and out of Philippine waters, and then sail them across the frigid upper latitudes of the Pacific. Early seventeenth-century attempts to construct ordinary Spanish vessels produced some noteworthy disasters. Seven galleons built in 1610 to keep colonial competitors away from Philippine shores, so huge that the mast for one of them cost the labor of 6,000 Filipinos for four months, were lost at sea without ever seeing action. Mediterranean-style galleys could not keep up with Filipino men-o-war or follow them into shoal waters, and their oars were too heavy for underfed Filipino slaves on convicts to handle: two of them dropped dead in 1606 after six hours of rowing. Once the Dutch threat was removed, however, the Spanish settled down to building heavy galleons to transship Chinese goods over the Manila-Acapulco run, and light caracoas to fight independent Filipinos in the Southern part of the archipelago.

All these ships were built by raw Filipinos manpower, but also by a certain amount of skilled labor on the part of Filipino coopers, caulkers, smiths, and master carpenters. The Manila government was rarely, if ever, solvent enough to meet royally approved pay scales, but at least the scales themselves reflect official assessment of such skills. In 1619, for example, a day when the minimum wage for forced labor was set at ₱.03 a day plus rations – and a first-class slave cost ₱80 – a Filipino shipwright who could lay out a mast or yardarm was supposed to receive ₱3 to ₱4 a month and a double ration of rice.

Filipino mariners did not practice celestial navigation... Their observations... were for meteorological purposes: by the appearance of the atmosphere; the hue, thickness and configuration of clouds; the direction, force and steadiness of winds; and the colors of the sun and the moon....

And in 1636 when the price of rice was fluctuating between ₱.50 and 1 per cavan and a Filipino seaman's wages were ₱4 a month and fifteen gantas of rice, a Filipino master blacksmith in the Cavite shipyards was listed at ₱8.50 and fifty gantas of rice. Only Visayan pandays were taken on at this rate with no previous experience in government yards, however, and Fr. Alcina has preserved the names of two of them—Figuman and Francisco Polacay of Palapag. Another testimony to the value of the Filipino carpenter was the number carried in Spanish fleets: of the 700 Filipinos lost in the Singapore expedition of 1616, 200 were carpenters. Nor was their presence in shipyards ignored by Moros destroying Spanish galleons on the ways — 400 were carried off in one raid alone in 1617.

Filipino mariners did not practice celestial navigation, though Visayans distinguished the major constellations to set their agricultural calendars. Their observations of the heavens were for meteorological purposes: by the appearance of the atmosphere, the hue, thickness, and configuration of clouds, the directions, force and steadiness of winds, and the colors of the sun and moon—Fr. Alcina says — they could predict typhoons three or four days in advance, and, less accurately, the amount of moisture to be expected a whole season in advance. They knew the Chinese mariner's compass — they called it ***padaloman,*** literally, "place for the needle" — but used it mainly at night-time. For the most part, they navigated by piloting — that is, by proceeding from one landfall to another, following island chains wherever they wished to go. Even when islands cannot actually be seen, their presence is betrayed by ocean currents, floating objects, the movement of birds or fish, and especially cloud formations on the horizon and the kind of lightning they display. Magellan's survivors took the ***Victoria*** from Cebu to what is now Indonesia by sailing from one island to another, and in Timor they found a Luzon ship which had no doubt got there by the same method. Similarly, Luzon traders carried their gold, wax, and honey to Malacca by passing down the north coast of Borneo — where, as a matter of fact, they were most probably business partners of the Sultan of Brunei to begin with. Even the mainland coast of China can be reached by following the Babuyanes and Batanes Islands to Taiwan in sight of mountain peaks almost the whole way, and when Visayan caracoas raided the Fukien coast at the end of the twelfth century, that is just where the Chinese thought they came from.

...the nautical skill which made Filipino seaman absolutely indispensable to galleon shipping was his knowledge of the powerful and capricious currents of Philippine seas.

But the nautical skill which made the Filipino seaman absolutely indispensable to galleon shipping was his knowledge of the powerful and capricious currents of Philippine seas. A current flows down the east coast of Mindanao, for example, at about the speed of a Spanish galleon, and in the sixteenth century effectively doomed all survivors of the Loaysa, Saavedra and Villalobos expeditions to Portuguese or Filipino captivity because they could get no wind to oppose it. Ships could be spun around 180° in the terrifying whirlpools off the northwest corner of Samar, and unwary boats were literally held captive for days at a time before being broken up on coral reefs. Worst of all were the San Bernardino Straits between Luzon and Samar — rushing torrents of water through which the colony's mercantile lifeline passed as if between the blades of coral knives. No Spanish captain could hope to get a returning galleon through that channel after the ***vendavales*** started blowing from the southwest without a dozen Filipino boats as tugs and a good Samareno pilot at his elbow. Such pilots were sometimes rewarded with princely sums like ₱100 or ₱200, contributed on the spot by greateful passengers — ₱50 from a general, slightly less from an admiral or commander, and ₱6 or ₱8 each from investors with cargo aboard. But, alas, colonial abuse eventually made it difficult to obtain such expert services. An arrogant ***Piloto Mayor*** who ran the ***San Francisco Jávier*** aground at Borongan in 1655, for example, rewarded a Filipino pilot who saved the galleon ***Concepción*** for him thirteen years later with nothing more than a blow with a cane. It is perhaps not surprising

that public opinion in the Philippines attributed the loss of the *San Francisco Javier* to God's judgment on the cruelties connected with building it — and pleasant to record that the only silver recovered from it went directly into the pockets of Filipino salvagers.

Filipino seamanship was appreciated by the colonial regime from the days when Morga used to send his caracoas out with only one Spaniard aboard. Laws of navigation and commerce promulgated in 1620 took it for granted that any Filipino born along the seacoast was qualified to ship out as a common seaman on government vessels, and the sailors of Malate were renowned for carrying Manila merchants to Cavite in any weather without ever having lost a passenger or his goods. Galleons sailed in those days with an equal number of Filipino and European deckhands — about seventy each, counting the Spanish guners — but by the 1720s Filipinos outnumbered the others two to one. By the middle of the eighteenth century they had won such a reputation abroad that there was hardly a Spanish ship in European waters which did not have some on board. A memorial written in 1765 by Francisco Leandro de Viana says three is no people in the whole world more dexterous on shipboard, or quicker to learn nautical terms or skills, a judgment echoed by another Spanish author sixty years later: a Filipino will lern as much seamanship with a few days' practice as a European does in twenty years. Viana also says of the Acapulco run, "There is hardly an indio who does not understand the mariner's compass, and therefore on this trade-route there are some very skillful and dexterous helsmen."[15] By the nineteenth century, Filipinos were migrating in such numbers to sell their skills outside the Philippines that other colonial regimes placed restrictions on employing them. In 1827, for example, the British in India limited them to four or five per vessel, and strung up offenders from waterfront gibbets as a warning to their fellows.

Filipino seamanship and the importance of seafaring in seventeenth-century Visayan life is nicely illustrated by a contemporary dictionary like Mentrida's 1637 ***Bocabulario.*** It is significant at the outset that boats seem to dominate the author's consciousness even when he is not defining nautical terms. ***Hugut,*** for example, he defines as "something taut, like the rigging of a ship," and ***kilikol*** as "to fasten one thing to another, like a boat towed astern," and he gives ***andoloy*** as "fast, like a ship" despite the fact that there is a special adjective for the swiftness of ships — ***makilas.*** Not surprisingly, some nutical terms are extended to more general meanings, while others provide the bases for colorful metaphorical images. ***Sangkap,*** for instance, is to equip a ship with its full crew, while ***kasangkapan*** is by extension, "everything needed for something", and ***dapak,*** the sheathing of a ship's hull, also means "To steal in the presence of the owner" — perhaps like English, "to fleece." Conversely, a common word may also be given a special nautical meaning: ***ulat*** "scar," can mean either to raise a scar or to raise a sail. However, as Visayan life styles changed over the centuries, so did the Visayan vocabulary. The modern word ***lawig*** includes tethering and pasturing cattle, and sailing and travel in general, but used to be defined:

Lawig: for a caracoa to drop anchor, even if not in port, and it refers to the ship, or the people on it; ***lawigon:*** the anchor cable; ***lalawigan;*** to let out the cable a bit; ***lawigan*** is the anchorage, which is usually a port but not necessarily.

Sakayan is the basic term for boat or ship, and its root is ***sakay,*** to travel by water, whether by paddling, rowing, or sailing. The absence of any such word in English may serve as a reminder that the Filipino people were a maritime people connected, not separated, by interisland channels and seas. Filipinos and their culture passed throughout the archipelago by sakay, and the connecting links are called ***bungalos,*** channels between islands. Indications in the water of safe channels are ***sibir,*** and the dark waters which indicate the presence of shoals are ***halum.*** Ordinarily, the Filipino sailor stays within sight of land if possible, though there is a special terms for a small boat putting out to sea — ***lu-aw. Hamgir*** is to follow the coast, and ***oway*** is to track a vessel — that is, pull it along the shore or riverbank by a rope. To steer directly toward some point like a tree or peak, or a star, is ***tuhur,*** and to proceed from one point to another without tacking or changing course is ***tagal.***

Paddling — or rowing — is the basic method of sakay and has a well-developed vocabulary. To row backwards without turning around in your seat is ***sibug,*** and to row at forced speed is ***sagaysay.*** The sound of such fast rowing or paddling is ***hagulut,*** but striking the side of the boat is ***hakdol*** or ***dakoldakol,*** and to splash water in the process is ***bungkalis. Lamba*** or ***lumba*** is an actual race between boats. Paddle-power is also used to assist a vessel under sail. This is called ***dalabay*** in general, but if it is done primarily to keep wind in the sails when close-hauled, then it is called ***sogot.*** To sail at top speed lightly loaded — for scouting, for example, or to deliver messages — is ***langpas,*** and a special boat for this purpose is ***lampitaw,*** such as a Spanish attack force sends out in advance. Only two winds are distinguished in relation to a vessel underway — ***tampiyok,*** a head wind, and ***tolot*** or ***solosor,*** a following wind ("as is necessary," the ***Bocabulario*** comments). In the case of tampiyok, the ship lowers its mast with sail furled around it ***(hagukun)***

and removes its awning to reduce wind resistance. (Awnings are carried away often enough for the process to have its own term — (*kakas* or *katkat.)* Then it proceeds against the wind — *somlol* or *sompong* — by manpower. To strike sails suddenly, however, because of high wind, to anchor, or for tactical purposes, is *landak.* For a vessel to be delayed by adverse winds is *bungbung,* and to be carried adrift or off course by eigher wind or current is *pilpil,* or *samapay* if actually driven ashore.

The effects of the sea on Philippine shipping have a rich vocabulary of their own. Of the four basic motions of a ship at sea — yawing, pitching, rising and falling, and rolling — the first three are distinguished as *waling, powat* or *limpowat,* and *luyan,* but rolling is restricted to *kiyakiya,* "the rolling of a boat without outrigers." For waves to pound a vessel is *amuk,* and to drop one on shore, shoals, or reefs is *buntar. Dapiya, dalapiya* or *tapowak* is the general term for destruction of all kinds — breaking up in heavy seas, beaching, striking reefs or rocks — while *sanglar* is grounding or failing in less dramatic ways. *Tokbol* is to strike submerged obstructions while underway, *sigaksak* to run aground on a sandbar or reef and be stranded or broken up, and *bungkag* is to be destroyed in a flood. In distress, *dagdag* is to jettison cargo, *hinubig* is to work pumps or bail, and *laka* is for tambukos to be broken off or stems to be loosened from the keel. *Tikyaob* is to capsize, *polang* is to be lost at sea with all hands without a trace, but *sangbat* — happily — is to go to a distressed vessel's aid or pick up survivors or exhausted swimmers.

Another set of terms enables us to picture the waterfront of a port like Butuan — so busy, perhaps, that men pass from one boat to another across the outriggers — *tapon.* The anchorage itself is the *lawigan. Awil* is to anchore offshore or outside the shoals, *hampil* is to anchor inshore with the bow touching the beach, and *bulibuli* or *mulibuli* is to moor by a stern line. *Hangiya* or *sangiya* is to beach a boat, or to beach it enough so that it looks like a crocodile with its head on the snad and its tail in the water. Sakay is to embark and *kawas* or *hawas* to disembark or unload cargo, and cargo itself is *lolan,* though cargo stowed on the 'upper deck" *burulan* for special handling is *orong* or *tampapaw.* To shift or remove cargo to find something or get water out of the hold is *bungkal,* but to do so for the purpose of trimming the ship to an even keel is *kankan.* As the boat is loaded it naturally sinks deeper in the water — *lobo* — and if it is down by the bow, it is *sukmur.* But added buoyancy may be given it by lashing bamboos along the hull — *kilikili.* If the vessel is small, the captain himself — *toway* or *tomoway* — will be in charge of all cargo, but if it is large enough, it will have a *tugub* — supercargo or pursur. Joint ownership is *tapi.* A busy port will have boats under repair, too. *Tokor* is to put a ship in drydock — that is, shore it up with blocks under the keel. *Lombo* is to remove and replace some of the planks, *balarbar* is a more extensive refitting by replacing the planks on both sides, and *ungkag* is to strip it right down to the keel, rebuilding it with the old or new planks, or constructing a smaller vessel on the same keel, or even scuttling it. A boat so old it actually becomes a useless derelict is an *apal.*

The maritime vocabulary also permits an insight into ancient Philippine culture deeper than the mere details of nutical architecture and boat handling techniques. Sakay is to embark and travel by water, but the motivation for such embarcation and travel is revealed by another form of the same word, *hinakay* — to pay freightage, rent a boat, or take passage in one. Filipinos took to the sea, in short, for purposes of trade. But raiding was also an endemic part of their interisland contacts. The Bacabulario defines *bangga* as "for two or more vessels to attack or assault each other in battle, either bacause their crews intend to fight, or by chance," and *abay* as "ships in convoy, or any enterprise for which people promise to stick together unto death." Moreover, as befits a real maritime culture, Philippine ships and boats partake of the sacred. The common baroto without outriggers is used for a form of divination called *kibang:* the occupants sit perfectly still amidships and the *diwata* (spirit) answers their questions by rocking the boat. And the great war caracoas which the Chinese said made the name Visaya a terror to all the islanders of the Eastern Sea, were dedicated with human sacrifices: *damilit* is to lie on the ground prostrate, and *mamamilit* is to launch a ship over a slave in that posture.

THE ROLE OF BOATS IN PHILIPPINE SOCIETY

Boats supplied almost all the Filipino's personal transportation needs from carrying *basura* out to fertilize his crops to attending weddings or wakes. The farmers of Bantayan Island went to farm their fields in Cebu, and the miners of Camarines to work the gold deposits of Masbate, by boat. But mainly, Philippine boats were used for four purposes — fishing, trade, warfare, and a combination of the last two which the Spaniards called piracy but which might more meaningfully be called trade-raiding. Fishing has always provided the major source of protein for coast-dwelling Filipinos, but local waters are too rich in this food to offer much incentive for the development of large and complex vessels. A barangay with only two or three planks on a side will satisfy most meeds, or even a baroto with nothing more than woven

sawali sides coated with beeswax or almaciga sap. It was trade that supported the Filipino boat-builder, whether hewing out one-man canoes for carrying a bunch of bananas to the next barrio, or constructing sea-going cruisers for handling such luxury cargo as gold, slaves, and Chinese porcelains. A consideration of this trade, together with its related activities of warfare and raiding, suggests that it inspired the refinement of the plank-built caracoa, justified the capital investment of building and maintaining one, and made possible whatever political vassalage existed between Filipinos in different islands.

In the early sixteenth century, Manila — or, more accurately, Luzon — was the only point in the archipelago regularly sending Filipino traders to foreign ports. New converts to Islam, these "Luzones" carried gold, wax, honey and foodstuffs to their partners or kinsmen in Borneo, picked up camphor, and proceeded to Malacca for Indian textiles, hardware and jewelry. They traded as far south as Timor, and were the easternmost agents of a larger network which included the colony of 500 of their countrymen at Minijam, 250 kilometers up the west coast of Malaysia from Malacca, and such notables as the Tumenggong of Malacca, Arejimute Raja, who regularly sent vessels to Siam, Sunda and China, or Curede Raja who dispatched his annual *jong* to China laden with pepper. It is not insignificant that Tome Pires, describing the great Chinese metropolis of Canton before the Portuguese rached that port, ends with the note, "So the Luzones say who have been there." An Italian pilot of the Villalobos expedition has left a tantalizing hint of possible direct trade with the Chinese mainland — an oared vessel encountered in Visayan waters in 1543 that boasted of making the China run in five or six days, but, alas, with no mention of its port of origin. Whatever the case, by the middle of the century, Luzones were no longer sailing direct to China if ever they had done so. Instead, they were dominating or monopolizing the resale of Chinese goods within the archipelago which had been carried to Luzon in Fukienese junks. One of them told Legazpi that:

since what they carry are goods from China, they call boats from Borneo and Luzon Chinese junks in these islands, and even they themselves are called Chinese among these islands, but in fact Chinese junks do not reach there [Butuan] because they are very big ships not fit for sailing between these islands. [16]

Thus it does not appear that the China-Philippine trade was conducted in Philippine bottoms. That plank-built boats were able to do so is clear, but that they were regularly used for this purpose is not. We know that Visayan caracoas were on the Fukien coast in the twelfth century. Governor Wang Ta-yu of Ch'uan-chow was eye-witness to a raid by three chiefs with several hundred followers sometime between 1174 and 1189; he said "the Visayan complexion is as dark as lacquer, so their tattoos can hardly be seen."[17] Two centuries earlier, in 982, Mindoro merchants appeared on the Canton coast with merchandise for sale, but the Chinese report of the contact is too brief to reveal whether they arrived in their own ships or not. At any event, in the thirteenth and fourteenth centuries, Ma-i on the southern coast of Mindoro opposite Ilin Island was an entreport for foreign merchantmen, and from there these imports were redistributed by domestic shipping. The cotton cloth from Ma-i which was noted on the west coast of the Malay Peninsula in the 1349 *Tao I Chih Lüeh* was therefore probably delivered by non-Filipino traders, no doubg of the same sort as those who flooded the Philippines with so much Sung, Yuan, Ming and Sawankhalok porcelain that hundreds of thousands of pieces have survived. By the fifteenth century, Ma-i had been eclipsed by another trading port in northern Mindoro which the Chinese called Mao-li-wu, whose ruler sent a Muslim emissary to China in 1405. And by the sixteenth, Chinese merchants were delivering their wares direct to Manila By under contract to Rajah Lakan Dula of Tondo whence they were retailed for local consumption in native outriggers.

The picture of Philippine domestic trade, however, is rather clearer — every community traded with other communities, and most of them did it by boat. The inter-barrio feuding which appears as endemic in Spanish accounts might suggest at first reading that such barrios were perforce isolated from one another and therefore self-sufficient. But the same accounts specifically name the betrayal or amicable intercourse as the major cause for war —"If a Filipino goes to a town and they kill him there without cause," as Loarca says, "or if they friends and they offend or maltreat them there and commit treachery against them under cover of firendship."[18] If there were any Filipino communities which supplied all their own food, clothing, tools and weapons, Spanish accounts do not describe them. Rather, the total impression is one of continual movements of rice, camotes, bananas, coconjts, wine, fish, game, salt and cloth between coastal barrios — to say nothing of iron, gold, jewelry, porcelain, and slaves. That is no doubt why the Suluan Filipinos' first reaction to Magellan's appearance on Homonhon was to go home and get two boatloads of coconuts and bananas to sell him.

When the Spaniards reached the Philippines, the main long-range trade item was rice. Cebu was a redistribution center for the Visayas, drawing supplies from as far away as the east coats of Mindanao, and Panay, which was second only to Manila in output. Rajah Katuna of Bohol received a boatload of rice from a Leyte vessal in Cabalian during Legazpi's visit in April 1565, and that Adelantado himself only survived a two-year

attempt by Cebuanos to starve him out because of Moro deliveries from Manila at inflated prices. (It may be worth noting that both these Surigao-Cebu and Leyte-Bohol rice lines could be controlled from a little island called Limasawa where the Rajah of Butuan and his brother Kolambu used to go "hunting.") The Manila Bay area was supplied from four Pampanga towns with controlled irrigation – Betis, Lubao, Guagua and Mexico – except during February and March when Ilocano shipping brought it from both the Ilocos and Cagayan. The Bikolanos even had a word for loading rice directly in to a ship's hold in bulk without anything under it – ***oray.*** But there was a wide variety of specialized trade as well. The breeding of goats, for example, caused Simara Island to be called Cabras Island, just as the sale of swine ***(babuy)*** and sugarcane wine ***(basi)*** branded the Babuyan Islands and the Bashi Channel. Expert shipwrights supported the economies of Cagayan de Sulu and tiny Buracay off Panay, while those of Catanduanes literally peddled their wares by loading smaller ones into larger. Cuyo Islanders wove cotton but did not grow it, and kept the inhabitants of neighboring islands in mat-weaving and salt-making subjugation. Farmers on Batbatan Island raised wheat on the north coast of Panay, and Bohol potters marketed their wares in Butuan, where prehispanic samples have been recovered from archaeological sites.

The extent and value of this trade is indicated by the fact that Cebu was the second largest settlement in the Philippines despite not having access to the ricefields, inland forests or goldmines enjoyed by the competing ports of Manila and Butuan. Cebuanos told Fr. Alcina that the prehispanic town had stretched along the beach for eight kilometers, and he believed them on the evidence of anicent graveyards and houseposts exposed by erosion. But the most impressive demonstration of Filipino merchandising was the delivery of imported trade porcelains to every Filipino language group from Bontoc to Bohol, from Manila to Marawi – warmaking, slave-raiding or head-taking as they may have been. This is a distribution achieved by no other product until American colonial power made twentieth-century marketing techniques feasible. Rajah Kolambu winded and dined Pigafetta out of Chinese porcelain, and when Magellan requested rice, presented him with unhusked palay in Chinese porcelain. Such jars and plates were priced in terms of human slaves, and included alongwith gold in that heirloom wealth called ***bahandi*** without which no Filipino datu could demand respect or exercise leadership. Nor were the Spaniards slow to assess the situation. When they sacked Sarangani Island in 1543, they dug up some hastily buried porcelain and carried it off as prizes of war for the Viceroy of Mexico, but traded it off for food in Samar instead.

Another evidence of prehispanic Philippine commerce is the vocabulary it produced, samples of which can be found in the early seventeenth-century Spanish lexicons. The Mentrida 1637 Visayan ***Bocabulario,*** for example, provides such retailing divisions as dealing in basic foodstuffs by sea ***(baligiya),*** rice and grain ***(dalawat),*** secondhand goods ***(lito),*** slaves ***(botong),*** or notions for the ladies ***(biniyaga).*** Specialized terms running from barter to big business can be selected from Marcos de Lisboa's 1618 ***Vocabulario de la Lengua bicol*** – e.g., ***balabag,*** to exchange goods; ***bahay,*** to pay in gold or silver; ***balos,*** to pay in labor; ***bongto,*** to sell on commission; ***sangholi,*** to go into pertnership; and ***hampil,*** a raid in which the junior partner supplies half the outfitting expenses to the ship's owner and receives one-third of the take. Really high finance, however, is best displayed in the San Buenaventura Tagalog dictionary of 1613. There, ***tapa*** shows up as capital or company (e.g., ***Mag kano ang iniyong pinagtapa?*** –[How much have each of you put in the company?] ***Momolong salapi ang aming pinagtapa*** – [We are each putting in ten ***tostones*** as capital]). ***Angka*** means to corner the market, and a dozen terms for the usury to finance such ventures start with ***laba,*** 20 percent (***pagihit*** if calculated monthly, ***ganda*** if annually), and range up to ***ibayiw,*** 100 percent, and ***dalawalima,*** 150 percent. The underlying ethic of this economy is probably to be found in the word ***bitang*** which refers to the inexorable daily increase of the traditional agricultural loan. Fr. San Buenaventura defines its basic meaning as "a mortgage such that while it is unredeemed the debtor and the one who gave the money divide the field every year."

Still another evidence of the extent of caracoa-carried commerce was the news they also carried along Philippine coasts and from island to island all the way to the Moluccas. When Loaysa's flagship, the ***Santa Maria de la Victoria,*** anchored in Lianga Bay in 1526, its crew ignored a local report of Spaniards shipwrecked farther south, not realizing that they had been preceded a few weeks by the ***Santa maria del Parral.*** A year later one of those Spaniards, then serving a local chieftain by the name of Katunaw, was told about the ***Victoria's*** visit by a native of the Marianas Islands who had been impressed with ten others to work the leaking ***Victoria's*** pumps and then escaped. Two other survivors of the ***Parral*** would up in Maguindanao, where they were notified in 1528 by the Sultan of Brunei that he had been informed of their presence by the Portuguese Governor of Malacca who was requesting their delivery to him, and that the Sultan would gladly provide transportation if they wished to go – and they did. Magellan's own ***Victoria,*** leaving the Philippines

after his death, found somebody on Palawan who could speak enough Spanish to translate for them, and captured a Moro off the coast of Mindanao who had been in the house of his good friend, Francisco Serrano, in Ternate. And all four of the post-Magellanic expeditions were given word of the fate of the survivors of the Cebu Massacre of 1 May 1521, two of whom survived as Filipino ***bihags*** (captives) for forty years.

But the caracoa is basically a warship, not a cargo carrier, and Philippine languages distinguish even more tactice of war than of commerce. These include terms of raids, sneak attacks, camouflage and ambush, bow-to-bow boarding, razing coastal villages, and probing strikes to test enemy strength — as well as such refinements of personal conduct as Bikol ***togkod,*** "to await enemies without fear," Visayan ***patay,*** "to fight to the death rather than surrender," or Tagalog ***puli,*** "to take a fallen comrade's place to avenge him." All these variations fall under the general heading of ngayaw or ***kayaw,*** a word which means "raid" and appears as ***mangayaw*** in all the major languages of the Philippines and, indeed, of insular southeast Asia from Mindanao to Malacca as well. This is the activity Spanish accounts inaccurately call "piracy." Modern international law defines piracy as robbery on the high seas, and although it is true that mangayaw raiders took weaker vessels at sea, when they did so they were not breaking any recognized law but rather performing a socially approved deed. Like the epic cattle raids of Ulysses or Irish folk hero Cu Chulainn, mangayaw was the esteemed occupation of the able-bodied male who could afford it. Its heroes' feats were the stuff of lyric and legend, and Fr. Alcina cites a Samareno ballad whose heroine is so coy she keeps sending suitors off on raids to Mindanao and Jolo, then Ternate, and finally Grand China itself. What was reprehensible in Philippine morality was not the act of plunder itself, but doing it to those who had not done it to you. That is why one of them climbed up in a tree in Cainta soon after the Spanish seizure of Manila and shouted out in the middle of the night, "What did we ever do to you, or what did our ancestors owe yours, that you should come to plunder us!"[19]

Although mangayaw raiders took booty both ashore and afloat when they could, their real object was slaves. Chattle slavery was common to civilized societies in the sixteenth century all over the world and Spain was no exception: friars carried slaves across two oceans as personal servants at His Majesty's expense. But in economically diversified Europe, the trade was licensed by national governments as separate monopolies. It is to call attention to this difference that the mixed merchandising of caracoa commerce is here referred to as "trade-raiding." Potential customers for this trade in the Philippines were legion because the purchase of slaves was an ordinary area for investing surplus wealth — Bikol ***saleu*** means "To buy slaves, dogs, houses, or boats." Filipino communities supplied most of their own slave labor locally by usury and panel action, but always preferred aliens for religious purposes — that is, sacrifice. (Loarca considered this a commendable attitude: "They always see that this is a foreign slave, not a native," he says, "for they really are not cruel at all")[20] A foreign market was vided by the petty potentates of maritime principalities to the south, and after the seventeenth century, colonial plantations and households expanded it.

In the sixteenth century, however, ransom appears to have been a more regular source of profit than outright sale: Visayan ***utao,*** for example, means "to display captives for exchange on the boat without letting them go ashore." Capture and liberation were daily facts of life, and communities collected contributions to rescue victims or render them charitable aid afterwards. If a man invested in a raid as a silent partner, he was obligated to put up half his active partner's ransom money as soon as he was captured, and was himself entitled to no return on his original investment. A datu's rank among his peers was indicated by his ransom worth — or what would be called wergeld ("man-price") if he were killed — and the capture of a high-priced individual was the bonanza every raider dreamed of and planned for. Such men were treated with respect and quickly ransomed since anybody who could afford to do so could expect to be reimbursed at twice the sum he had advanced. As a matter of fact, to underestimate a man's exchange value was a non-too-subtle affront to his dignity — or what Mindanao Moros call ***maratabat.*** When Spaniards captured a dignitary in 1521 whom Pigafetta called " the Governor of Palawan" and ransomed him off for rice and livestock, he generously added coconuts, bananas, sugarcane, and jars full of wine, as it befit his station to do.

The importance of mangayaw trade-raids in Philippine society is indicated by the fact that they were carried out by a separate social class. These are called ***timawa,*** and in classic Visayan culture they are the sons or descencants of datus by secondary wives, who neither work fields nor pay tribute but are obligated to man their datu's boat, armed at their own expense, whenever he puts to sea. In return, they receive a share of the spoils, and have the right to transfer their services to another datu if they choose. But their captain — ***tomoway*** — is a datu and has both authority and responsibility: there is a Bicol term, ***bonglo,*** which means " for a captain to ransom his captured comrades." His timawa are rewarded at his pleasure, just as their children inherit at his pleasure, and all cap-

tives belong to him: a crewman must reimburse him if he kills one. These are professions which were destined to disappear under foreign occupation, of course: the mangayaw skills which could defend a Visayan community against Mindanao and Sulu attack could also be turned against invasion from Leon and Castile. And as they disappeared, the popular image of one group of Filipinos as helpless victims of another was created by Spanish disarmanent of all those who accepted their sovereignty.

Timawas assigned to paddle on the outrigger darambas were held in lower status than those inside the hull, and those manning the burulan fighting deck were considered a real warrior elite. In Malay, these latter were called "men-of-the-*baileu* [i.e.,*burulan*]," and Antonio Galvano describes their full hierarchy in the Moluccas as follows:

> *And the King travels up on the* **baileus** *with his captains and mandarins, and their sons who are still youths down below paddling, and others at the paddles on the* **cangalhas [darambas]**, *and when they want to promote them, they elevate them to the* **baileu** *and they do not paddle. This is the highest honor that is given. So long as they do not perform any deed of valor, they may not carry a sword or receive such a promotion, which is like a knighthood; and when they move them inside the hull, it is already a greater dignitv; afterwards, if they deserve it, thev elevate them to the* **baileu** *and they aive up their paddles.*[21]

Filipino expertise in boat-building and seamanship was employed by the Spanish colonial regime in caracoa fleets to fight Moros and in mercantile galleons to cross the Pacific. Filipino nautical skills are attested by Spanish accounts, and the importance of the seafaring life in classic Philippine culture is demonstrated by the vocabularies contained in early seventeenth-century Spanish dictionaries of Philippine languages. A detailed description of Philippine boat-building techniques is included in Francisco Alcina's unpublished 1668 *Historia de las Islas e Indios de las Bisayas.*

Boats were the only Philippine transportation, and all commercial and political contacts depended upon them. Trade included the local exchange of foodstuffs, the exploitation of special marketing patterns, and the distribution of imports like Chinese procelain throuhout the archipelago. Slaves were taken in raids called mangayaw by trade-raiders whose exploits were acclaimed in lyric and legend. Trade-raiding formed the basis of pacts between maritime leaders in which precedence was expressed in terms of personal deference rather than political domination. Communities that did not have the means for such trade-raids achieved security through alliances by blood, marriage or vassalage with those who did. The caracoa may therefore be seen as the key to the political scene in the sixteenth-century Philippines: those who had them dominated those who did not.

The caracoa may... be seen as the key to the political scene in the sixteenth—century Philippines: those who had them dominated those who did not.

In the Philippines, it appears that the lower ranks of this naval hierarchy even included those commoners the Spaniards indiscriminately called "slaves." Such a non-timawa crewman could theoretically save enough from his share of the spoils to buy his freedom and then work his way up the military ladder until, if he were man enough for it, he might even attaact a following of his own and become a datu. The first conquistadores, however, accustomed as they were to galley slaves in their own navies, did not recognize these Viking-like professionals: Bernardo de la Torre in 1543 thought a Samar chieftain by the name of Iberein was rowed out to his flagship by slaves wearing gold collars. The real timawas was usually an experienced seafarer who shared such trade-raiding sophistication as his master's command of Malay, the lingua-franca of southeast Asian trade. Thus Magellan's Malay-speaking slave was immediately understood in Limasawa by the oarsmen serving the brother of Rajah Awi of Butuan, one of the most cosmopolitan ports in the archipelago.

The caracoa may therefore be seen as a key to the political scene in the sixteenth-century Philippines: those who had then dominated those who did not. Coastal communities that had none – or could not launch them fast enough if they had – would, at the least, have been potential victims for the slave trade. This is, in fact, precisely the condition later suffered by Filipinos under Spanish occupation: as some of them told Rios Coronel, "Let us be free, and let us have arms, and we shall be able to defend ourselves as we did before the advent of the Spaniards."[22] Yet not every community could build or man a caracoa. The manpower, social organization, and mechanical skill to extract two dozen curved planks twenty-five meters long from hardwood giants in some interior forest, and then convert them into a sophisticated sea-going vessel along the beach, could not have been available to all. Moreover, those burulan runways indicate that the caracoa were designed for more advanced naval warfare than the simple running down of the inhabitants of some defenseless fishing village. The crew of a caracoa engaged in a naval duel who could get 200 paddles in the water simultaneously and carry out a captain's orders quickly could expect to survive the battle, carry off enough booty to contract brides of their choice, and rear up another generation with skills like their own. The only alternative to active participation in this seafaring, trade-raiding life style was alliance by blood, marriage, or vassalage to those who practiced it.

To whatever extent the caracoa produced this political scene or was the product of it, it was obviously an integral part of it. At the time Spanish friars started describing Philippine society, there were coastal communities that purchased their security with annual tribute to a distant overlord who sent his caracoas to collect it. But those with caracoas of their own are not portrayed in such roles of outright subjugation. Rather, their chieftains appear as being related to one another in a kind of political pecking order characterized by deference rather than domination. Thus Katuna of Bohol had a rice-producing supporter in Leyte but himself deferred to another Bohol rajah called Si Gala, and both of them were outranked by a Boholano with the fine name of Pagbuwaya who migrated to Dapitan in 1563, quickly established lordship over the Subanon there, and then joined the Spanish cause in 1565. Such peer relationships are still distinguished in Maranao as *pegawid* "support" and *pegawidan* "supported." There were also those who topped a sufficient network of vassals, *primus inter pares,* to become harbor princelings collecting anchorage fees in their own biliwicks. How much an armed cruiser paid in such fees in any particular port of call depended upon the relative ranks of the parties involved, and these ranks were established by the protocol of exchanging gifts. That is what Saripada Humabon of Cebu was evidently trying to establish after Magellan's *Victoria, Trinidad* and *Concepcion* fired off the heaviest guns ever heard in Philippine waters, and dropped anchor. When he was informed that his visitors were not going to pay harbor fees because their overlord was so powerful, he simply asked whether gifts were expected by three captains or if one would receive for all. And it is also what Rajah Sultan Mansur of Tidore was doing eight months later when he swore allegiance to the King of Spain on the Koran, and then loaded the rotting *Trinidad* with so much spices her seams opened.

SUMMARY

Planks from two ancient Philippine boats were discovered in Butuan in 1976-77, excavated by the staff of the National Museum, and dated to the fourteenth century by radiocarbon-14 technology. The boats were edge-pegged and plank-built — that is, their planks were hand-carved, fastened together by pegs in adjoining edges, and lashed to ribs by means of wooden lugs carved out of the planks themselves. This is a style of boat-building which once extended from Scandinavia to the South Pacific from the third century B.C. to the present time in a few remote islands.

By the sixteenth century, a highly refined plank-built warship had been developed in Southeast Asia which was called a caracoa in the Philippines. It was a sleek, double-ended vessel twenty to twenty-five meters long, with low freeboard and light draft, quarter rudders and tripod masts with square sails, a raised fighting deck amidships, and double outriggers with accommodations for several banks of paddlers. In contrast to Spanish galleons or Chinese junks, the caracoa was especially adapted for carrying warriors at high speed before seasonal winds through reef-filled waters and dangerous currents. It was used mainly for interisland trade-raids by harbor princelings with limited capital.

FOOTNOTE

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2. Huang Shu-ching, *Fan Shu Liu K'ao* (1736), quoted by Ling Shu-sheng, *Ming-Tsu-Hsueh Yen-Chiu-Suo Ch'i-k'an (Bulletin of the Institute of Ethnology)* (Academis Sinica, Taipei), Vol. 27 (1968), p. 3.

3. Wang Ta-yuan, *Tao I Chih Lueh,* chap. 45.

4. Anon. *Relacion* in Isacio R. Rodriguez. *Historia de la Provincia agustiniana del Smo. Nombre de Jesus de Filipinas,* vol. 13 (Manila 1978), p. 463.

5. Antonio Pigafetta, *Primo Viaggio intorno al Mondo* (MS 1522), text in Blair and Robertson eds., *The Philippine Islands,* 1943-1898, 33: 224.

6. Chang Hsieh, *Tung Hsi Yang K'ao,* ch. 5.

7. Ibib.

8. Chao Ju-kua, *Chu Fan Chih,* Part I: *P'i-she-ya.*

9. Francisco Combes, *Historia de Mindanao y Jolo* (Madrid 1667), 2nd ed. Pablo Pastells and W.E. Retana (Madrid 1897), pp. 70-71.

10. Francisco Alcina, *Historia de las Islas e Indois de las Bisayas,* MS 1668, *cap.* 10.

11. Combes, *Historia de Mindanao y Jolo,* pp. 70-71.

12. Anon. *Relacion,* p. 463.

13. Antonio Galvano, *Tratado dos descobrimentos antigos e modernos* (1563), 3rd ed. (Oporto 1731), p. 278.

14. Alcina, *Historia delas Islas, cap. 9.*

15. Francisco Lean dro de Viana, *Memoria* (Madrid 1765), translated in Blair and Robertson, 48, p. 301.

16. Anon. *Relacion,* p. 467.

17. Lou Yao, *Kung Kuei Chi,* chap. 88.

18. Miguel de Loarca, *Tratado* (MS 1582), text in Blair and Robertson, vol. 5, p. 140.

19. Letter from Fray Martin de Rada dated Calompit, 16 July 1577, in *Nouveau Journal Asiatique* 8 (1831): 377.

20. Loarca, *Tratado,* p. 134.

21. Antonio Galvano, text in Hubert Jacobs, *A Treatise on the Moluccas (c. 1544), probably the preliminary version of Antonio Galvano's lost Historia das Moluccas* (Rome 1971), p. 41.

22. Hernando de los Rios Coronel, *Memorial y Relacion* (Madrid 1621), translated in Blair and Robertson, eds, *The Philippine Islands,* 19:218.

Linguistics and Philippine Prehistory

by Eugene Verstraelen, SVD

INTRODUCTION

Linguistics, the study and science of language, has a very old and respectable history. The first steps in this field, as far as we can say, were undertaken by the Akkadians (2600-1700 B.C.) when they adapted the cuneiform writing of the Sumerians to the writing of their own, unrelated (Semitic) language. It was, however, Greek and Indian scholars who undertook the first scientific studies of their respective languages and literatures, in the process producing the first text editions as well as the first grammars and lexica of their languages. Nothing much was added to the basic stock of knowledge in this field until the end of the 18th century. Then things began to happen. European acquaintance with Sanskrit led to the discovery that the majority of European languages were quite obviously related to Sanskrit, the ancient sacred language of the Upanishads. With this discovery comparative linguistics was born. The old dream of finding the original language from which all existing languages were supposed to have descended seemed about to become a verifiable reality. Looking back on that dream today, we may well smile at the nativeté of those scholars. Yet, in their eager pursuit of that dream, they made some of the most far-reaching and fruitful discoveries. One of the major beneficiaries, apart from linguistics itself, was prehistory. In its never-ending efforts to shed light on the undocumented part of the history of mankind — which as we know is by far the larger part — it could not but welcome comparative linguistics as a powerful, though at times tricky, instrument for its own purposes.

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The major division of linguistics that primarily serves this function is known as ***diachronic*** linguistics, which studies language in its historic development. The other major division, ***synchronic*** linguistics, which takes for its subject a given language, either as a whole or in part, is of lesser interest to the prehistorian. ***Comparative linguistics*** is a subdivision of diachronic linguistics. It compares entire languages (or dialects) or certain aspects of languages with one another. It may, e.g., compare the entire structure of two or more languages in what is called a ***contrastive study.*** The latter presupposes an exhaustive analysis of the languages concerned, which is a task for synchronic linguistics. Where comparison turns on the so-called ***cognates,*** i.e., etymologically related words or morphemes, no recourse need be had to synchronic linguistics.

> ...sound–shifts, far from being a random happening, obeyed certain recognizable "laws", which permitted... no exceptions.

It was the study of lexical cognates in the Indo-European language that led to the epoch-making discovery of the sound-shifts. Linguists define sound-shift as a change of a phonemerealization in a specific language. An example from Indo-European linguistics may serve to explain this definition to the non-linguist. By a sound-shift occurring ca. 500 B.C. the tenues ***p,t,*** and ***k*** were changed to their corresponding spirants, viz.***f, th,*** and ***h.*** Thus there were these sound-shifts: ***p > f, t > th, k > h.***

Examples:

Latin	Gothic
pater	*fadar 'father'*
tres	*thries 'three'*
canis	*hunds 'hound'*

For the greater part of the 19th century, a school of German linguists, known as the neogrammarians, devoted their whole attention to the study of the laws governing sound-shifts. They were

it is (diachronic linguistics), with its historical, comparative study of languages, especially as concerns their sound–shifts, which holds out the greatest promise to the prehistorian.

eventually able to prove that sound-shifts, far from being a random happening, obeyed certain recognizable "laws", which permitted of no exceptions. What appeared at first to be exceptions was eventually shown to be "controlled" by a sort of modification of the general rule, which got the name of "Verner's law"—after its discoverer, the Danish linguist Carl Verner.

Other linguists, inspired by the findings of the "Indo-Europeans," later on extended the search for sound-shifts to other groups of languages outside the Indo-European language family. It is now definitely established that sound-shifts are a phenomenon that has affected virtually all languages. In the Malayo-Indonesian languages, e.g., we find such a soundshift as the following: A phoneme */r/*, realized as (r), underwent the sound-shift *r› l;* it affected not just some forms (including lexical ittems), but all of them. Not only did, e.g., *surat* be come *sulat,* but also *ribu› libu;* Malay *arak ›* Tagalog *alak,* etc. (This is not the place to go into greater detail. The interested reader is referred to Bloomfield (1950), where he will find a fuller explanation of the sound-shift laws.)

In this century linguistics underwent a "shift" of its own, away from historical and comparative studies to the synchronic, especially the structural, study of languages. The latter proved so promising and fruitful that it was able to hold the virtually exclusive attention of linguists until very recently. Only lately has historical linguistics been taken up again, but now developed and refined in many ways (see e.g. Hoenigswald 1960). But whatever may be said on the respective merits of synchronic vs. diachronic linguistics, it is evidently the latter, with its historical, comparative study of languages, especially as concerns their soundshifts, which holds out the greatest promise to the prehistorian.

Sound-shifts are historical events. They occur in a certain geographic area and within a definite period of time. It may often not be possible to fix these dimensions in an absolute fashion, but, by a careful study of all pertinent data, one may at least arrive at a relative chronology and an approximate location in geographic space. By these means one may then 'date' lexical items, at least in a relative fashion. Since words are symbols of either perceptual or conceptual items, they tell us of the presence of the things, practices, and ideas designated by them in a given culture at a given time. We are thus put in a position to say at approximately what time such items may have put in their first appearance in a particular society. By a careful weighing of available linguistic and extra-linguistic data, it will at times also be possible to identify the ethnic groups involved.One class of words, the so-called loanwords, deserve special mention in this context. They are words imported from another culture together with the thing or idea or practice they designate. They are thus prime indicators of contacts between different cultures and ethnic groups. Dating them by means of sound-shift will help to date the contact.

Comparative linguistics can be (important) for the prehistorian, es— pecially in areas where other sources of information, such as artifacts, monuments, etc. are scarce.

the foregoing should suffice to show how important comparative linguistics can be for the prehistorian, especially in areas where other sources of information, such as artifacts, monuments, etc. are scarce.

PHILIPPINE COMPARATIVE LINGUISTICS

This brings us to the question: What, if anything, has been done in the field of linguistics that may have a bearing on Philippine prehistory and protohistory? Most of the recent work on Philippine languages has been in synchronic linguistics; grammatical, lexical, and structural studies dominate the field. It was not always that way. Earlier in this century, a number of scholars working in the field of Malayo-Indonesian languages produced a substantial body of writing in what we would now call diachronic linguistics. Four of them will be mentioned here.

a) Herman Neubronner van der Tuuk (1825-1894), a Dutch linguist, produced the monumental Kawi -

Balineesch - Nederlandsch Woordenboek (1897-1912). The four-volume work contains an immense wealth of data. It is a work for experts in Indonesian linguistics; the main entries are in Javaese script; the numerous examples are not translated. The work thus presupposes extensive knowledge of different Indonesian languages. The four volumes are of uneven value. The author was able to complete only the first volume, and not all of that. After his untimely death, another capable scholar, J.L.A. Brandes, continued editing the work. Vols. 2 and 3 had been compiled from the disoraganized notes and jottings left by van der Tuuk when Brandes in turn was overtaken by death. The fourth volume, which was eventually put together by D.A. Rinkes, is not up to the standard of the preceding volumes.

It was van der Tuuk who discovered the two most important sound-shifts in the group of languages to which the majority of Philippine languages belong, viz., the *r* > *g* and the *r* > *l* sound-shifts.

b) The second name to be mentioned here is that of Hendrik Kern (1833-1917), an outstanding Dutch Indologist and linguist. His "Verspreide Geschriften" (Miscellaneous Writings), which fill 16 volumes of text (forming, with the index volume, 17 volumes in all), contain much important material on Philippine languages, especially in vols. X, XI, and the Supplement. He shares with the first mentioned scholar the misfortune of having written many of his contributions in Dutch and German, languages which very few in this country are able to read.

c) Otto Dempwolff (1871-1938), a German linguist, set himself the ambitious task of reconstructing the 'original' Malayan language Despite much that is valuable in the three volumes (1934-38) in which he published the results, the work is seriously flawed by two basic methodological mistakes: (1) He made use of only three modern languages, viz., Tagalog, Toba-Batak, and Javanese. This is an insufficient basis for such an undertaking. For a reconstruction that carries at least a minimum of probability, it would have been necessary to compare a far greater range of related languages. (2) He appears to have had no inkling of the relative chronology of the different sound-shifts. So he is led to conclude from the two sound-shifts *r* > *g* and *r* > *l* the *g* and *l* represent two differnt sounds (phonemes?) in the original Malayan language.

If he had been the first to undertake the study of these phenomena, we could forgive him his simplistic explanation. But he had before him the splendid studies of the neogrammarians which could have saved him from this blunder. What aggravates the situation, as far as Philippine linguistics is concerned, is the fact that his work is, thanks to his onetime student, Prof. Cecilio Lopez, relatively well known in this country and is, moreover, still considered a safe guide in its field.

d) The fourth and last name to be mentioned here is Jan Gonda (1905). Being by profession a Sanskritist, he restricted his work on the Indonesian languages to the study of Sanskrit influences (1952). But his contributions in this field, which he extened to the Philippine languages, are both comprehensive and thorough.

We pass over more recent work in comparative Philippine linguistics. Such as there is, does not contribute significantly to prehistoric and protohistoric studies.

There is a new kind of comparative linguistics which has in recent times received an increasing amount of attention, vix., *glottocharonology.* It tries, by means of lexico-statistics, to compile lists of basic words in the different languages. By a comparative study of these basic words according to a mathematical formula, it hopes to establish the degree of relatedness between the languages concerned. The present writer shares the misgivings and criticisms of some other linguists, like Knut Bergsland and Hans Vogt (1962) and C. Douglas Chrétien (1962) about the whole method. But whatever may be the final verdict on glottochronology, it cannot take the place of the "older" style of comparative linguistics for purposes of the prehistorian.

SOUND-SHIFTS IN PHILIPPINE LANGUAGES

As has been stated above in the introduction, H.N. van der Tuuk discovered the two most important sound-shifts affecting Philippine languages: *r* > *g* and *r* > *l.* What is significant from the prehistorian's viewpoint is the classes or types of words affected by the one or the other. Loanwords from the Sanskrit, which abound in Philippine languages (see e.g. Francisco 1964; Kuizon 1964), underwent exclusively the *r* > *l* sound-shift. Let us give a few examples:

Sanskrit (diacritical signs are omitted!)	Tagalog
wrtta	*balita 'news'*
bhattára	*bathala 'God'*
dhara	*dala 'to carry'*

Other words, which are clearly not Sanskrit loanwords, belong to either of two groups, one undergoing the sound-shift *r* > *g,* the other the sound-shift *r* > *l.* Here follow some examples of both:

a) *r* > *g* sound-shift

Malay	Tagalog
arus	*agus 'current'*
bara	*baga 'glowing ember'*
baru	*bago 'new'*

b) *r* > *l* sound-shift

Malay	Tagalog
arak	*alak* 'wine'
djarang	*dalang* 'scarce'
děras	*dalas* 'thick, full'

These two sound-shifts did not occur at the same time, nor are they evidence of different phonemes in the language of origin, as Dempwolff had mistakenly assumed. Rather they are linguistic events occurring at different times, with the result that one and the same original phoneme came to acquire too different realizations. The question that presents itself then is this: Can we say which of these sound-shifts came first?

The answer is: It is quite certain that the *r* > *g* sound-shift preceded the *r* > *l* sound-shift in time. Sound-shifts do not originate at just any old place; they take their origin in the so-called speech-centers. The latter are places or areas whose speech habits are considered the model for others. Changes in speech habits occurring in the center will in the course of time diffuse outward. This process is well-attested for civilized societies in historical times, but it holds equally true for the more primitive societies in prehistoric and protohistoric times. As Johannes Schmidt (1872) was able to show, the sound-shifts, after having been initiated in a speech-center—which is often identical with the cultural center for a given population—spread in more or less concentric circles outward to the "provinces". It follows that the more wide-spread a sound-shift is, the earlier it must be in time. (All of this is supported by indubitable examples in the Indo-European family of languages).

Applying this principle to Philippine languages, it is clear that of the just mentioned two basic sound-shifts, the one from *r* > *g*, being the more widespread, must also have been the first to take

> ...sound–shifts originate in a speech center which...is identical with the cultural and...the political centre of a speech community.

place. The second one, *r* > *l*, is not as widespread and common as the former. It must thus have been a later development. The *r* > *g* shift seems to have originated somewhere in the Bisayan-speaking area. It affected such languages as Waray and Maranaw, and also, but to a slightly lesser extent, Tagalog. In Ilocano the g-feature is definitely weak. There we often encounter doublets, i.e., pairs of words that are etymologically identical, differing only in the alternative presence of the *r* or *g*-feature.

Examples : *nadaŕas, nadaǵas* 'quick'
bibíŕ, bibíǵ 'lip'
rau-ab, gay-ab 'to rip' to tear'
idassaag, idassaar 'to let go down'

The *r* > *l* sound-shift, being of later date, is often absent in those languages less under the influence of the Bisayan speech-center. In Waray and Maranaw, to mention just two examples, there is in many instances an *r* where Cebuano Bisayan has an *l*. Clearly, this sound shift must be rated a later event than the one from *r* > *g*. This relative chronology is also borne out bt the fact already mentioned that in loan-words from the Sanskrit one finds exclusively the latter sound-shift.

By means of the chronological differentiation of the two basic sound-shifts, it is possible to ascertain the relative chronology of the other sound-shifts.

Here are the sound-shifts as they occurred in Tagalog in their chronological order:

r > *g, VdV* > *r, VlV* > *ʔ, VdV* > *r.*
(*VdV* means *d* between vowels; VlV > *ʔ* means l between vowels disappears)

r > *g*

Malay	Tagalog
běras	*bigas* 'rice'
tĕras	*tigas* 'hard'
bĕrat	*bigat* 'heavy'

VdV > *r* > *l* (a succession of two sound-shifts!)

Malay	Tagalog
dalam 'inside'	**maralim* > *malalim* 'deep'
tidur	**turug* > *tulug* 'sleep'

(Note: The *g* in *tulug* is a result of the preceding sound -shift *r* > *g*).

kamudian 'later' **huri* > *huli* 'late'

VlV > *ʔ*

Malay	Tagalog
bulan	*buwan* 'moon'
djalan	*daan* 'road'
talinga	*tainga* 'ear'

For the last of the sound-shifts, *VdV* > *r*, the comparison made is between Tagalog and Ilocano. The latter speech-area was not reached by this last sound-shift, which is otherwise quite widespread in the Philippines. (It is found in Tagalog, most of the Bisayan dialects, Gaddang, Ibanag, but *not* Apayao)

VdV > *r*

Tagalog	Ilocano
aral 'to learn'	*adal*
baro 'native dress'	*bado*

larawan 'picture' *ladawan*

Ilocano is one major speech-community which did not experience the foregoing sound-shifts except in a few isolated instances. In general it may be said that cognates of those words which underwent the earlier sound-shifts, especially the *r* > *g* shift, have to be looked for in languages outside the Philippines, while in the case of words undergoing the later sound-shifts, these will be found in other Philippine languages and dialects.

SOUND-SHIFTS AS EVIDENCE OF EXTRA-LINGUISTIC DEVELOPMENTS

The information about prehistoric and protohistoric developments that many be gained by a study of sound-shifts are of two kinds, viz., those relating to the habitat and movements of ethnic groups and their culture, and those pointing to particular items in a given culture.

As has already been stated sound-shifts originate in a speech-center, which in the majority of cases is identical with the cultural and often also the political center of a speech community. Sound-shifts spread outward from the center, never the other way around. The reason for this is fairly obvious: the pronunciation of a language in the cultural center is considered refined and cultured, serving as the model for the rest of the language area, while the speech habits of the 'province' and the more remote areas is considered coarse and uncultured. Thus, innovations such as sound-shifts originate in the culture center to be eventually adopted by the 'provincianos'.

Armed with this principle we are in a position to pinpoint the culture center for prehistoric Philippines, at least since the time when the present population had established itself on the major islands, especially along the coasts and in the plains. A detailed study of the *r* > *g* and the *l* > + sound-shifts makes it highly probable that the Cebuano-speaking area was the speech-center for a rather long time, and that, e.g., the pronunciation of the ancestors of the modern Tagalogs was considered backward and 'provincial'.

> words that have undergone the earliest sound–shifts evidently belong with the oldest stock of words forming a given language.

The different sound-shifts and the way they spread through Northern Luzon allow some tentative inference about the movements of the different tribal groups there. Thus, contrary to general belief, the Pangasinan people 'originally' (in a relative sense) lived in the mountains and only later on moved down to the lowlands. The Ifugao must 'originally' have lived along the Magat river, the Apayao along the Cagayan river. (These are only a few examples; for more on this, and the supporting evidence, see Verstraelen 1962).

The other kind of information, viz., that pertaining to certain components of a given culture, is yielded by a comparative study of individual words. As has been made clear, it is possible to establish the relative 'age' of a given word by means of the sound-shifts it may have undergone. Words that have undergone the earliest sound-shifts evidently belong with the oldest stock of words forming a given language. The things or ideas designated by them must then likewise have been known and —in the majority of cases—used by the speech-community. By the same token, where words were affected only by later sound-shifts, we may rightly infer that they point to later accretions to the culture of a community.

> ...it is possible to establish the relative "age" of a given word by means of the sound shifts it may have undergone.

Let us look at some examples of both classes of words. There is Tagalog word *luksa'* 'mourning'. The Sanskrit cognate is *ruksa,* which means 'dry'. On account of the great difference in meaning one might doubt that *luksa'* and *ruksa* are really cognates. But in Old Javanese the Sanskrit loanword *ruksa* has the meaning 'dry, unkempt, going unwashed' (as a sign of mourning) (cf. Râmâyana VI, 34). It is clear that Tagalog *luksa'* is a Sanskrit loanword. But it is also clear that here the Sanskrit influence is not direct but indirect only, viz. via Old Javanese. It is probable that the Tagalogs and the Javanese of those days shared the same mourning practices, if not always, at least on some occasions.

The cognates in the following examples all exhibit the early sound-shift *r* > *g.*

Malay	Tagalog
beras	*bigas* 'rice'
telur	*itlog* 'egg'
niyur	*niyug* 'coconut'
diri 'to stand'	*haligi* 'post'

The Tagalog term *alipin* 'slave' underwent a double sound-shift, first the relatively early one *VdV*>*r,* then at a much later date, *r*> *l,* thus **adipin* **aripin alipin* (cf. Ilocano *adipen!*).

Tagalog *hagdan* 'ladder' also involves the early shound-shift *r* > *g* (**hagdan* < *hardan,* cognate with Javanese *anda).*)

In the following examples we have cases of a more recent sound-shift, *VdV* > *r*. As has been pointed out above, when giving the relative chronology of the various sound-shifts in Tagalog, there are actually two sound-shifts *VdV* > *r*. In the examples given below it is the second one which is involved. If it had been the first *VdV* > *r* shift, the *r* would meanwhile have changed to *l* by the subsequent *r* > *l* shift.

Ilocano: *tadi* Tagalog: *tari'* 'metal spur' (put on fighting cocks)

Waray: *hadi'*	*hari'* 'king'
Ilocano		
Waray: *bado*	*baro'*	native dress

The next example is particularly instructive for it clearly shows the chronological differentiation between the *r* > *g* and the *r* > *l* sound-shifts. To the old Javanese *surat* 'to scratch; to write' there is an early Tagalog cognate *sugat* wound The r > g sound-shift shows that *sugat* belongs with the oldest stock of T. But there is also a second cognate in T.: *sulat* 'to write' (cf. Cebuno *suwat, sulat;* Waray - *surat*). The r - l correspondence shows that *sulat* is a younger word, a loanword from another Indonesian speech-community, from which the Tagalogs presumably learned the art of writing.

This may be the place to correct an erroneous view which, thanks to its being found in the generally used Talalog reader, *Ang Ating Panitikan* (1950), is still widely believed and held. According to the *Panitikan, sulat/surat* is a loanword of Arabic origin. A more recent 'authority', the *Diksyunaryo-Tesauro Pilipino-Ingles* (Panganiban 1972, s.v.), once more mentions Arabic *surat* as a cognate. Now the most common Arabic term for 'writing' has the radicals k.t.b. There is no possible correspondance with *sulat/surat.* The Arabic word *sura(t)* has the menaing of 'chapter' in the Qor'an. One may grant that this could have acquired the somewhat related meaning of 'writing' (in general). But there is no need to seek that far from home!*Surat* in the precise meaning of 'to write' is found at least twice in hte old Javanese translation of the Ramayana, which is definitely pre Islamic. Thus *surat* must be an original Indonesian word which entered the various Philippine languages as a loan word together with the art itself it designates. Its adoption from an

> ...words...tell us of the presence of things, practices, and ideas designated by them in a given culture at a given time.

Indonesian togue also suggests that writing was introduced to this country before the coming of Islam (as is also suggested by the forms of writing evolved here).

Similarly *tuli* 'circumcised' from *turi* (cf. Waray), exhibiting as it does the later *r* > *l* sound-shift, reflects a late 'import' from some other culture-area.

From the foregoing, the following inferences as regards the culture of the early Tagalogs may be drawn: They cultivated rice, kept chickens for eggs, planted coconut trees, had houses built on posts, which could be entered by means of a ladder, and slaves (or at least servants). But they had not yet evolved big political units (no 'king'), they wore only G-strings, they did not practice cockfighting, were not circumcised, and had not yet acquired the art of writing. Some of these inferences are, by the way, supported by other, non-linguistic evidence. E.g., cock-fighting is even now unknown among the more remote tribes, like the Bontocs and Ifugaos. Also, circumcision is not practiced among these tribes, and even the Ibanag in the lowlands are generally not circumcised. The limited extent to which these practices have spread indicates their recentness. The art of writing was indeed quite widespread in the Philippines at the time of first contact with the Spaniards. This argues for its introduction some time before the event. On the other hand, as shown by the linguistic evidence, it could not have been introduced very much before that time.

Linguistic evidence may also help to lay the ghost of one still widely held view, viz., that the name *Bisaya* is somehow derived from the name of the Sumatran empire, Sri Vijaya. According to the laws of sound-shift, Vijaya should have become either Bidaya or Biraya, but not Bisaya. This was pointed out by Juan R. Francisco (1961). His article shows also that all the other evidence seems to point in the same direction: Bisaya and Vijaya have nothing to do with each other.

Having said this, we hasten to add that there is a good deal of linguistic evidence for a close relationship between Java and the Philippines. While the *r* > *g* sound-shift is a purely Philippine affair and must thus have originated in a Philippine speech-center, the *d* > *r* sound-shift is widely spread over the Indonesian archipelago. It is already found in Old Javanese, but is absent in Malay. According to N.J. Krom (1931), for a certain period the whole eastern part of the Indonesian Archipelago and probably also the Philippines were more or less under the influence of Java, while the western part (!) was under the control of Sri Vijaya, with Malay as its official language. Towards the end of the 14th century, the king of Java, Hayam Wuruk (with the adopted Sanskrit name of Rajasanagara), greatly increased his power and influence with the help of his famous prime minister, Gajah Mada. It is to be expected that the various trade centers established or flourishing at that time exerted a good deal of linguistic influence. Indeed, we observe the *d* > *r* sound-shift in the chief trade centers of the Philippines, viz. Manila, Cebu, and Jolo. (I did not have the opportunity to look for old trade centers outside the Philippines. Was Larantuka, on the island of Flores, one of them? In any case, we do find in that area the *d* > *r* sound-shift).

With these few examples we must rest our case. It should by

(Continued on Page 44)

Homo Erectus Erectus: The Search for his Artifacts.

by Gert-Jan Bastra

Where are the artifacts of Java Man? This is the question that arises now that almost four years of research and fieldwork in Indonesia (1977-81) have provisionally been completed.[1] One of the aims of this work was to shed light on the material culture of the early hominids of Java. Accordingly, most of known sites with stone tools and fossil hominid remains were visited and surveyed, and several new ones were discovered. River terraces in many places in Central and East Java were mapped and investigated for the presence of artifacts. Much attention was devoted to regions in which the geological history indicates that Upper Pleistocene and (Sub-) Holocene disturbances have been minimal. Many artifacts (including handaxes and unifacial and bifacial choppers) were found, collected, and studied, but nowhere were we able to demonstrate that these artifacts came from Lower or Middle Pleistocene deposits and therefore could have been made by Java Man.

The story of the discovery of Java Man has become legendary.

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In 1887 the Dutch army surgeon Dubois arrived in the former Dutch East Indies with the aim of finding the "missing link," and in October 1891, in the course of excavations at Trinil, a village in Central Java (fig.1), he did indeed find the heavily fossilized braincase of a primitive hominid. Almost a year later, in August 1892, the same fossil horizon yielded a femur with a remarkable resemblance to that of modern man. Dubois (1894) described these remains as belonging to ***Pithecanthropus erectus,*** thus honouring Ernst Haeckel, who had used this generic name hypothetically in his writings. There was not much further clarification concerning Java Man until 1937, when the calvarium of a second, fully grown individual was found at Bapang, near Sangiran, also in Central Java.[2] Java Man could then be accepted with more certainty as a precursor of modern man—unfortunately, however, no longer with the approval of Dubois, who came to stress the apelike features of the Trinil skullcap more and more. ***Pithecanthropus erectus*** is now clsssified as ***Homo erectus erectus,*** although some of those who are closely involved with palaeoanthropological research on Java still use the name ***Pithecanthropus. H. erectus erectus*** (of which the remains of about 30 individuals are now known) differs subspecifically from ***H. erectus modiokertensis,*** remains of which have been found in older deposits, and from ***H. erectus soloensis*** (Solo Man), known from younger sediments. In Africa and in Europe representatives of the species ***H. erectus*** lived in the Lower Pleistocene (from 1,800,000 to 700,000 years B.P.) and in the Middle Pleistocene (from 700,000 to 130,000 years B.P.). Java Man probably lived in the same time span.[3]

In the literature dealing with early man in Java, claims have often been made of the discovery of artifacts of ***H. erectus erectus.*** The first such claim appears in the reports of the Selenka expedition, where it is stated that some fossil remains of vertebrates were found at Trinil with traces of working by man (Carthaus 1911). The Selenka expedition carried out excavations (in1906-8) close to Dubois's former pits, and the alleged bone implements came from the same fossil horizon as the braincase of the first ***H. erectus erectus.*** Subsequently, in the 1930s, von Koenigswald reported the find of small stone tools at Sangiran, the most prolific site of fossil hominid remains in Java, and attributed them to ***Pithecanthropus*** (e.g., von Koenigswald 1936*a*:41), a connection that he still maintains (e.g., von Koenigswald 1978). These implements from Sangiran must be clearly distiguished from the larger and more pronounced artifacts of the Patjitan[4] culture in South Java, also found for the first time in the

1930s (von Koenigswald 1936*b*). The finds from the older phases of this "Patjitanian" have also been ascribed to ***Pithecanthropus,*** for example, by Movius (1949:408) and van Heekeren (1972:43). Finally, Jacob et al. (1978) mention "stone tools from mid-Pleistocene sediments" near the village of Sambungmacan (also in Central Java, between Sangiran and Trinil) and suggest a correlation with a Middle Pleistocene hominid.

All these claims for the association of artifacts with a Lower or Middle Pleistocene hominid can be refuted. To do this in detail is beyond the scope of this account; details must await more extensive reports. However, several points will be emphasized here.

In the case of the Selenka expedition, it is the "implements" themselves that are doubtful. The illustrations that are given of them (it seems that the originals were destroyed in World War II) certainly do not show typical bone tools; in fact, they are reminiscent of the "osteodontokeratic" controversies in South Africa. Their characteristic features and fracture patterns can be explained by, for example, the action of carnivores.[5]

Concerning the small stone tools found at Sangiran by von Koenigswald, it is the deposits in which these artifacts occur that raise doubt as to an association with ***H. erectus erectus.*** Von Koenigswald calls these deposits Middle Pleistocene on the basis of remains—in lower-lying strata but within the same(Notopuro) formation—of Middle Pleistocene vertebrates (a so-called Trinil fauna, i.e., the fauna that was originally found in the horizon of the skullcap and femur at Trinil). However, these remains are heavily abraded and water-worn and are certainly derived from still older strata. They cannot be used for age determination; among the first to point this out was Teilhard de Chardin (1937:29), after a visit to Java in early January 1936, and others have only been able to confirm his observations (e.g., de Terra 1943: 456; Movius 1944: 90 n. 58; 1949:354 n. 12; van Heekeren 1972:48; Bartstra 1974: 7; 1978: 68). From a geological point of view, the artifact-bearing deposits indicated by von Koenigswald cannot be older than Upper Pleistocene (< 130,000 years B.P.).

> ...on Java there is still not a single site where artifacts can be associated with *H. erectus erectus*

As for the Patjitan culture, "Palaeolithic" types of artifacts, such as handaxes and choppers, are found in terrace fills and in the channel-load of several small rivers on the south coast of Java. These artifacts, however, cannot be the work of ***H.erectus erectus.*** The oldest river terraces in the region west of Pacitan (where most of the finds have been made) belong to the last phases of the Pleistocene; the younger terrace fills and scarps are Holocene, and the artifacts have not been derived from older sediments. What is even more important is that so-called Palaeolithic types of artifacts occur in surface assemblages away from rivers. In the literature these assemblages are rather vaguely categorized as "Neolithic"; it can be demonstrated geomorphologically that they do indeed belong to the Holocene. It is truly questionable to what extent the various sites of the Patjitan culture represent only different seasonal or occupational activities of a group of (Sub-) Holocene hunter-gatherers. Wajak Man[6] could very well have been the manufacturer of the Patjitan tools, and the very name "Patjitanian" can be cast into the melting-pot of the Hoabinhian. In any case, the label "Lower Palaeolithic" that is always attached to the Patjitan culture is extremely confusing.

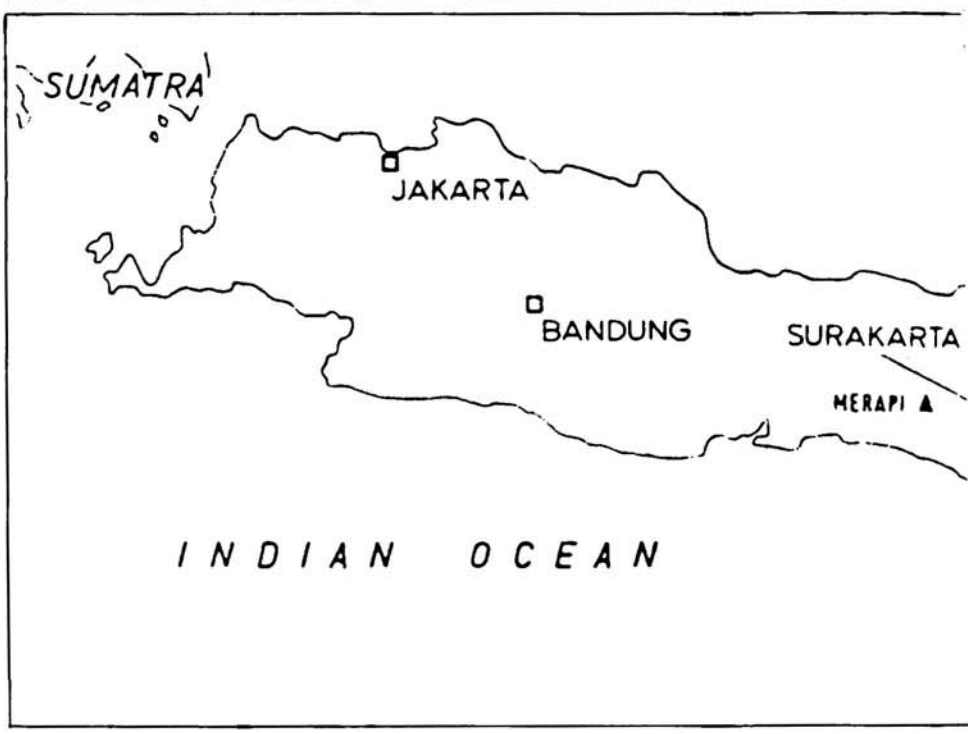
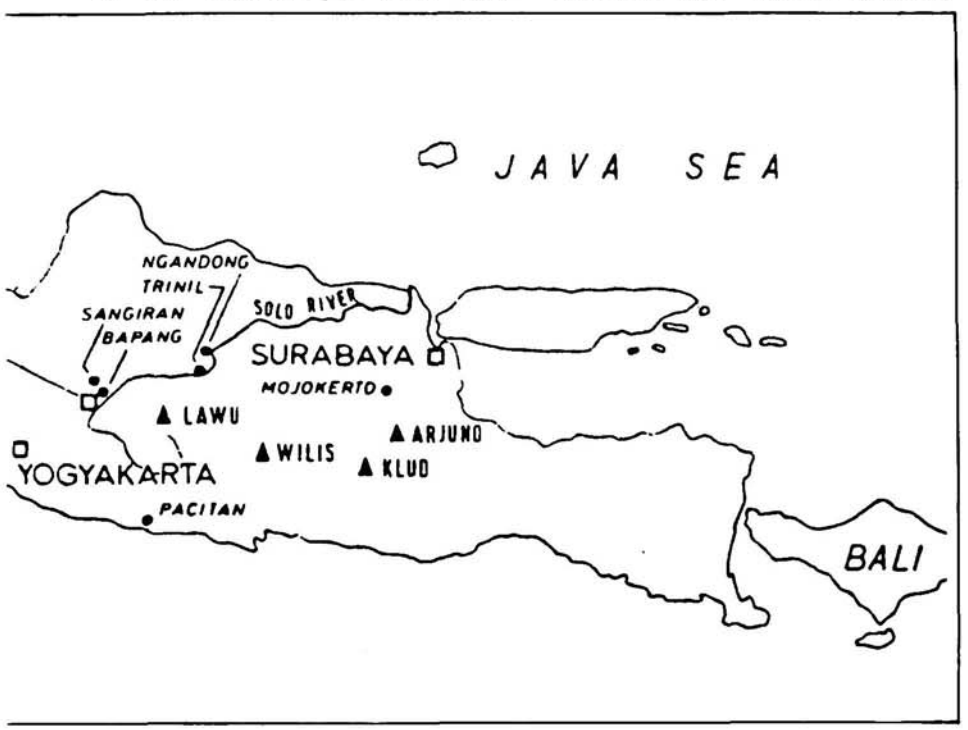


Fig. 1 The island of Java with the principal localities of fossil hominids and prehistoric stone artifacts

Finally, the tools from Sam-

bungmacan amount to no more than a chopper and a flake. The village of Sambungmacan made news in 1973, when a fossilized hominid cranium was found in the course of canal-digging operations to short-circuit a meander of the Solo River. From a morphological viewpoint this cranium shows many more advanced features than the remains of *H. erectus erectus* from Trinil or Sangiran. In fact it is very similar to the skulls found farther east in terrace sediments of the Solo near Ngandong (see fig. 1), known in the literature as Solo Man

> Continuing palae oanthropological research and fieldwork on Java...will ultimately bring to light older Quaternary deposits containing...stone-tool types of the Lower Palaeolithic in southern and eastern Asia....



(●), active volcanoes (▲), and towns (□).

(Oppenoorth 1932, Weidenreich 1951). This Solo Man is definitely younger than Java Man: in contrast to the deposits that contained the skullcap and femur at Trinil, the fluviatile deposits from which the Ngandong skulls originate can be correlated with an existing river drainage system. If geologically speaking Java Man belongs to the Lower and Middle Pleistocene, then Solo Man must be placed in the Upper Pleistocene. Now, the cranium from Sambungmacan also comes from fluviatile sediments exposed along the Solo River. Making use of Occam's razor, one should then assume that the sediments with a "Solo Man-type" skull at Sambungmacan will also be Upper Pleistocene terrace sediments. However, instead of doing so, some make the situation unnecessarily complicated by calling the Sambungmacan sediments "old," principally on the basis of remains of allegedly Middle Pleistocene vertebrates found therein (Jacob et al. 1978). In the first place, the attribution of these sediments to the Middle Pleistocene is disputable on the basis of the small number of genera excavated and identified at Sambungmacan (Sartono 1979:86). In the second place, it must again be emphasized (after what has already been said about the artifact-bearing deposits at Sangiran) that relative-age determinations of fluviatile sediments on Java on the basis of the fossilized vertebrate remains found in them (according to the "established" Javanese vertebrate stratigraphy) would best be dismissed, for sediments are continually being designated as "old" on the basis of allochthonous fossils. Our observations have made it clear (in complete agreement with Sartono's [1979] conclusion) that in Sambungmacan the fluviatile layers that yielded the cranium are indeed normal Upper Pleistocene terrace deposits. That these immediately overlie the Neogene with a stratigraphic hiatus is not at all unusual, being observable in various places along the Solo River,[7] and that the Solo terraces contain autochthonous and allochthonous components of fossil faunas has already been reported (Bartstra, Basoeki, and Santosa Azis 1976:31–33). As for the stone tools found at Sambungmacan, the chopper and flake, which are not abraded, but very fresh-looking, are contemporaneous with these terrace deposits; they are certainly not Middle Pleistocene.

In conclusion, it must be said that on Java there is still not a single site where artifacts can be associated with *H. erectus erectus*. Since many remains of this fossil hominid have been found, however, a feeling of paradox arises: where are the artifacts of Java Man?

Two paths to a solution lie open. First, it could be assumed that the

absence of any association between artifacts and Java Man is the result of the lack of sufficient research. From this it would follow that continuing palaeoanthropological research and fieldwork on Java in the traditional way will ultimately bring to light older Quaternary deposits containing the recognizable and (by Movius) long-established stone-tool types of the Lower Palaeolithic in southern and eastern Asia, which are clearly to be associated with *H. erectus erectus.* This hominid must have been able to manufacture stone tools, even if the use of wooden implements was more the rule. Other Lower and Middle Pleistocene hominids, elsewhere in the world, have been found in association with stone artifacts, among them *H erectus pekinensis* (Peking Man), *H. erectus mauretanicus* (Ternifine),and *H. erectus leakeyi* (OH 9). And even if one would want to point out that Java Man is morphologically more primitive and probably somewhat earlier than the other subspecies mentioned, it should still be recognized that in East Africa stone implements have been found in channel deposits (Omo Delta) older than the oldest strata containing *H. erectus erectus* in Java.

> The Patjitanian is not the work of *H. erectus erectus.*

It is my opinion, however, that a second path should be followed. To find the tools of Java Man the search strategy must be altered. We should stop searching for the established core types of the "chopper/chopping-tool complex," because these constitute a very late development on Java, the roots of which extend at most into the Upper Pleistocene. The Patjitanian is not the work of *H. erectus erectus.* Instead, we should look at the small irregular cores and crude flakes collected by von Koenigswald at Sangiran, which, while not Middle Pleistocene as he contended, are up until now the oldest tools in all of Java. These artifacts point in the direction in which we must search to find the stone tools of Java Man: assemblages of mostly small, indistinct flakes.

Unfortunately, however, this second road is full of pitfalls. The question is whether it will be possible to recognize these amorphous, indistinct, simple, small stone artifacts as such in the synorogenic river sediments and lahar deposits of the Middle and Lower Pleistocene of Java, which were formed "during this very turbulent time that the *Pithecanthropus* lived here, threatened by waterfloods, landslides, and frequent earthquakes" (van Bemmelen 1949:591). In fact, in recent years some finds have been reported of alleged stone implements from Middle Pleistocene strata at Sangiran,[8] but when one sees these objects, made of chalcedony, silicified limestone and claystone, and similar materials, one can only be reminded of the disputes concerning eoliths at the beginning of this century. At Sangiran, too, these "implements" come from deposits in which their raw materials are abundant. Horizontally and vertically they have a remarkably wide distribution, and what is clear is the absence of distinct forms and types: they consist for the most part of small crude flakes, sometimes with irregular retouch and an occasional cone of percussion. Are these the work of Java Man, or are they just stones?

> To find the tools of Java Man, the research strategy must be altered... (one must look out for) assemblages of mostly small indistinct flakes.

FOOTNOTE

[1] The research and fieldwork, carried out in cooperation with staff members and students of the National Research Centre of Archaeology in Jakarta, were made possible by a grant from Wotro, the Netherlands Foundation for the Advancement of Tropical Research.

[2] In fact, a new skull of a *Pithecanthropus* had already been found a year earlier (in 1936) near Mojokerto in East Java. This, however, was an infant calvarium, so no satisfactory comparison could be made with the Trinil vault.

[3] A good deal of research has been done on Java in recent years with the aim of obtaining reliable absolute datings of Pleistocene strata. Although one would expect the K-Ar method to offer considerable prospects in view of the significant role that vulcanism has played on Java, difficulties arise in the analysis of samples (Stross 1971). Methods currently employed also include fission-track dating (Nishimura, Thio, and Hehuwat 1980), U-series dating on vertebrate bones, and palaeomagnetic dating (Semah et al. 1981, Sartono et al. 1981).

[4] The new Indonesian spelling for the town which gave its name to the culture is Pacitan (see fig. 1).

[5] Carthaus was in fact the only member of the expedition who accepted them as "implements" (Blanckenhorn 1977:259). In this connection it is interesting to note that Dubois (1908 :1251) remarked that despite meticulous searching at various sites he had never succeeded in finding any artifacts. Concerning the vertebrate fossils of Trinil he says that many bones were broken by crocodiles, in some cases showing (fossil) tooth marks of these animals, and that the fauna included vast numbers of crocodile teeth (Dubois 1908:1242).

[6] Formerly written Wadjak Man. The skulls of this prehistoric hominid were found in caves east of Pacitan at the end of the last century (see review by Jacob 1967).

[7] In the transverse Solo Valley north of Ngawi, Upper Pleistocene terrace sediments immediately overlie Neogene marls and limestones, but this stratification can also be observed in the Trinil area, along the Solo River north of the village of Gajah and west of the village of Glaman.

[8] These Middle Pleistocene strata are jointly known as the Kabuh formation. This formation underlies the Upper Pleistocene Notopuro formation, in which von Koenigswald found his small stone implements. Kabuh and Notopuro are regarded by some as one formation, but this is not to be recommended, as they certainly do not represent uniform conditions of deposition.

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now be obvious that historical linguistics is important for prehistorical studies on the Philippines. Much needs still to be done in this field. The Linguistic Institute of the University of San Carlos has the long-range plan of gathering linguistic material, especially in the southern part of the Philippines. Up to now the material collected partains mainly to the grammatical aspects of the languages to be studied. It is hoped, however, that in the

(Continued on Page 45)

SPAFA AFFAIRS

SPAFA 9th Governing Board Meeting

Members of the SPAFA Governing Board and Observers.

SPAFA held its 9th Governing Board Meeting at the Wong Amat Hotel in Pattaya, Thailand, from 26-28 August 1985. This was attended by the SPAFA Governing Board Member for Indonesia, Mr. Bastomi Ervan, who was subsequently elected Chairman of the Meeting and for FY 1985-1986; the SPAFA Governing Board Member for the Philippines, Dr. Alfredo E. Evangelista; and the SPAFA Governing Board Member for Thailand, Mr. Taveesak Senanarong, who was the outgoing Chairman. Present as Ex-officio Board Members were Dr. Adul Wichiencharoen, SEAMES Director, and Miss Suchitra Vuthisathira, Co-ordinator of the SPAFA Co-ordinating Unit in Bangkok. Dr. Rosa C.P. Tenazas, Assistant Co-ordinator, provided additional assistance.

Observers at the 9th SPAFA Board Meeting were: Miss Fabienne Mensancal, French Consultant to SEAMES; Dr. Frederick J. Woolley, SEAMEO Pilot Project Field Co-ordinator, ACCC, Canada; and Mrs Savitri Suwansathit, Director of External Relations Division, Ministry of Education, Thailand.

The Meeting took up important matters such as the status of the reconstitution of SPAFA from Project to Thai Regional Centre, extension of terms of office of the professional staff, support profile and status of funding resources for the programmes and activities that still remain to be implemented until the end of the current Development Plan in June 1986.

Linguistic. . .from page 44

future lexical items which may yield more information on the prehistory of the Philippines, can also be collected.

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Opening of SPAFA Training Programme on Ceramics of East and Southeast Asia.

Deputy-Director of the Fine Arts Department, Mr. Prapat Saengwanit, gives the welcoming speech at the Opening Ceremony

A SPAFA two-month training course on Ceramics of East and Southeast Asia was launched by the SPAFA Thai Sub-Centre at an Opening Ceremony held at the main auditorium of the National Library in Bangkok on October 15, 1985. The ceremony was presided over by the Deputy-Director of the Fine Arts Department, Mr. Prapat Saengwanit and Mr. Somsak Rattanakul, Director of the Archaeology Division, Fine Arts Department.

The SPAFA Co-ordinating Unit was represented by Miss Suchitra Vuthisathira and Dr. Rosa C.P. Tenazas, Co-ordinator and Assistant Co-ordinator, respectively, and other members of the Co-ordinating Unit staff.

Designed to meet the felt need in the region for trained personnel in ceramic research, the course covers lectures on topics such as archaeology and Asian history, spatially and temporally delimited to the study of ceramics. The practical aspect of the training will focus on identification and classification of ceramics based upon standardized terminology and typology.

The trainees, numbering twelve in all from the Member Countries were, from Indonesia: Miss Novida Abbas, Mr. A. Oka Astawa and Miss Wiwiek Ediati Setianingsih, from the Archaeology Departments of Yogyakarta, Bali and Jakarta, respectively; from the Philippines: Mr. Artemio Barbosa, Miss Thelma Roales and Mr. Alfredo Orogo, all from the National Museum, Manila; and from Thailand: Miss Sirikul Pichaijumpol, Mr. Suwit Chaimongkol, Mrs. Suntree Prasong, Mr. Sakchai Pojnunvanich and Mr. Chaiyanand Busayarat from the Fine Arts Department, Bangkok, and Miss Uranee Thongchai from the Faculty of Humanities, Chiang Mai University, respectively.

Participants to the training course from Indonesia, the Philippines and Thailand.

SPAFA Workshop Held in Indonesia

Professors Claude Jacques and J.G. de Casparis inspecting one of many inscriptions found on west Sumatra.

The SPAFA Sub-Centre for Archaeological Research convened a SPAFA Consultative Workshop on Archaeological and Environmental Studies on Srivijaya on September 17-29, 1985 in three venues namely, Jakarta, West Sumatra and North Sumatra. The Workshop was attended by participants from Indonesia, the Philippines and Thailand. Consultants and Observers came from France, Japan, the Netherlands, USA, Indonesia and Thailand.

The workshop was the last in a series of four SPAFA workshops on Srivijaya studies that was started in Indonesia in 1979. Over twenty papers were presented covering a wide range of topics such as architecture, inscriptions, art, archaeological remains, religion, iconography, sea routes and ships attributable to the Srivijaya Period.

Official Delegates from the Member Countries were, from the Philippines: Dr. Jesus T. Peralta, Mr. Wilfredo Ronquillo, Dr. Aurora Roxas-Lim and Dr. Juan R. Francisco; from Thailand: Mr. Pisit Charoenwongsa, Mr. Tarapong Srisuchart, Miss Kongkaew Veeraprajak and Professor Chusiri Chamoraman; and Indonesia: Dr. R.

Soekmono, Mrs, Satyawati Suleiman, Mrs. Soejatmi Satari and Mr. Soekarto Kartoatmodjo.

Consultants and Observers were: Dr. J.G. de Casparis, University of Leiden, the Netherlands; Dr. Pierre-Yves Manguin, Ecole Francaise d'extreme-Orient, France; Professor Claude Jacques, France; Professor Tatsuro Yamamoto, Japan Academy; Mr. Shoji Ito, Waseda University; Dr. R.P. Soejono, Director, National Research Center of Archaeology, Jakarta; Mr. Uka Tjandrasasmita, Director, Directorate for the Protection and Development of Cultural Heritage Jakarta; Mr. Boechari, University of Indonesia; Dr. S. Sartono, Institute of Technology, Bandung; Dr. Noerhadi Magetsari, University of Indonesia; Dr. John N. Miksic, University of Gadjah Mada, Yogyakarta; and Dr. Nandana Churiwongs, University of Amsterdam, the Netherlands.

Additional Observers from the National Research Center of Archaeology in Jakarta were as follows: Dr. Hasan M. Ambary, Ms. D.D. Bintarti, Mrs. Endang Soekatno, Mr. Machi Suhadi, Mr. P.E.J. Ferdinandus, Mr. Bambang Budi Utomo, Mr. Soeroso, Mr. Kosasih, Mr. Nyoman Purusa Mahawiranata and Mr. Goenadi Nitihaminoto.

The SPAFA Co-ordinating Unit was represented by Miss Suchitra Vuthisathira.

Participants to the workshop.

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