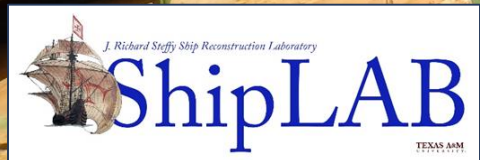


Introducción a la Arquitectura Naval I

Especialización en Patrimonio Cultural Sumergido

Bogotá, April 2019

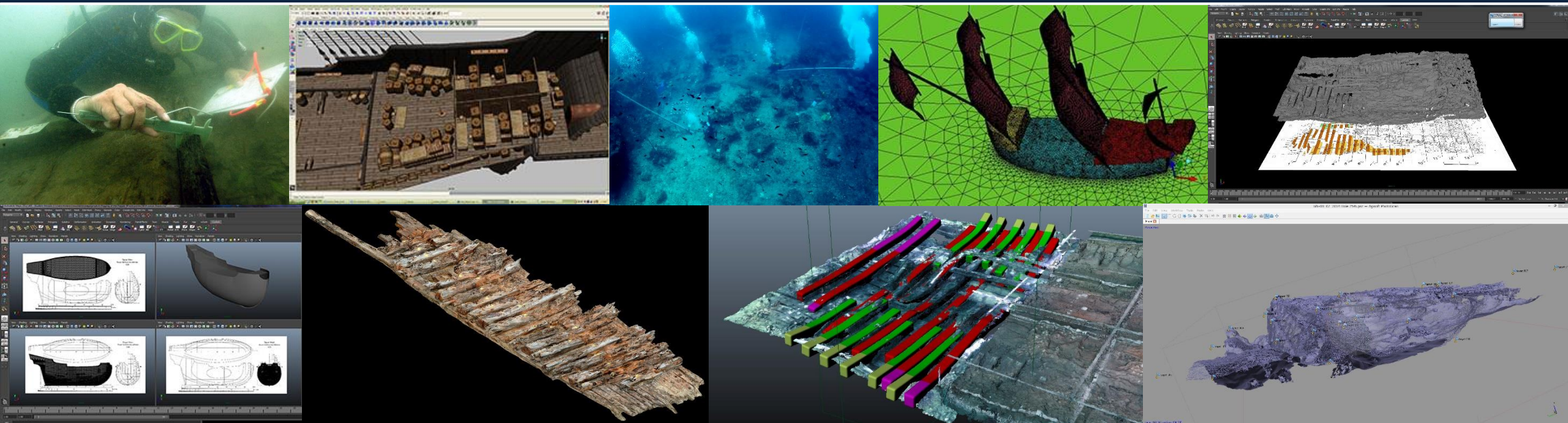


Part 2 - Taxonomies

Filipe Castro

M.S. in Maritime Archaeology and Conservation

Paris, April 2-17 – UNITWIN / UNESCO



TEXAS A&M
UNIVERSITY



Created in 1976, the Nautical Archaeology Program at Texas A&M is the oldest and one of the largest master and doctoral degree granting programs of its type in the world.



Ship Reconstruction Laboratory

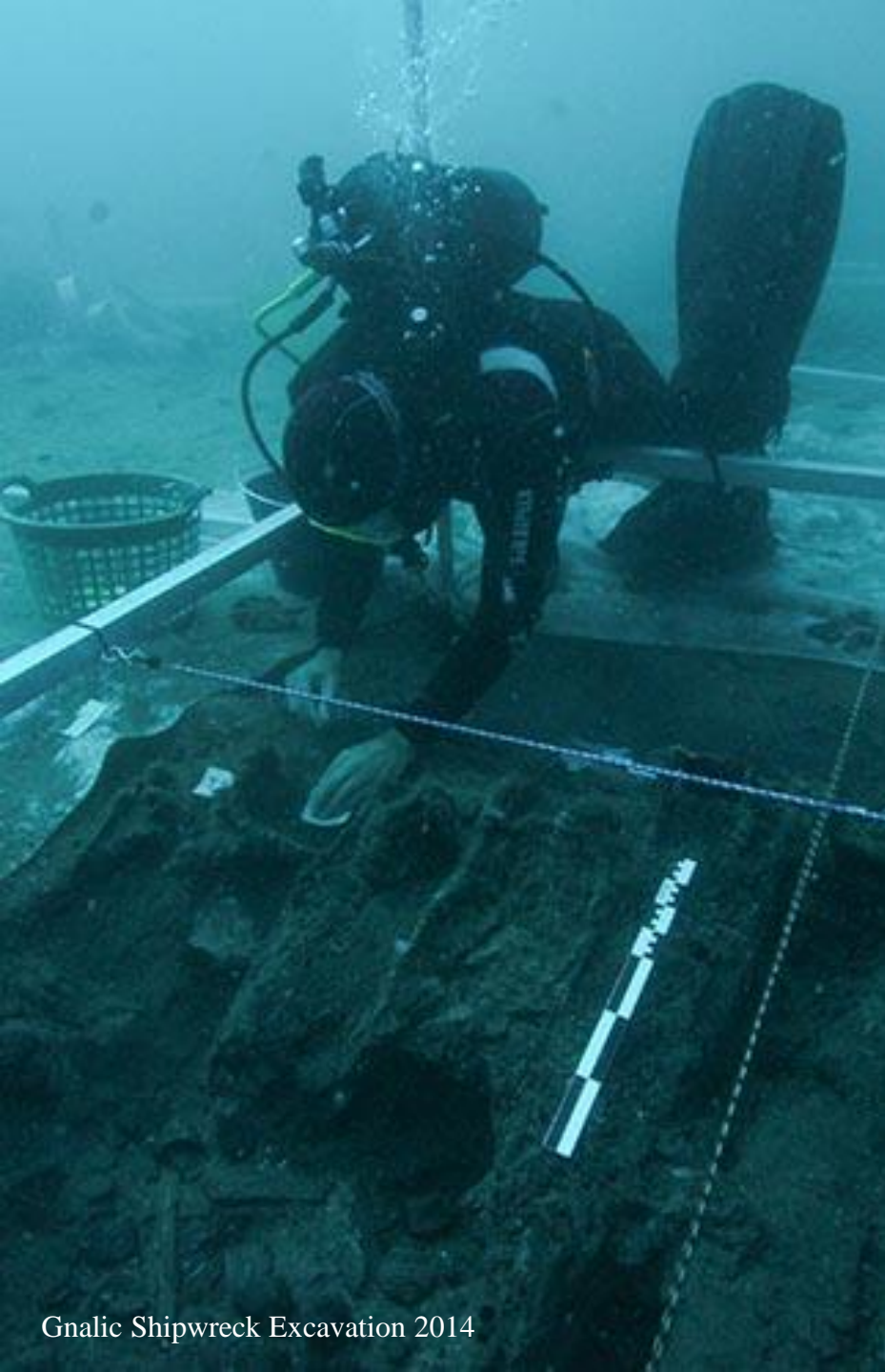
Problems related to the time to completion in our MA and PhD degrees led to the creation of a two-year M.S. in Maritime Archaeology and Conservation, aiming at the needs of the market and focused on placement.



Audrey Wells - VizLab

The new MS (32 Credit Hours) maintains our traditional focus on ships and seafaring around the world and throughout time, as well as the fundamentals of archaeological artifact conservation.

Further specialized training in maritime archaeology emphasizes technical skills required in a variety of professional areas.



The M.S. is designed to prepare students for employment in maritime museums, cultural resource management firms, (including companies working with the offshore oil industry), and federal, state, or similar government agencies.



Students in the M.S. program will benefit from the research opportunities and internships available through Texas A&M University's Center for Maritime Archaeology and Conservation (CMAC), the university-affiliated Institute of Nautical Archaeology (INA).

The program is open to a limited number of students, selected on a competitive basis. We accept around 20% of the applicants.

Required Courses

ANTH605 Conservation of Archaeological Resources I (4 credit hours)

ANTH608 Skills in Maritime Archaeology (3 credit hours)

ANTH611 Introduction to Nautical Archaeology (3 credit hours)

ANTH615 History of Wooden Shipbuilding Technology (3 credit hours)

ANTH616 Research and Reconstruction of Wooden Hulls (3 credit hours)



Maritime Elective Courses

(3 credit hours each)

ANTH607 Historical Archaeology

ANTH644 Classical Archaeology

ANTH612 Pre-Classical Seafaring

ANTH613 Classical Seafaring

ANTH618 Medieval Seafaring in the Mediterranean

ANTH628 New World Seafaring

ANTH629 Post Medieval Seafaring

Maritime Elective Courses

(3 credit hours each)

ANTH610 Outfitting and Sailing the Wooden Ship 1400-1900

ANTH614 Books and Treatises on Shipbuilding

ANTH603 Seafaring Life and Maritime Communities

ANTH606 Conservation of Archaeological Resources II

ANTH633 Deep-Submergence Archaeology

We are planning establish working relations with other institutions, such as *The Smithsonian*, the *Park Service*, *N.O.A.A.*, etc.



ANTH 660 Field Archaeology (optional 3 hours)
ANTH 684 Anthropological Internship (optional 3 hours)

Recommended Courses

MAST489 Forensic Underwater Science (Scientific Diving - 4 credit hours)

We also recommend that students take courses outside the Department: GIS, AutoCAD, AutoDesk Maya, Rhinoceros, Houdini, PhotoScan, etc.

Some students take advantage of other elective courses available in the Department: ANTH 637 Paleoethnobotany; ANTH 634 Palynology; ANTH 627 Human Paleonutrition, etc.

Other Elective Courses

(3 credit hours each)

ANTH602 Archaeological Methods and Theory

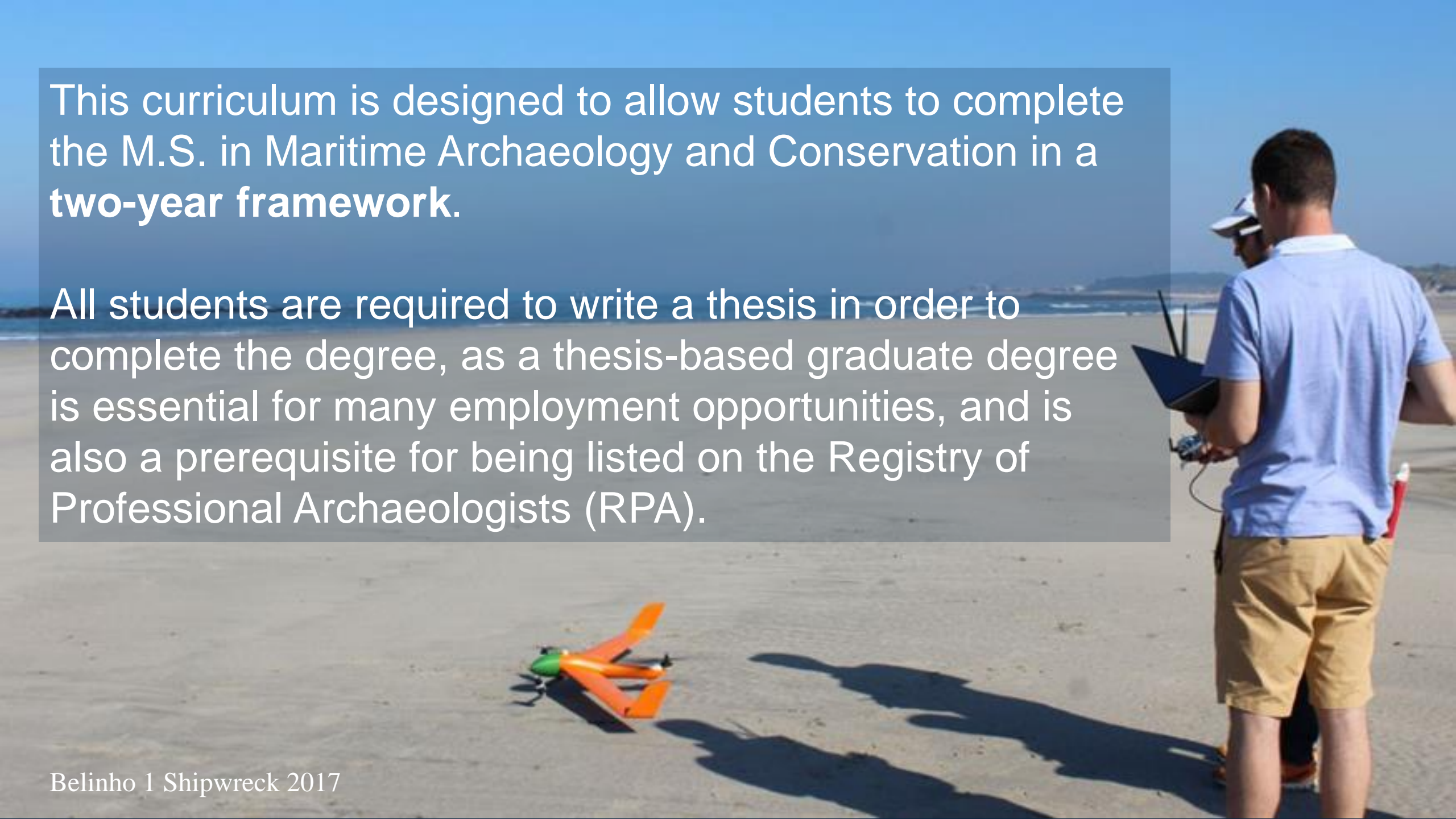
ANTH639 Gender, Ethnicity and Class in Archaeological Research

ANTH642 Research Design in Anthropology

ANTH645 Cultural Resource Management

This curriculum is designed to allow students to complete the M.S. in Maritime Archaeology and Conservation in a **two-year framework**.

All students are required to write a thesis in order to complete the degree, as a thesis-based graduate degree is essential for many employment opportunities, and is also a prerequisite for being listed on the Registry of Professional Archaeologists (RPA).



Faculty

Filipe Castro researches Iberian seafaring, history of shipbuilding, and cultural heritage management.

Kevin Crisman researches seafaring from circa 1500 AD to the present, especially American seafaring history.

Chris Dostal is a historical archaeologist who specializes in the conservation of archaeological material and computer graphics.

Donny L. Hamilton is a historical archaeologist who specializes in the conservation of archaeological material.

Deborah Carlson is a classical archaeologist specializing in seafaring in ancient Greece and Rome.

Cemal Pulak researches Bronze Age maritime trade, technology, seafaring, ship construction, and nautical archaeology of the eastern Mediterranean and the Aegean from prehistory to post-medieval times.

Shelley Wachsmann focuses on ships and seafaring, primarily in the eastern Mediterranean during the Bronze and Iron Ages.

Taxonomies

A. J. Richard Steffy:

Cargo carriers, warships, fishing craft, utility craft.

B. Sean McGrail:

Floats, Rafts, Boats;

C. Eric Rieth:

Floats, Rafts, Boats (dugouts, extended dugouts, assembled craft);

D. Olaf Hasslöf / Lucien Bash:

Shell-first, skeleton-first, things in between;

E. Lucien Bash / Fred Hocker:

Shell-first, skeleton-first, Bottom-first;

F. Basil Greenhill

Rafts, Skin boats, Bark boats, Dugouts

G. Patrice Pomey:

Conception, Structural Principle, Construction Sequence;

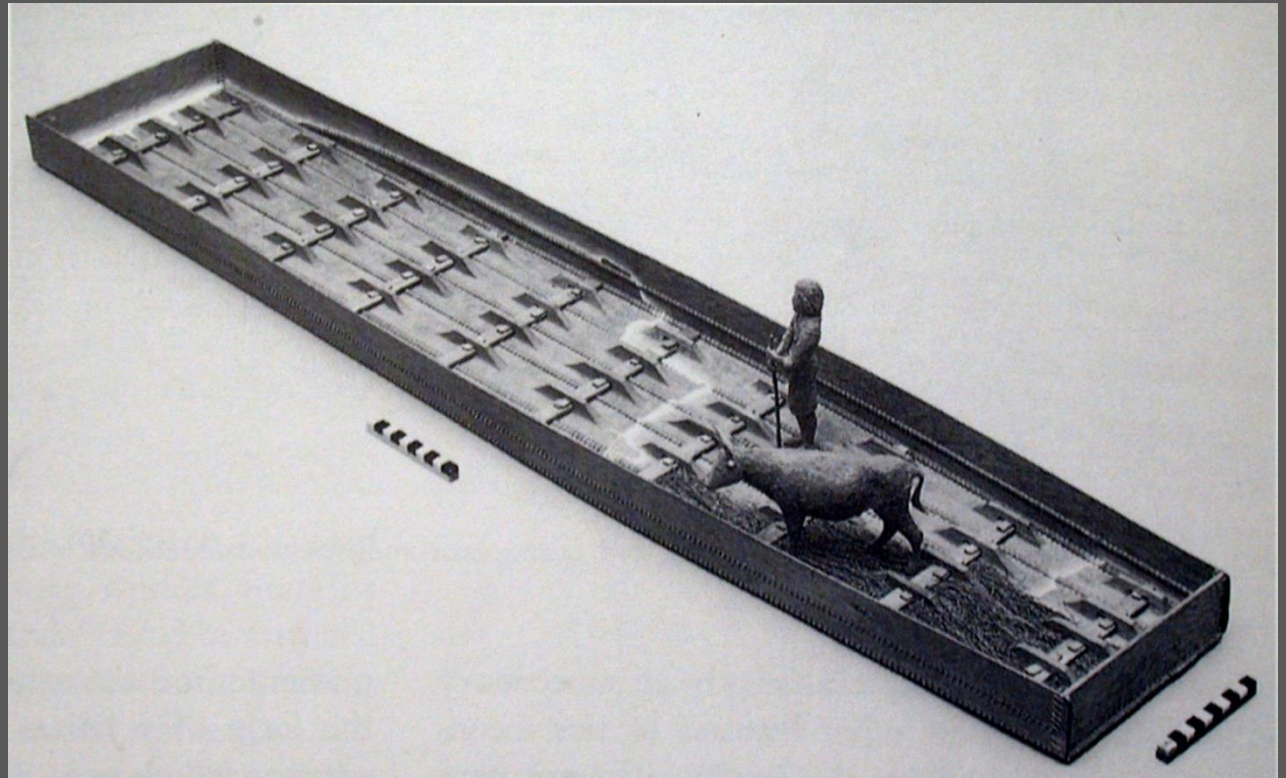
H. Piero Dell'Amico:

Oral tradition, Partially geometric methods, Geometric methods.

A. Dick Steffy's taxonomy (function):

1. Cargo carriers,
2. Warships,
3. Fishing craft,
4. Utility craft.

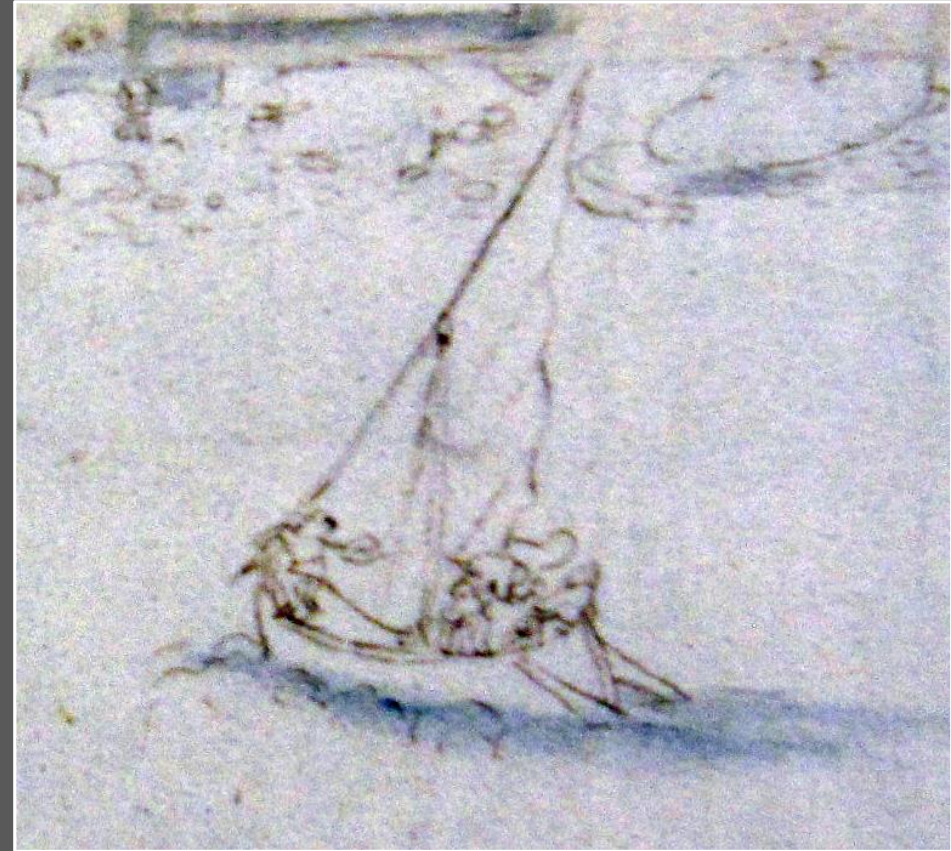
1. Cargo carriers: boxes, the ends are the price one has to pay to sail them; size is the most important feature; there are many trade offs (Venetian great galleys).



2. Warships: gun platforms, stability, sturdiness, speed, maneuverability.



3. Fishing craft: adaptation to the fishing techniques; as many examples as fishing communities.



4. Utility craft: diverse, cheap, good for experiments and introduction of new technologies.



A

Figure 10.1 Five stages in the building of a curach or *navog* in Co. Kerry. (Photos: National Museum of Ireland.)

Irish *curach*:



B



C

Irish *curach*:

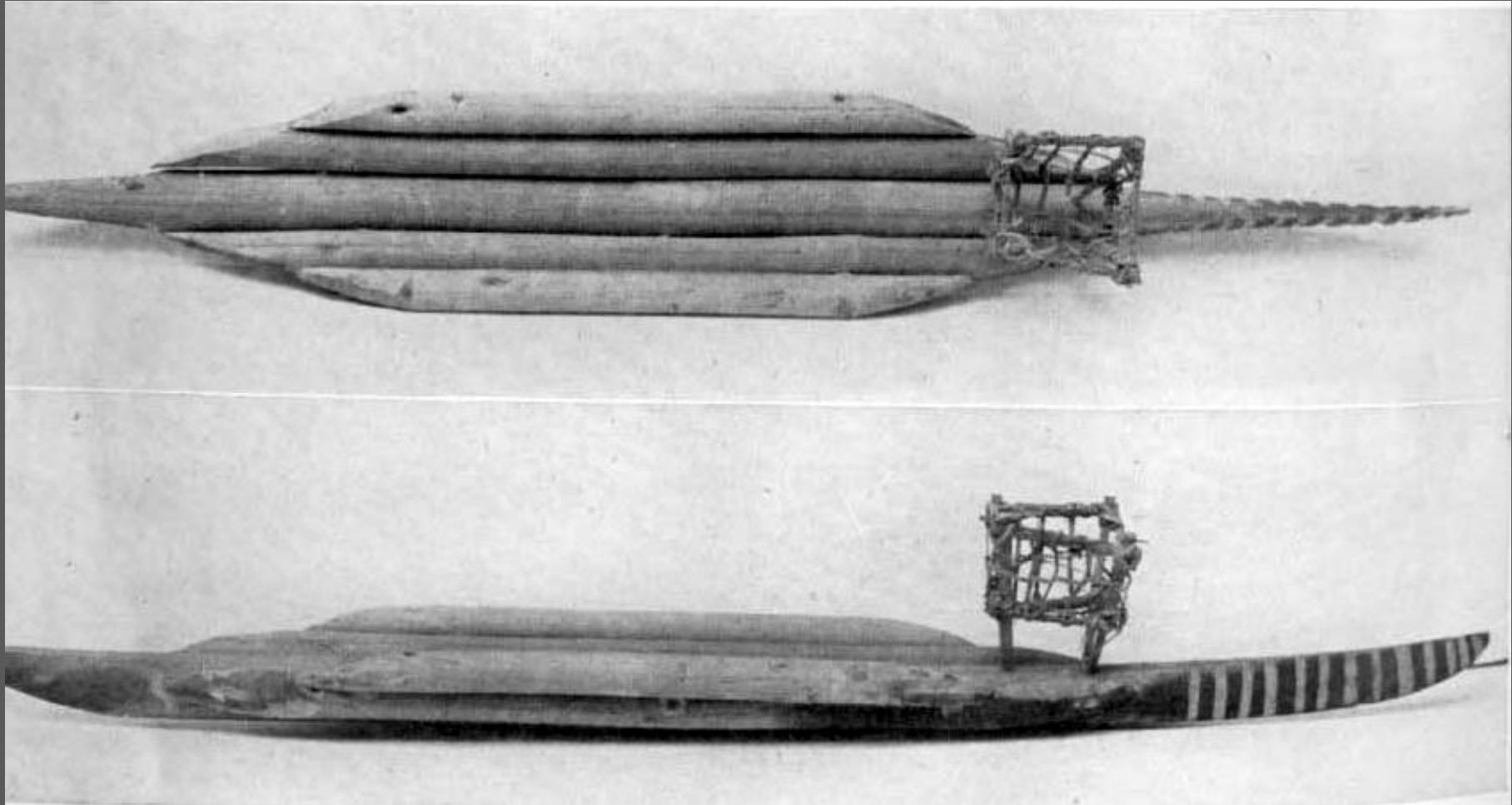


D



E

Log catamaran from the Solomon Islands boat:



Ambatch canoe from Kenya:



Bengal boat:



B. Sean McGrail's taxonomy (bouyancy):

1. Floats
2. Rafts
3. Boats

Bouyancy applied:

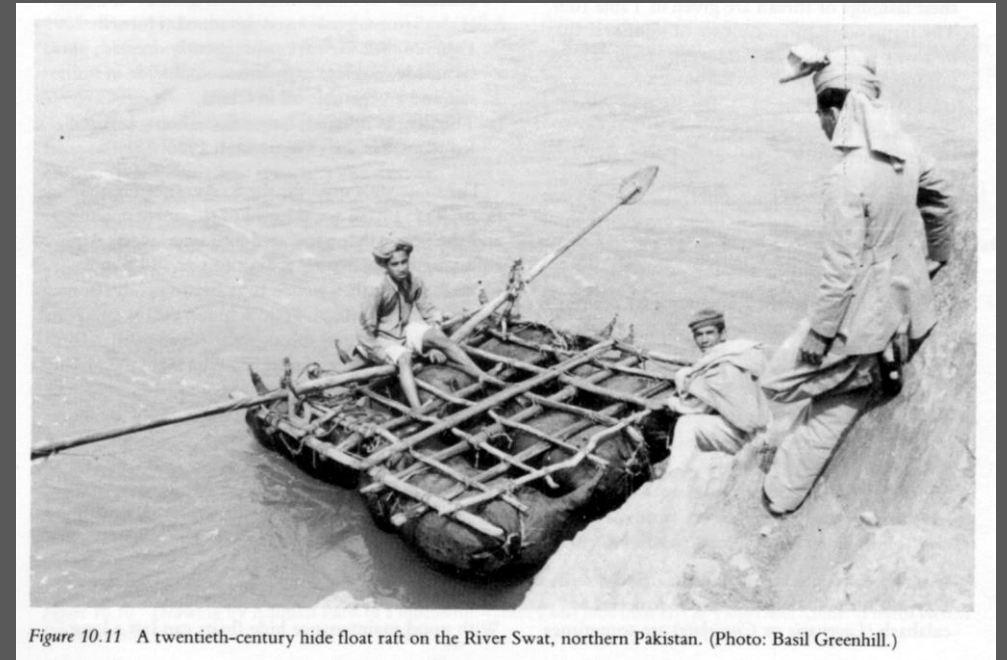
1. Directly (on men): Floats.



Bouyancy applied:

2. Indirectly:

2.1. From individual elements: Rafts;



2.1. From individual elements: Rafts.

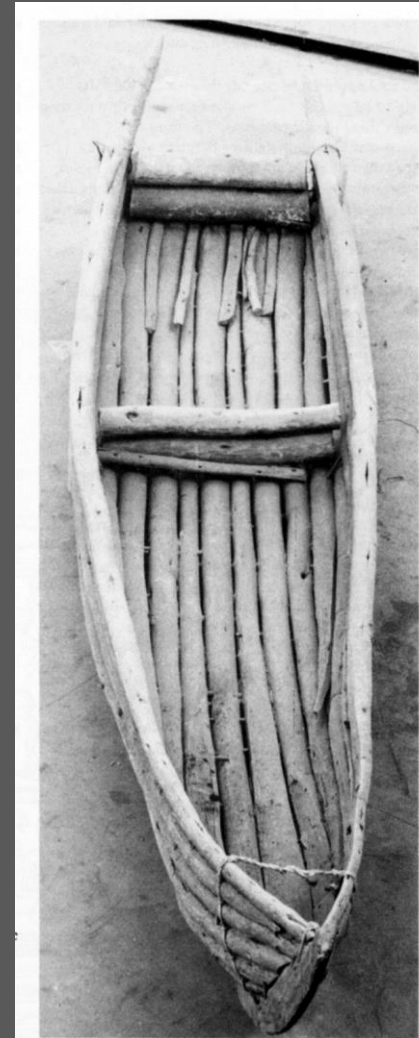


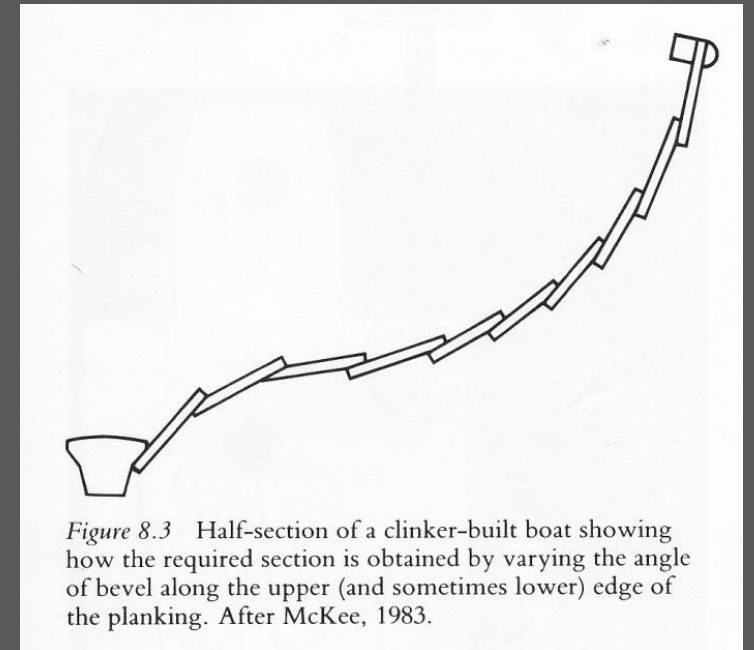
Figure 5.2 A boat-shaped log raft from Lobito Bay, Angola. (Photo: NMM Greenwich.)

Bouyancy applied:

2. Indirectly:

2.2. From whole vessel (hollow): Boats.

2.2.1. Watertight shell;

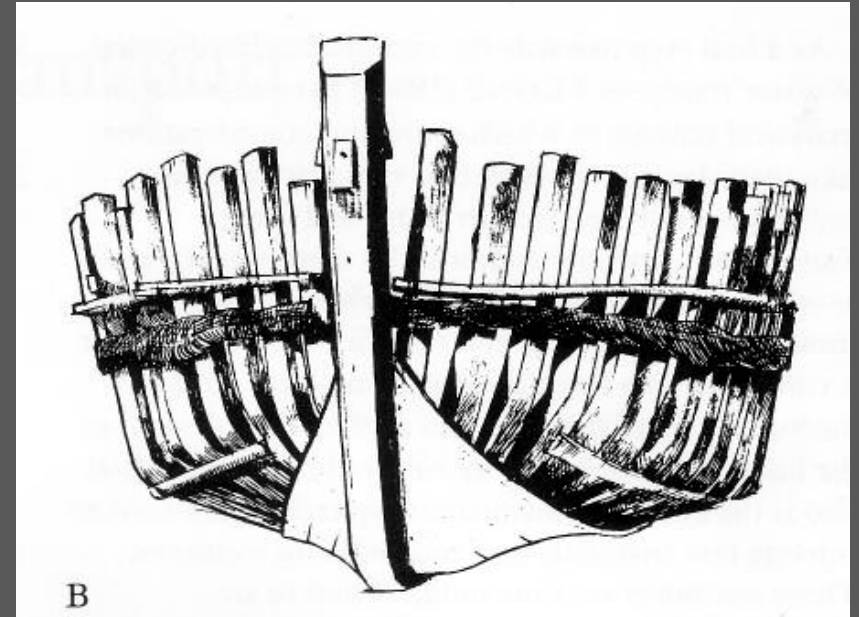


Bouyancy applied:

2. Indirectly:

2.2. From whole vessel (hollow): Boats.

2.2.2. Water-proofed frame.



Planking: Edge-joining

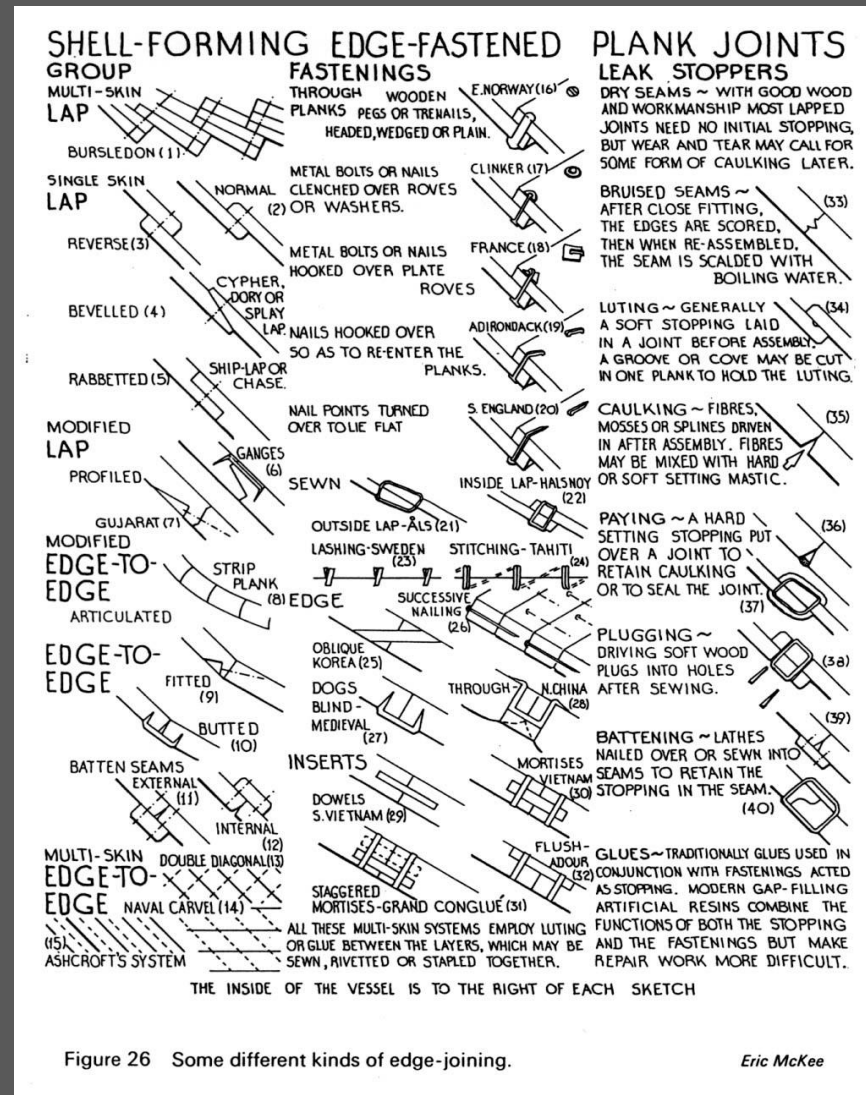


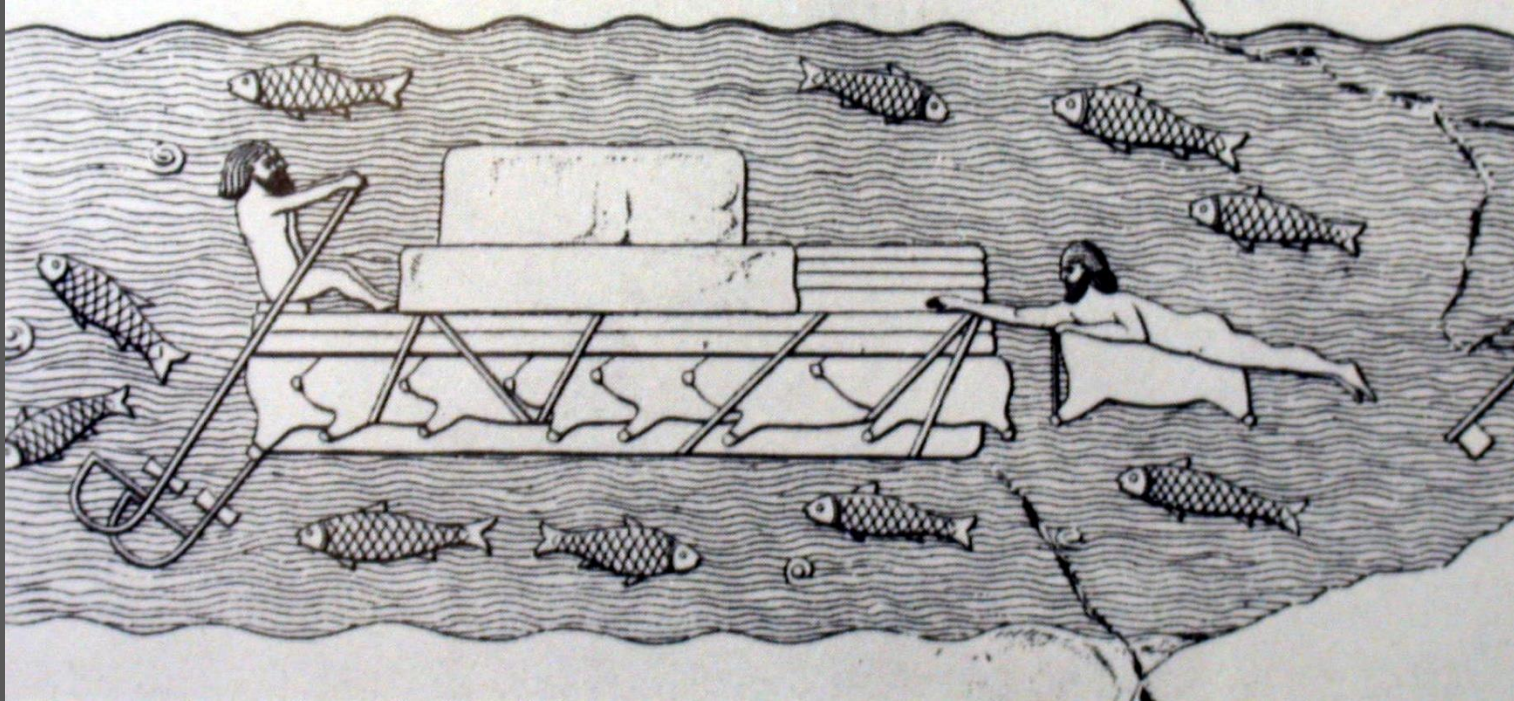
Figure 26 Some different kinds of edge-joining.

Eric McKee

C. Eric Rieth's taxonomy (technology):

1. Floats,
2. Rafts,
3. Boats:
 - 3.1. Dugouts,
 - 3.2. Extended dugouts,
 - 3.3. Assembled craft.

1. Floats,



Ox-Hide
Ravi River
Cashmir



India: Tandem floats

Inverted pots



Tin cans

2. Rafts,

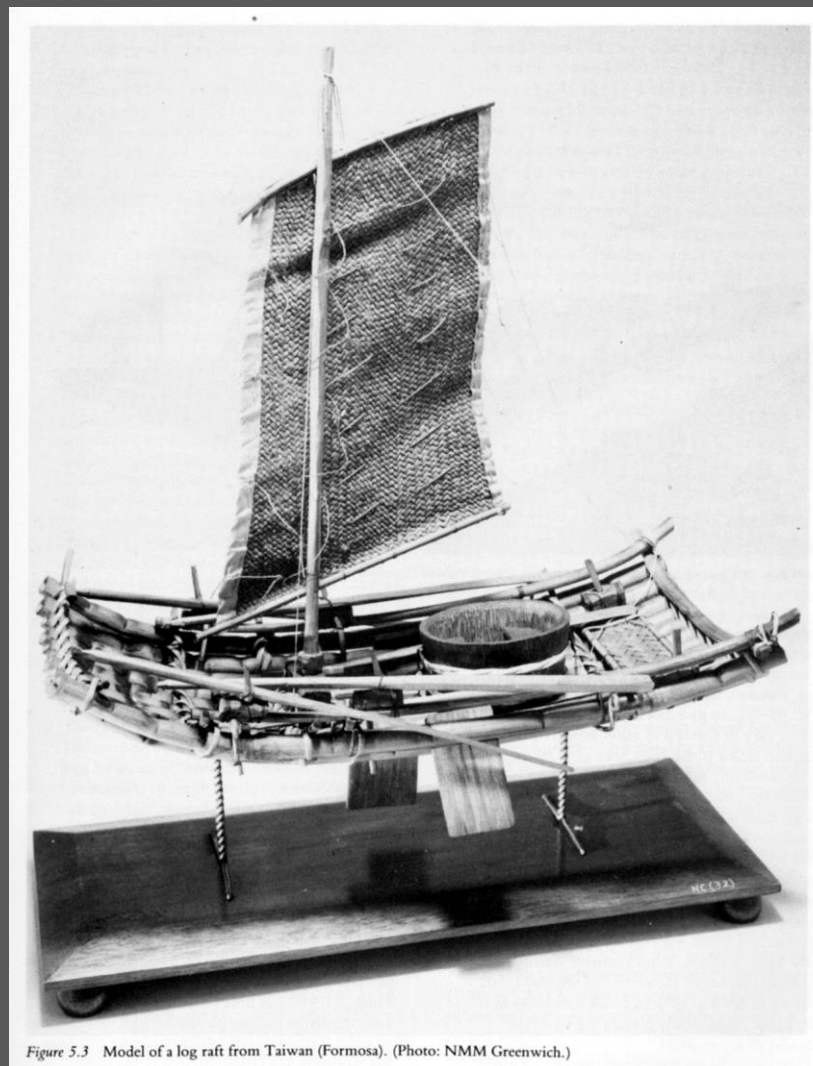
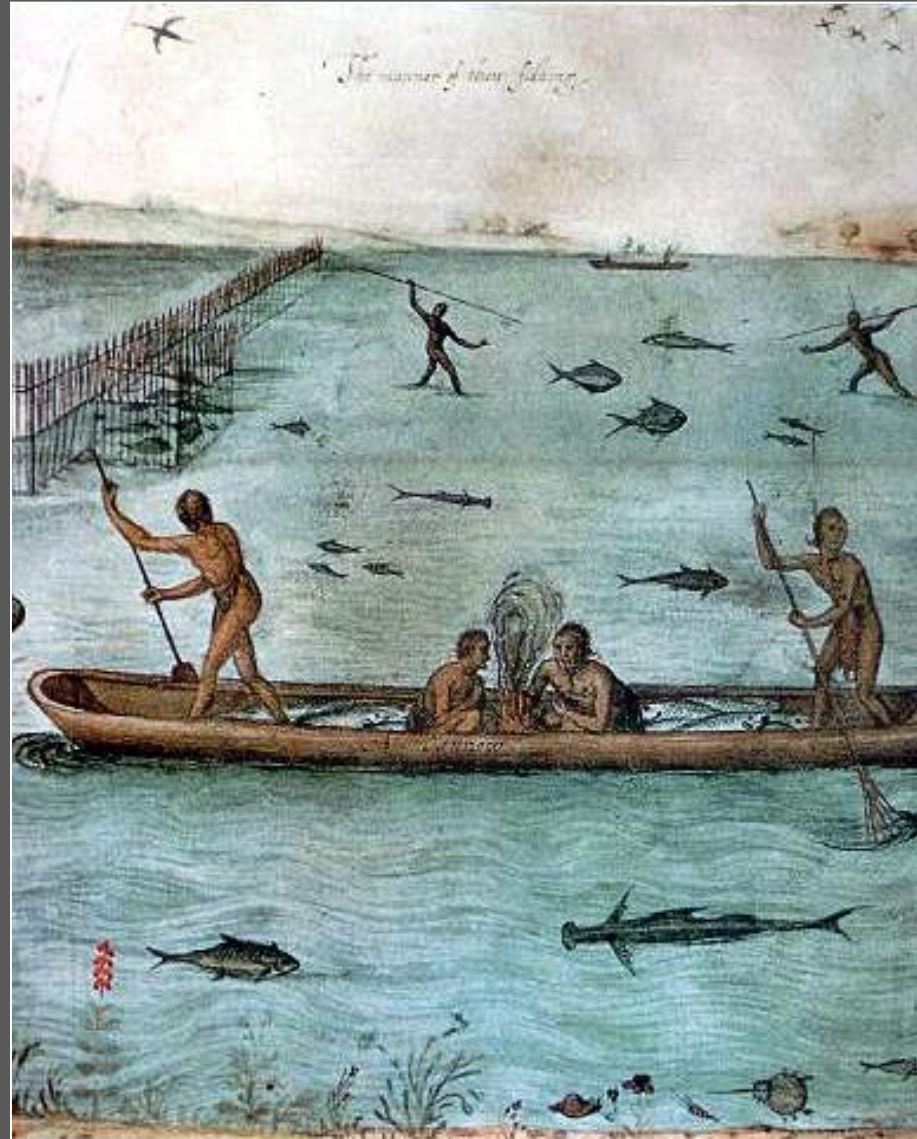


Figure 5.3 Model of a log raft from Taiwan (Formosa). (Photo: NMM Greenwich.)

3. Boats:

3.1. Dugouts,



3. Boats:

3.2. Extended dugouts,



1



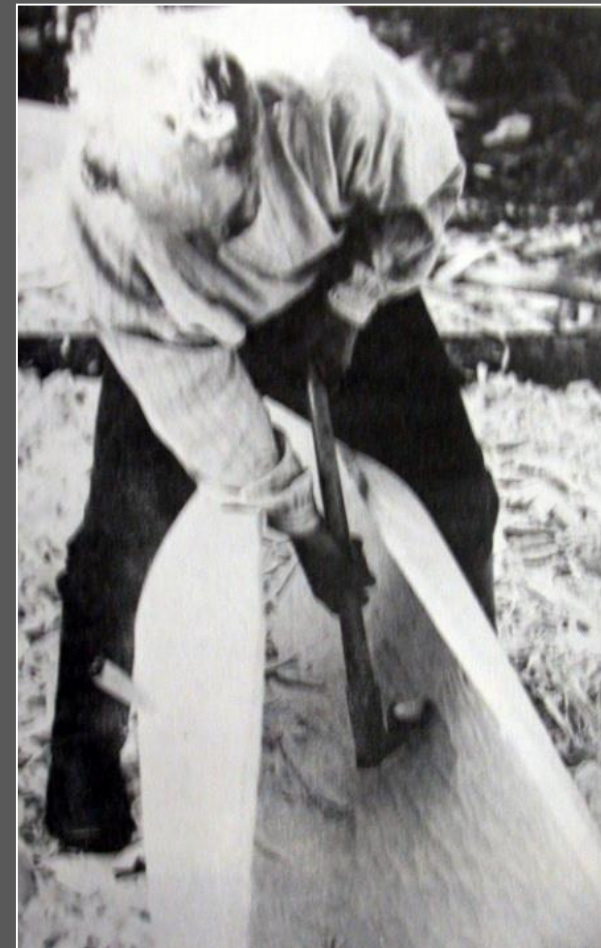
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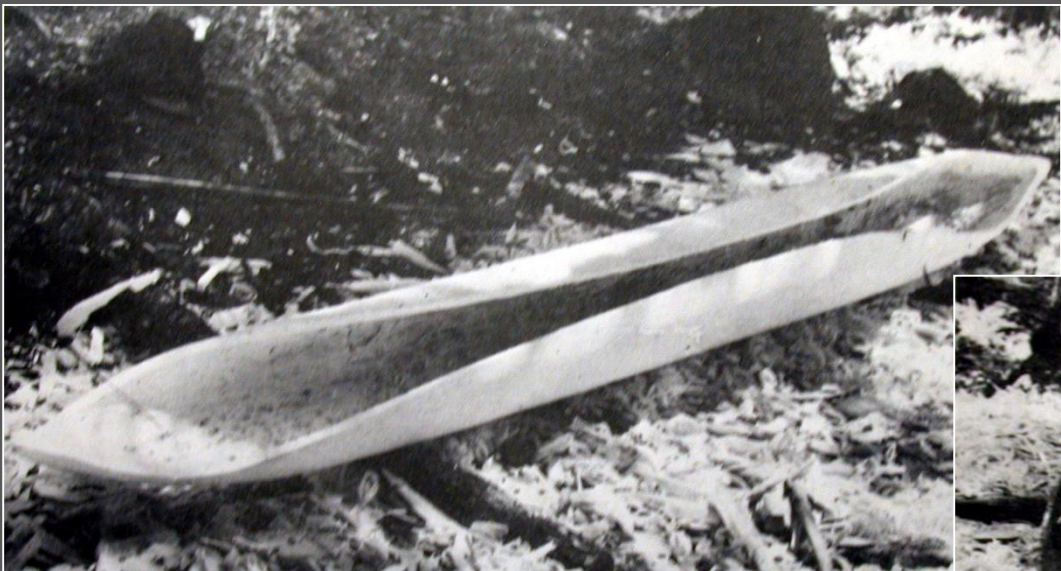
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4



5



6

8



7

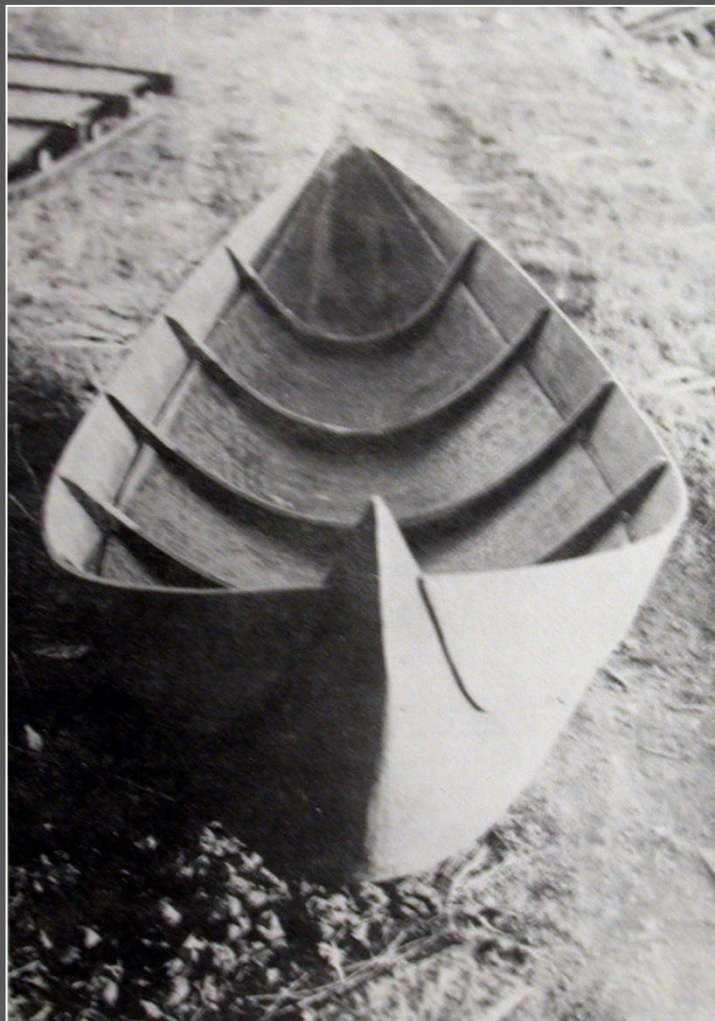


9





10



11

3. Boats:

3.3. Assembled craft.



3. Boats:

3.3. Assembled craft.



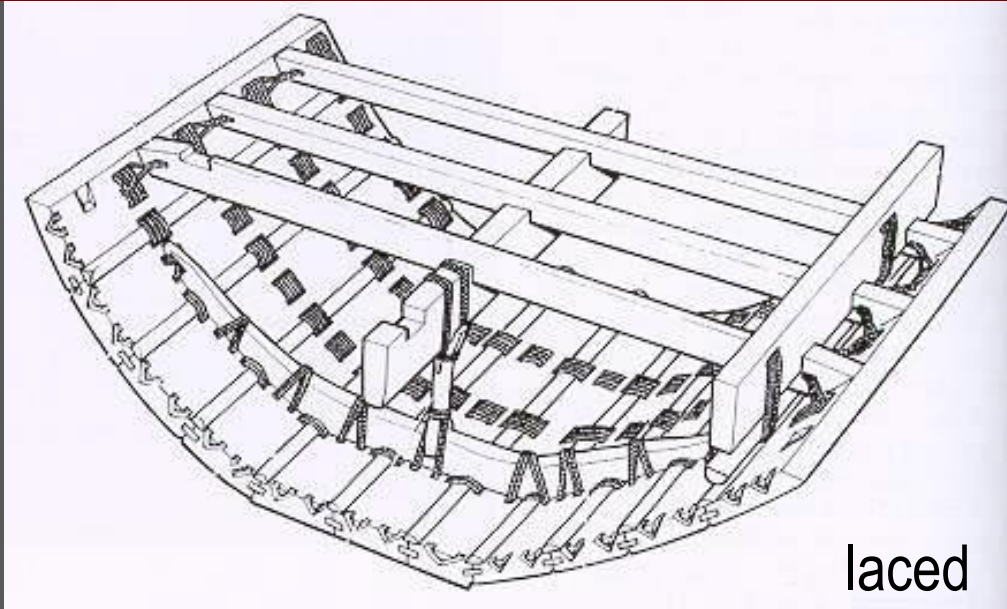
D. Hasslöf / Basch:

1. Shell-first (based) vessels
2. Frame-first (based) vessels
3. Things in between...

Shell-based vessels



Shell-based vessels

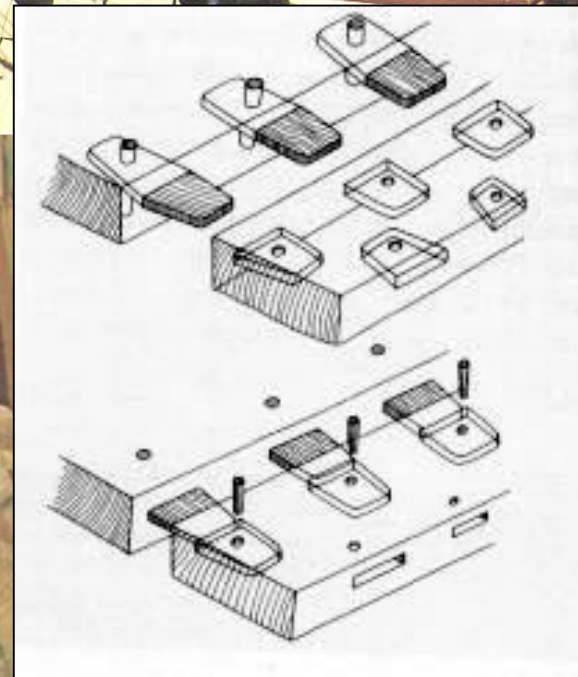
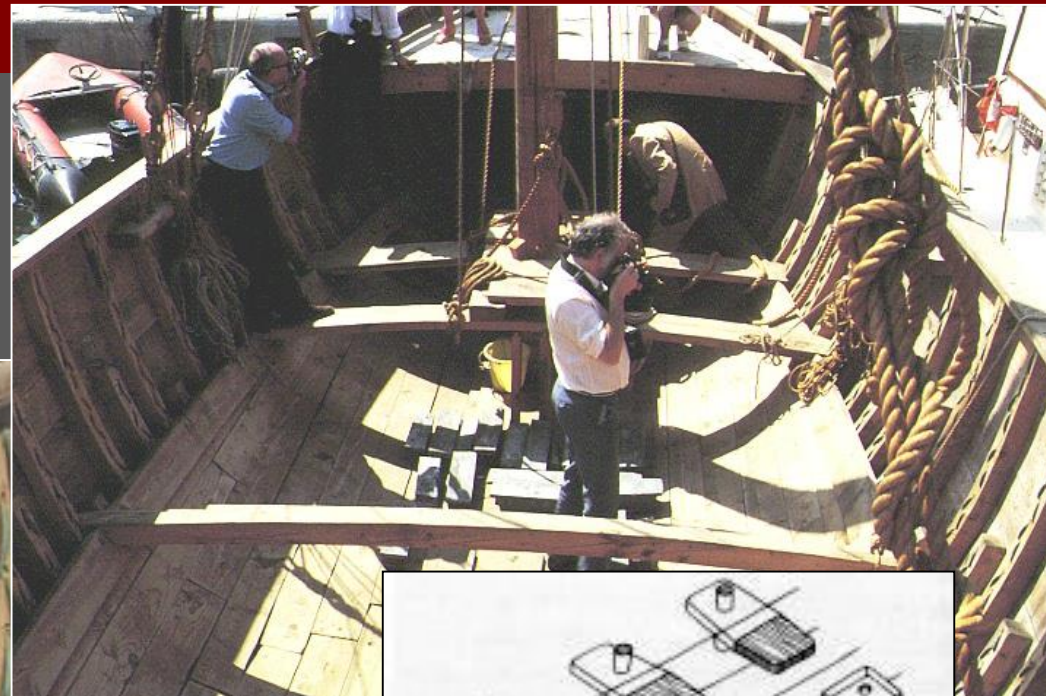


laced



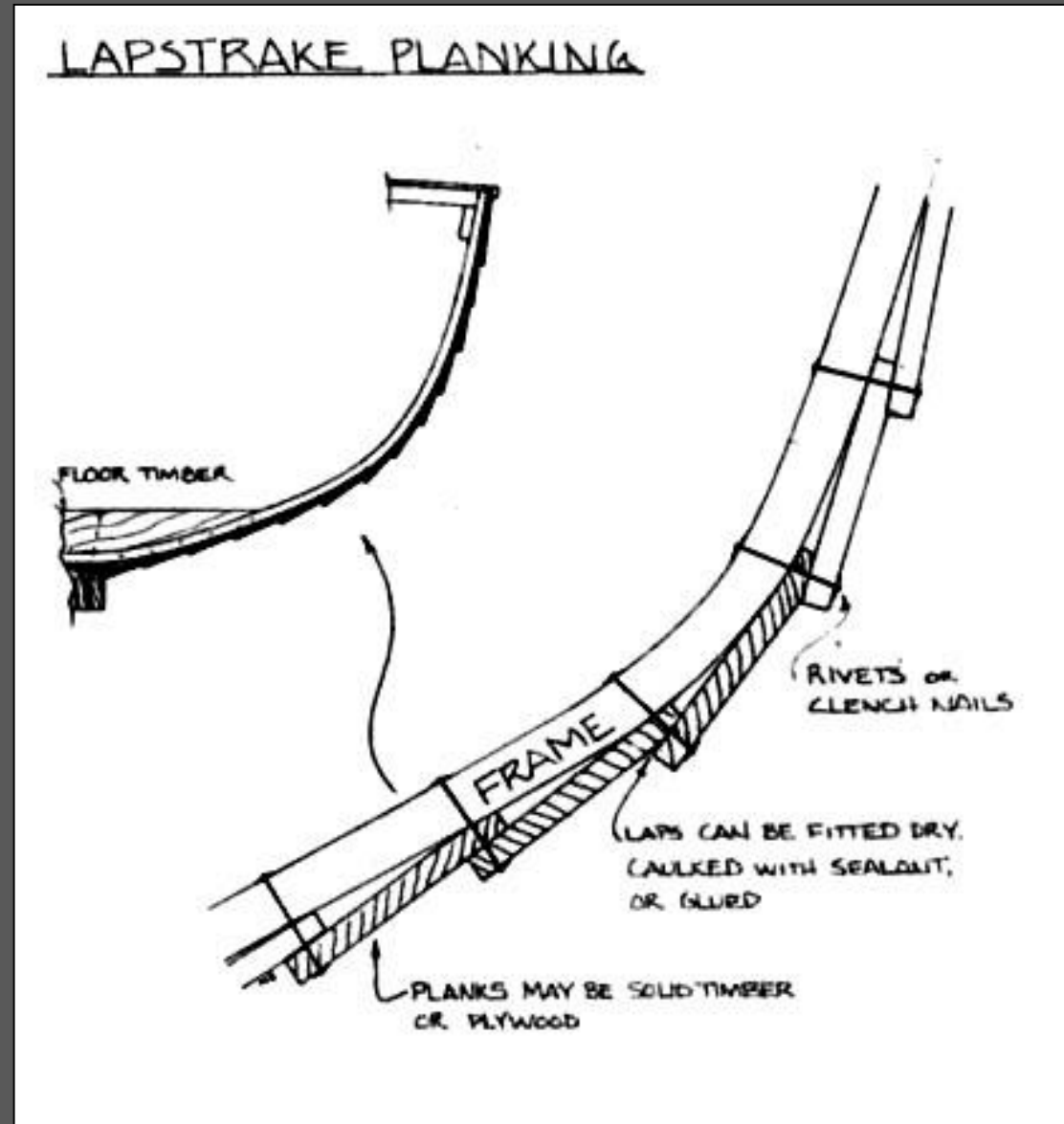
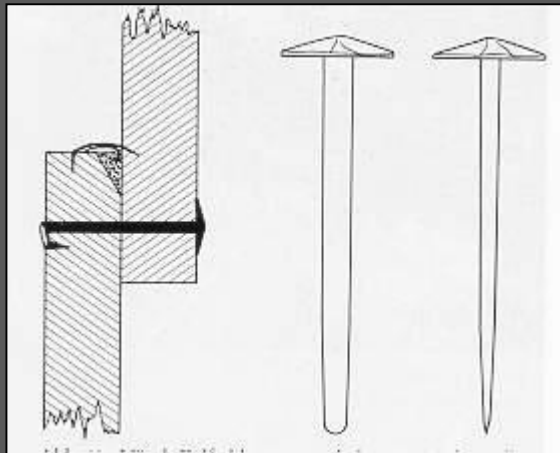
sewn

1. Shell-based vessels



Pegged mortise and tenon joints

1. Shell-based vessels



1. Shell-based vessels



Lapstrake
 (clinker)

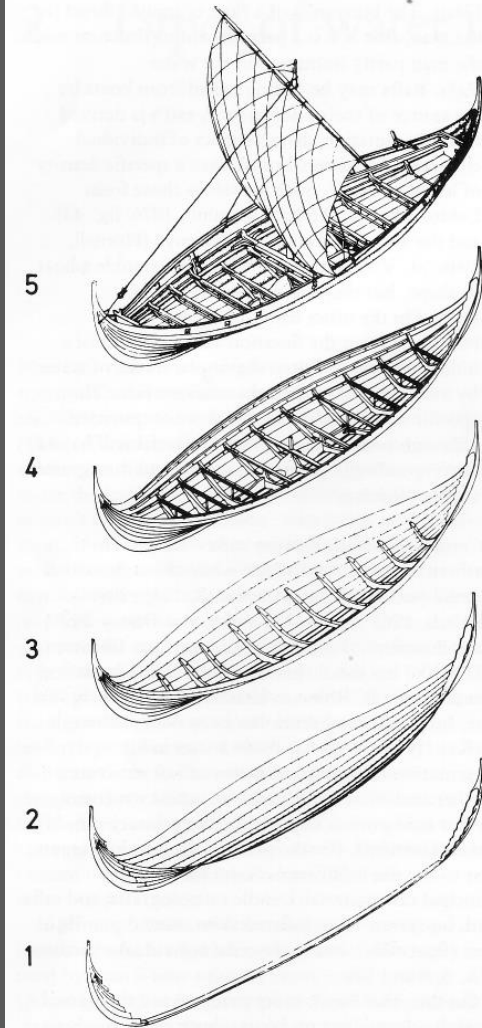
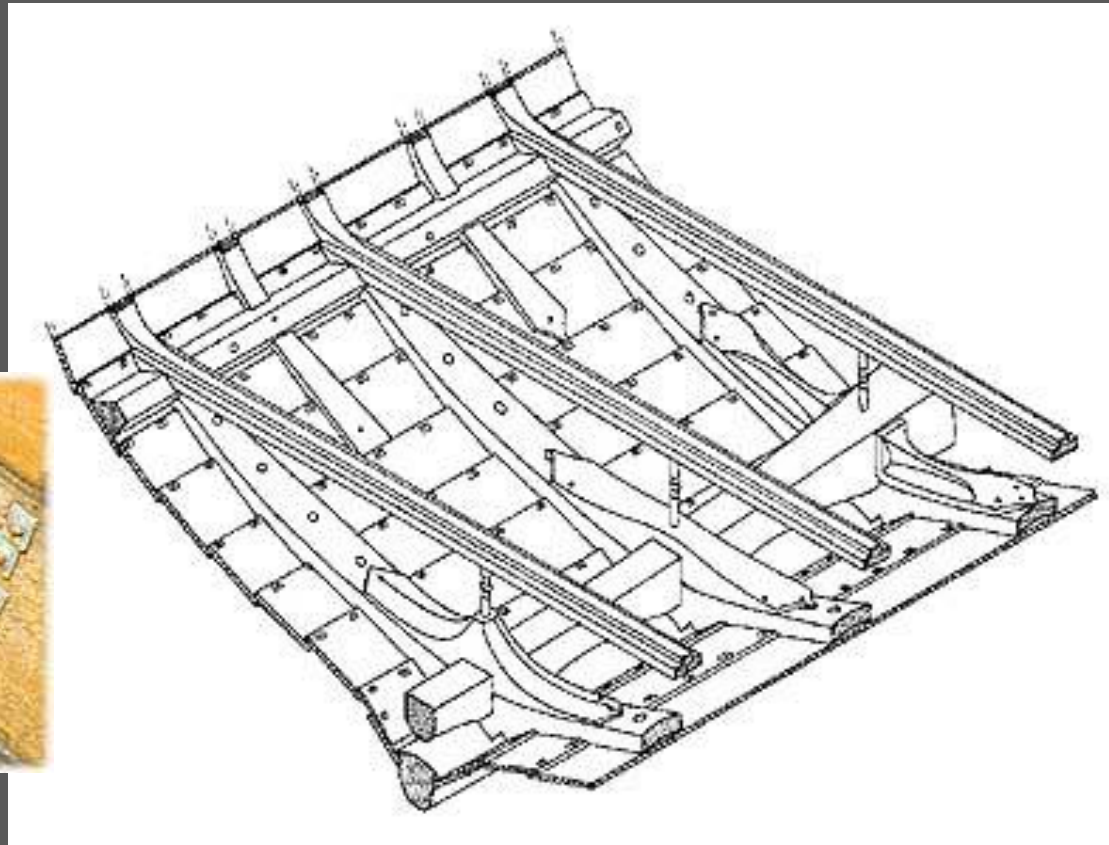


Figure 2.1 A Five stages in the shell sequence of building a medieval boat. After Crumlin-Pedersen, 1983b: fig 5.
 B The skeleton sequence: planking-up on an already erected framework. (Drawing: NMM Greenwich.)

1.

Shell-based
vessels

Flush laid (carvel) planking

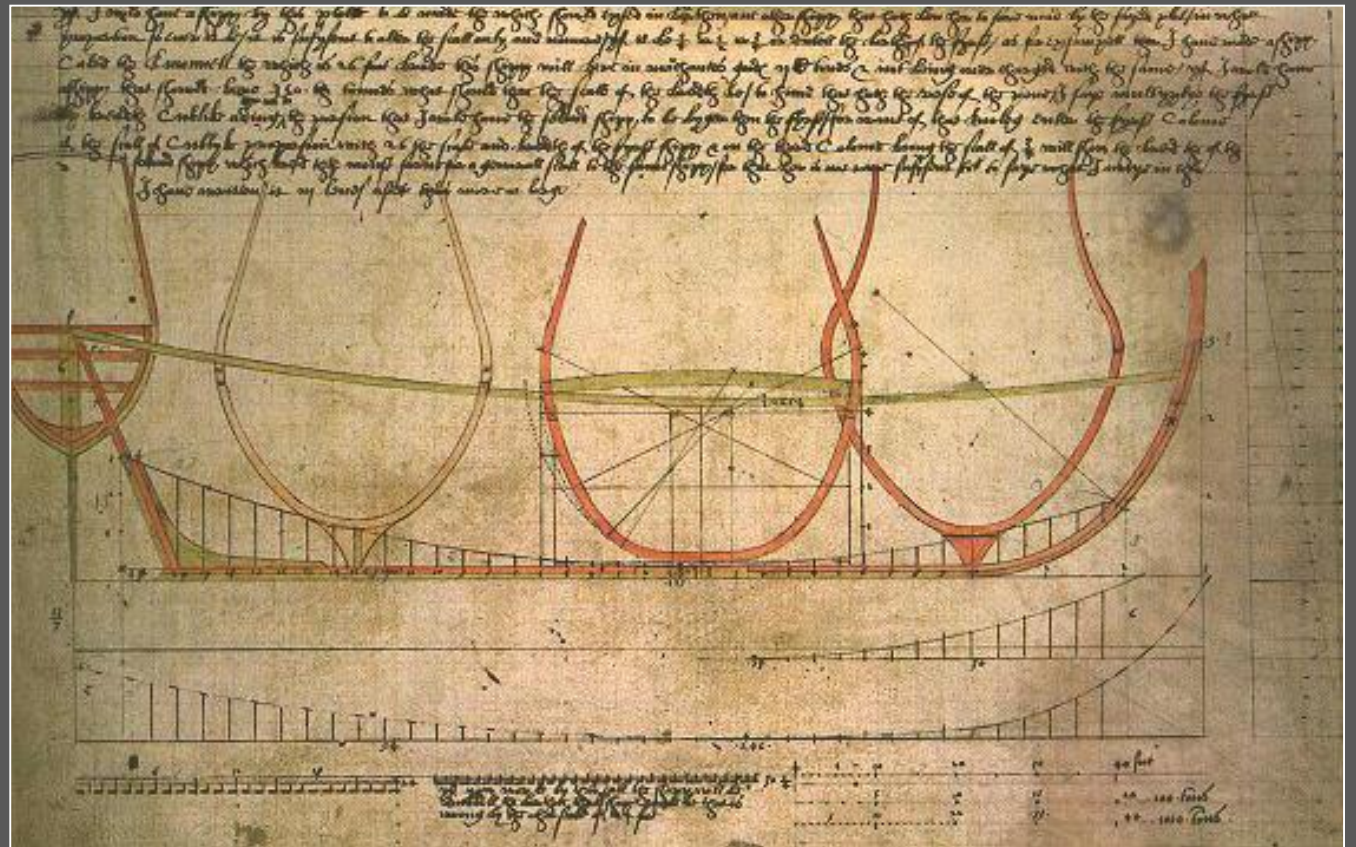


2. Frame-based vessels

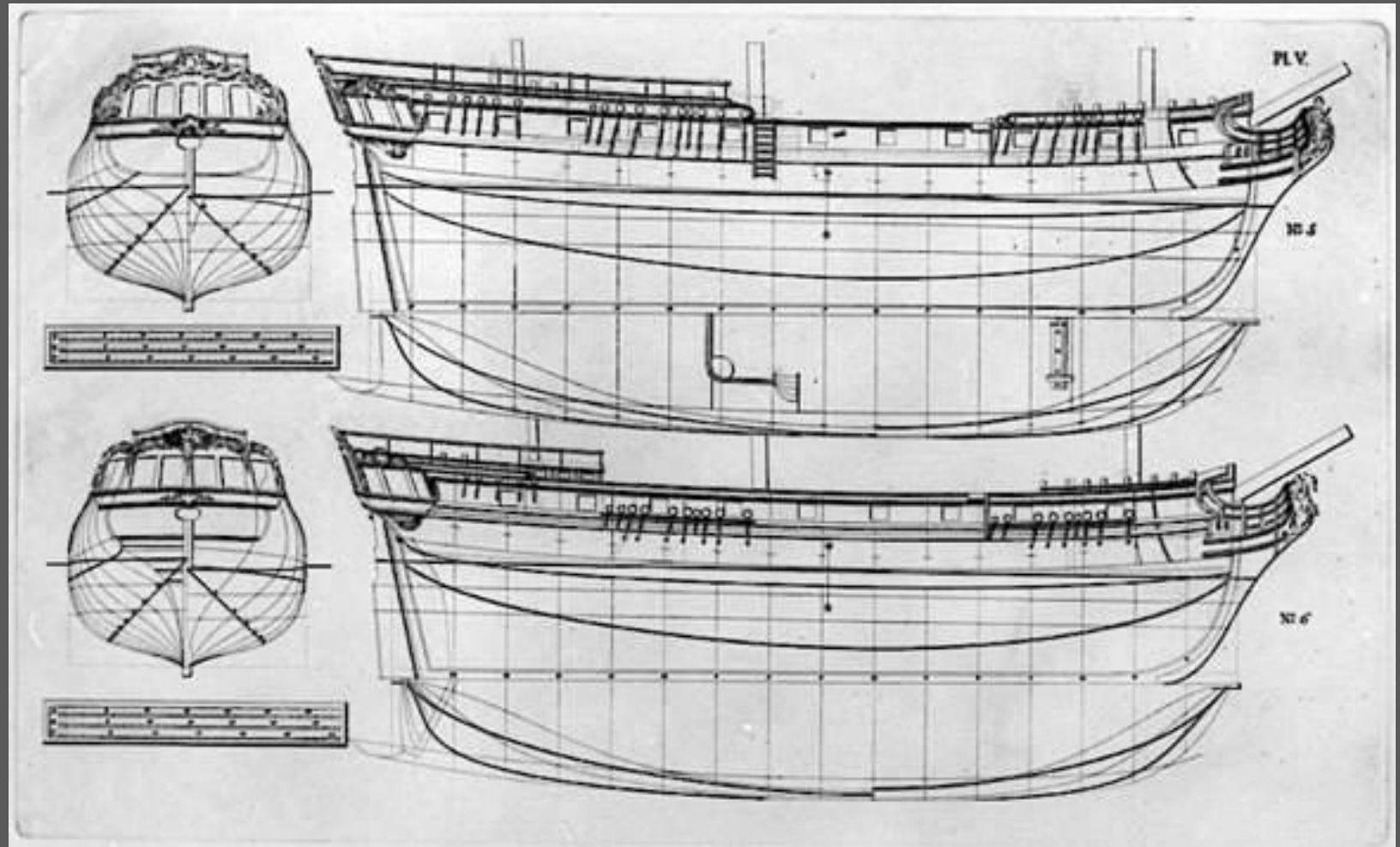


2. Frame-based vessels

Frames' shape must be known in advance...



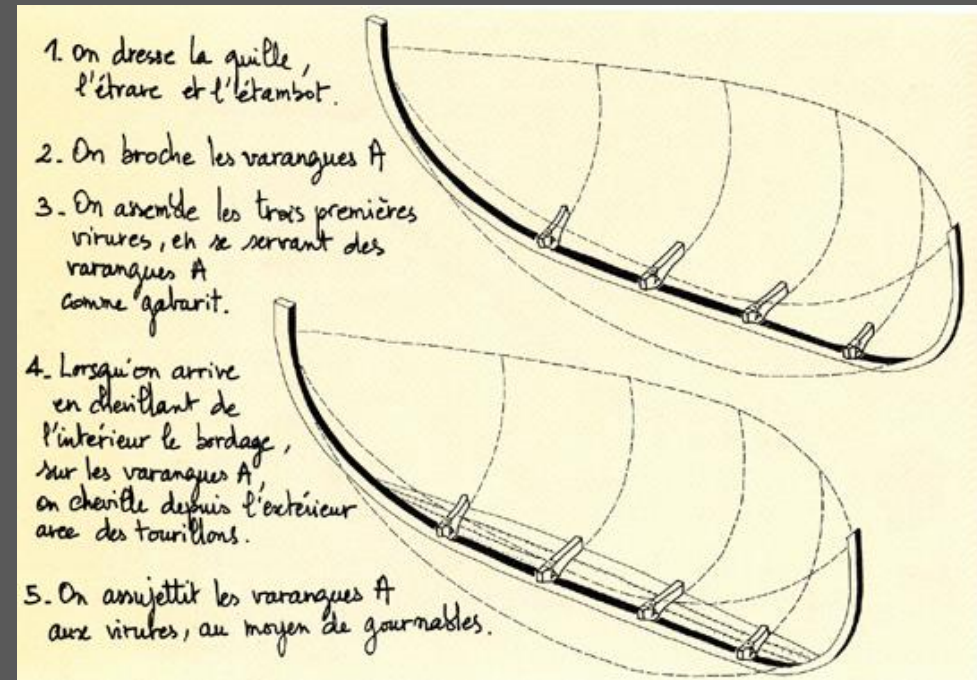
2. Frame-based vessels – lines drawings

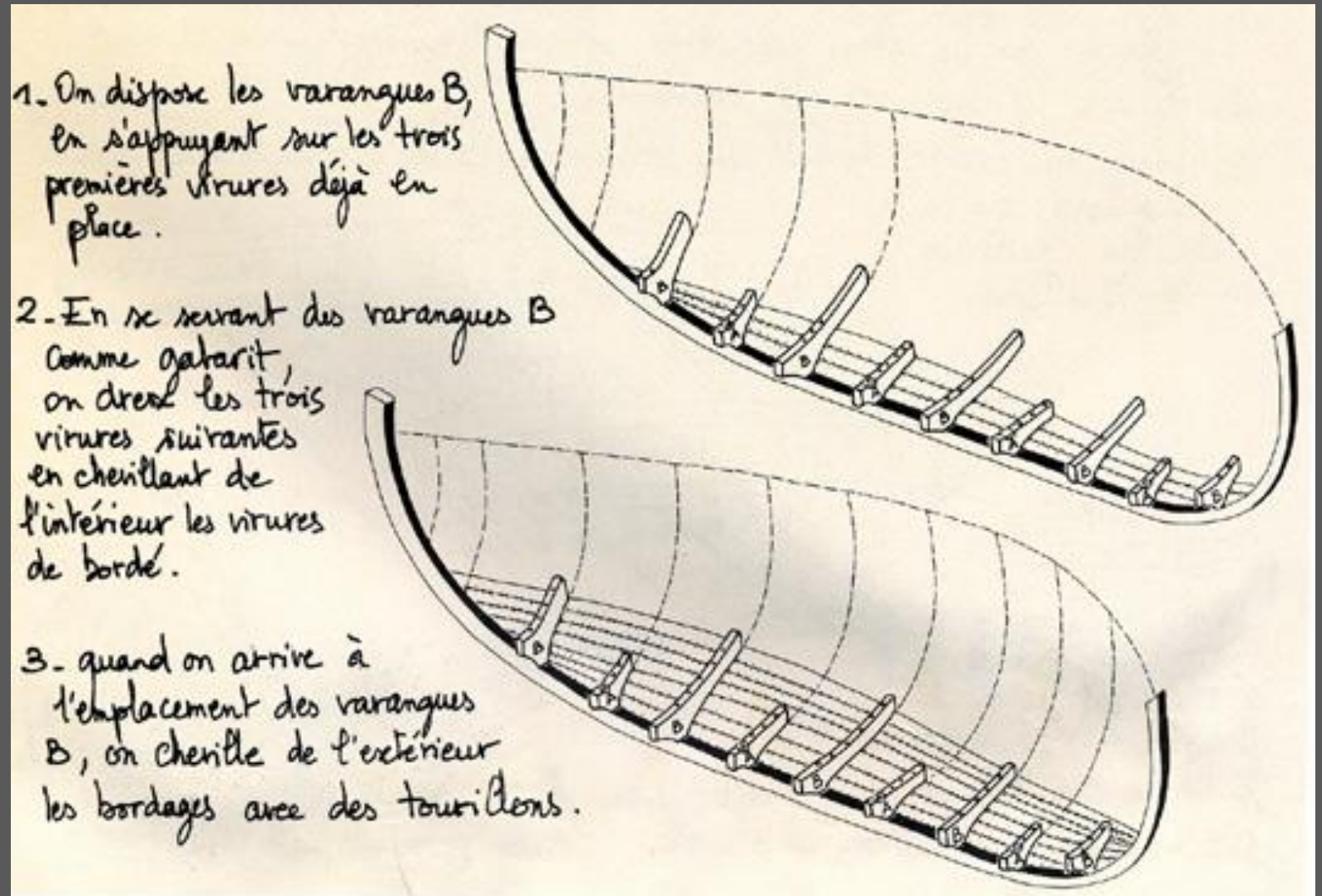


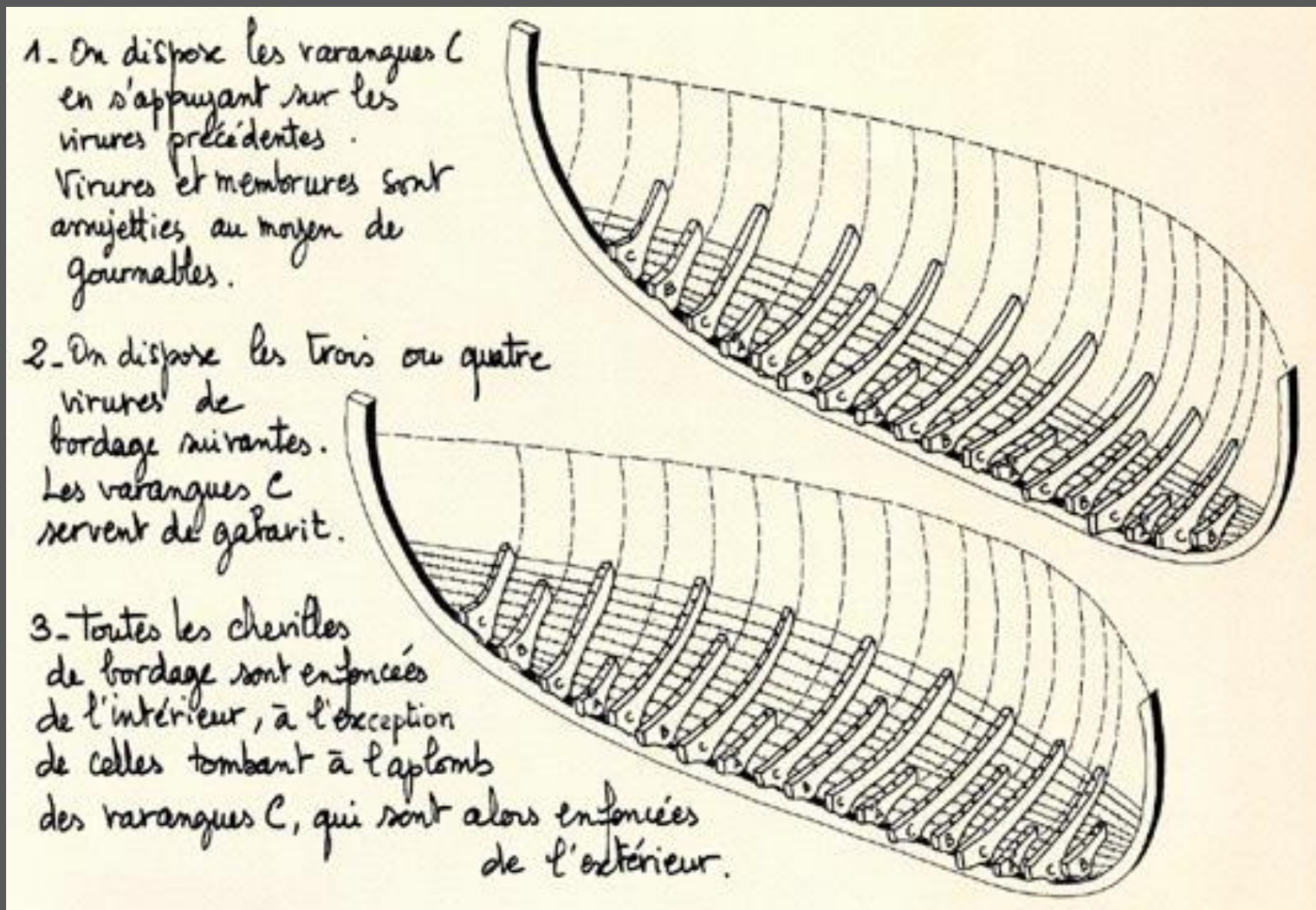
Mixed construction:

Ship of the Bourse de Marseille

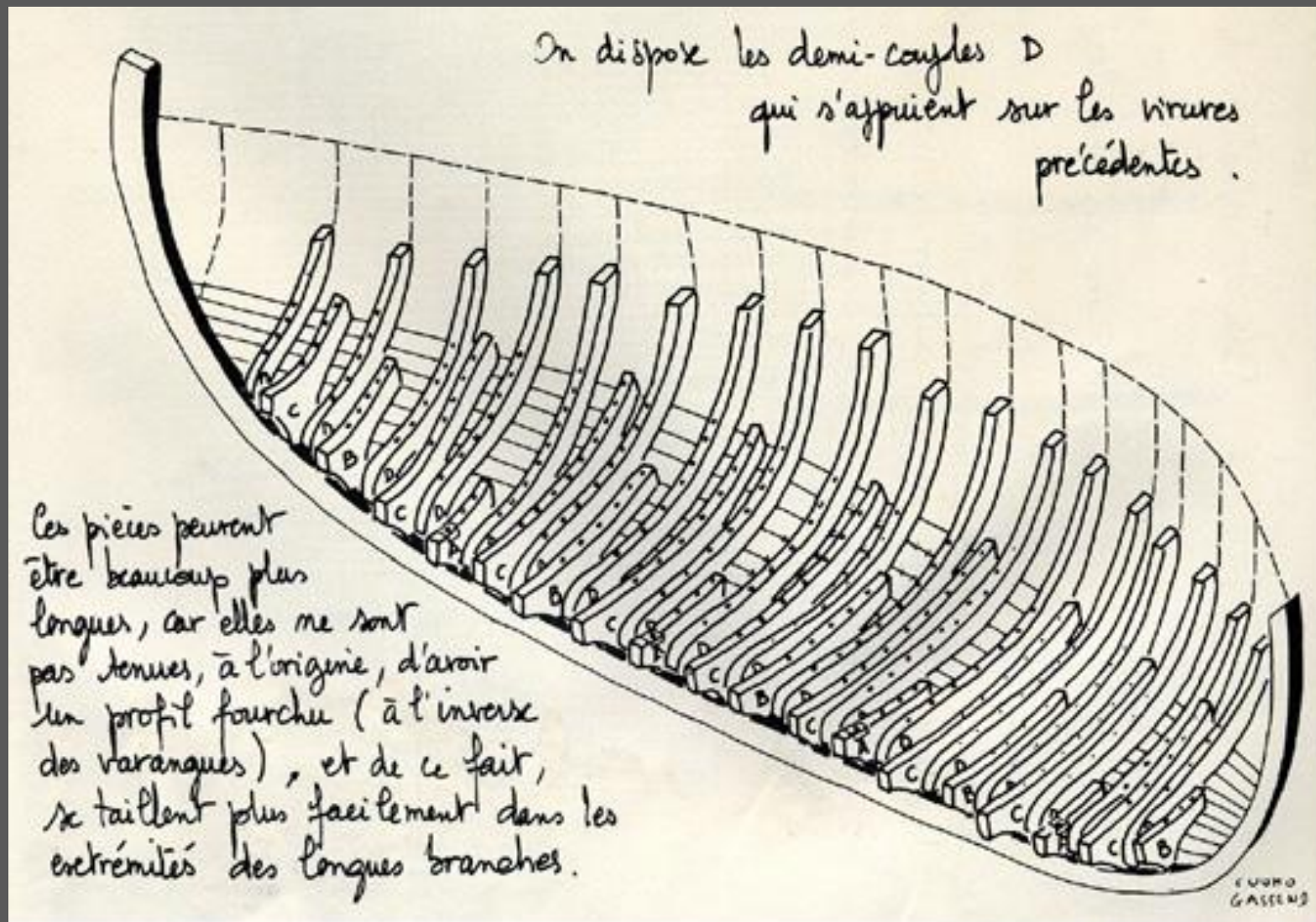
J. M. Gassend proposed the following construction sequence:







Taxonomies – Hasslof / Basch



E. Hasslöf's* taxonomy (structure):

1. Shell-first (based) vessels
2. Frame-first (based) vessels
3. Bottom-first (based) vessels

* and Lucien Basch, and Fred Hocker.

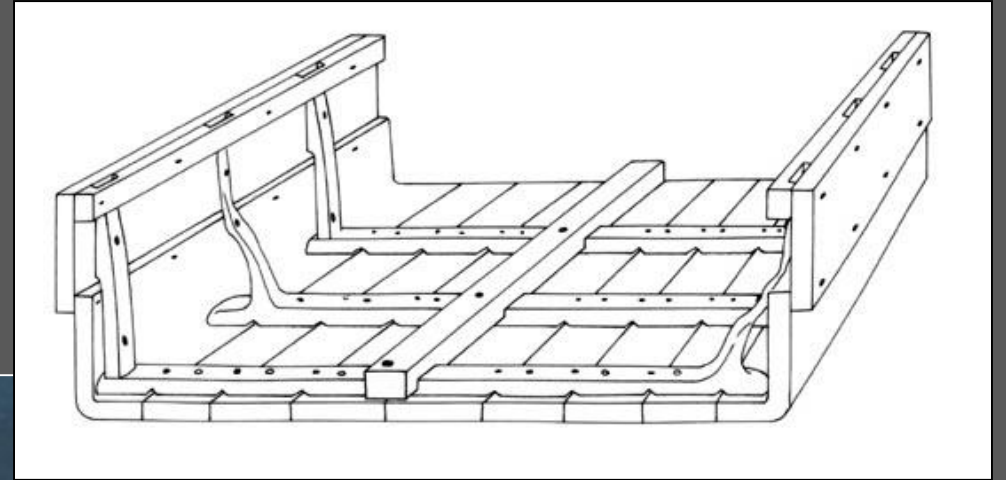
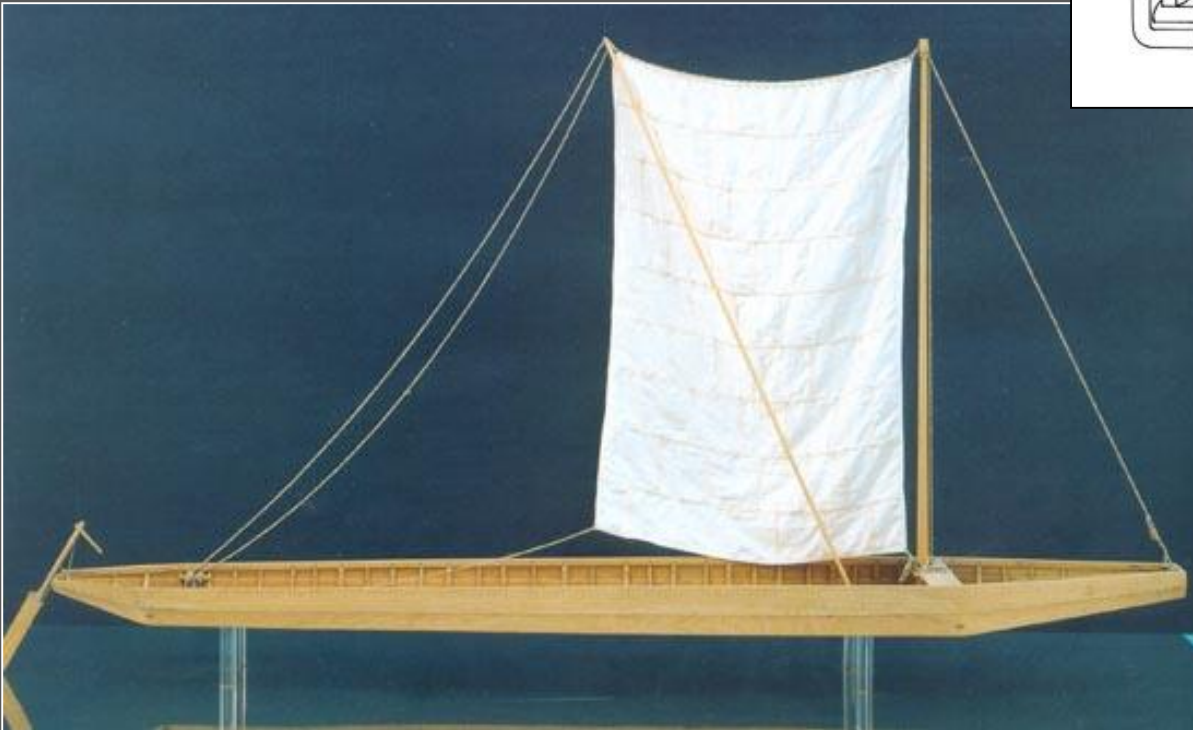
3.

Bottom based
vessels



3. Bottom based vessels:

Bottoms with raised sides.



F. Basil Greenhill's taxonomy (roots):

1. Rafts
2. Skin boats
3. Bark boats
4. Dugouts

1. Rafts

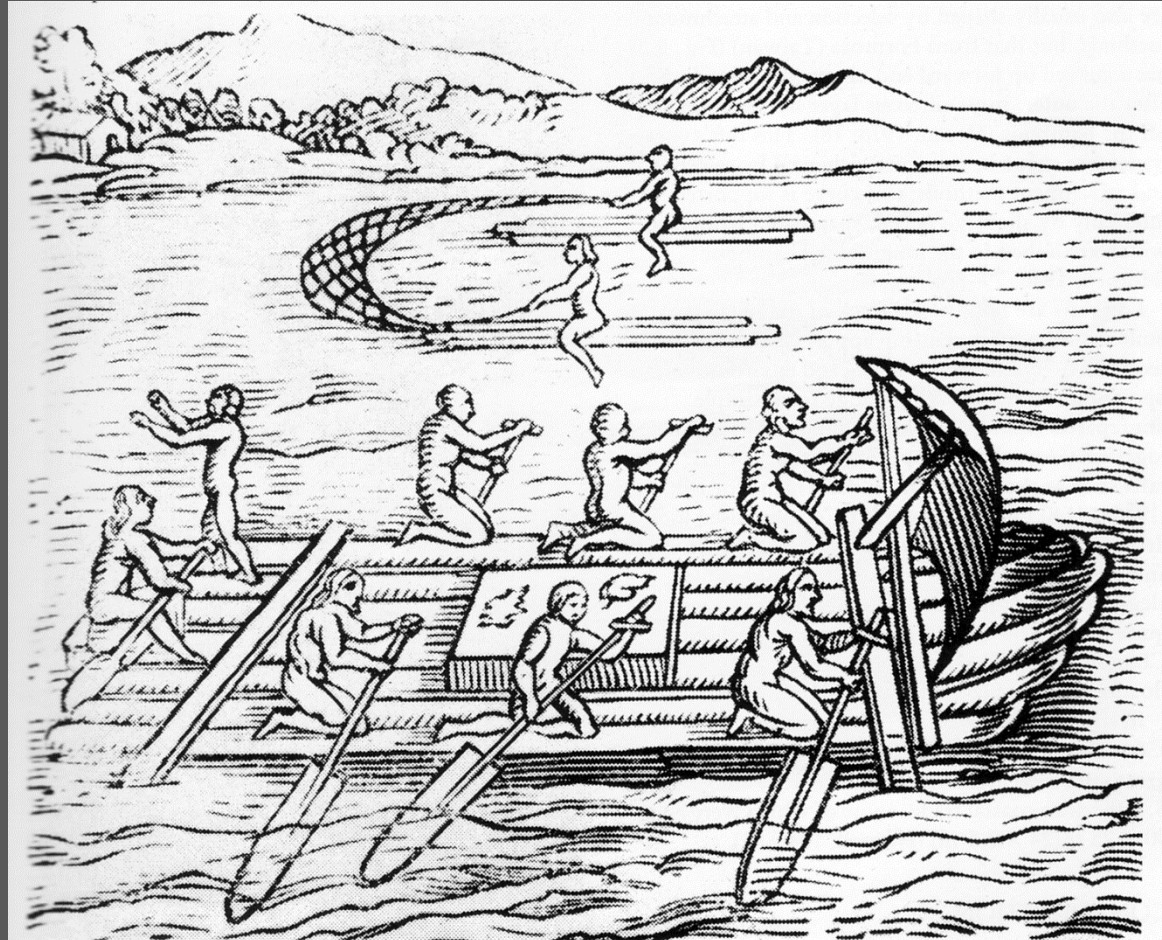


Figure 5.1 Sixteenth-century log rafts of Ecuador as drawn by G. Benzoni. After Edwards, 1965: pl. 16b (courtesy The University of California Press).

1. Rafts



2. Skin boats



2. Skin boats



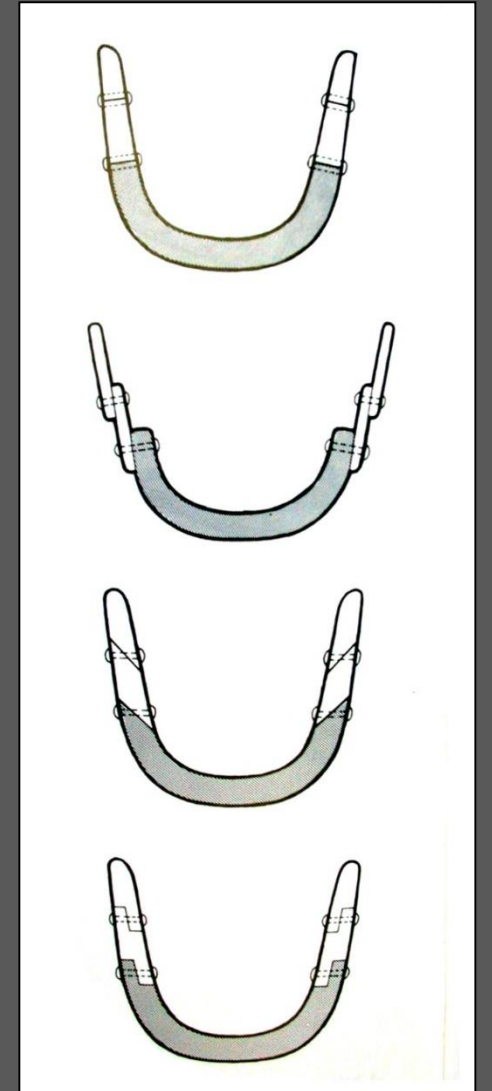
3. Bark boats



4. Dugouts



4. Dugouts



G. Patrice Pomey:

1. Conception
2. Construction
 - 2.1. Structural Principle
 - 2.2. Construction Sequence

G. Patrice Pomey:

1. Conception

How does the shipwright conceive the ship
in his mind?

How does he define the structure?

Skeleton first? Shell first? Bottom first?

G. Patrice Pomey:

2. Structural Principle

Is most of the hull strength conferred by the planking, or by the frames?

Do the frames shape the runs of the planks (are the planks bent against/over the frames)?

Frame based? Shell based?

G. Patrice Pomey:

3. Construction Sequence

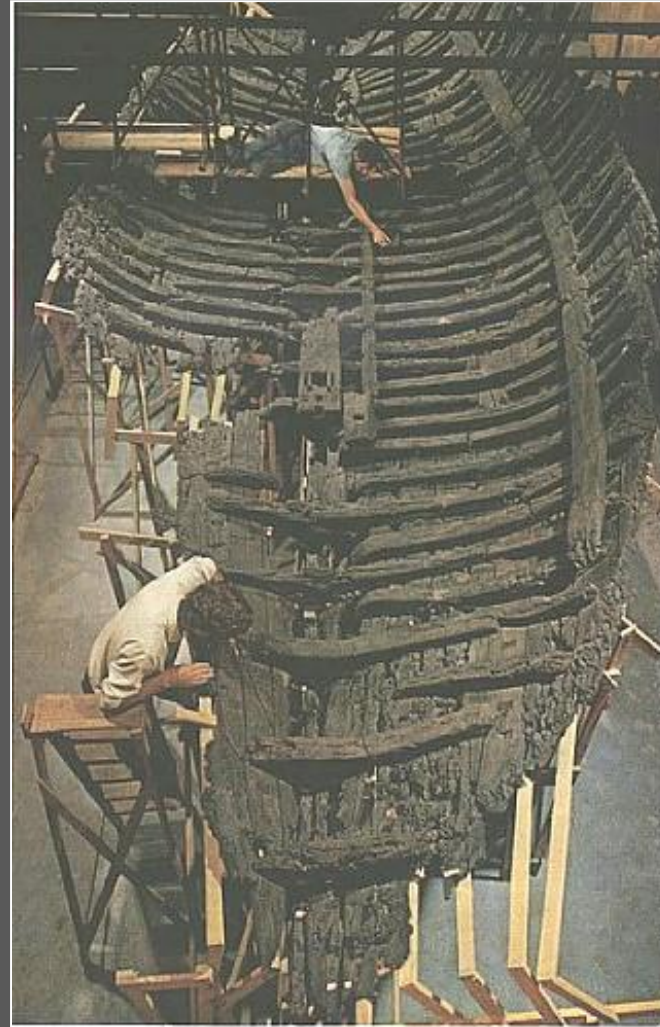
- a) Keel, floor timbers, first strakes, first futtocks, second batch of strakes, etc.
- b) Keel, first group of strakes, floor timbers, second group of strakes, etc.
- c) Bottom, floor timbers, first futtocks, etc.
- d) Sides, bottom...

G. Patrice Pomey:

Kyrenia (4th c. BC)

Structural conception: shell based.

Building technique: shell first.



G. Patrice Pomey:

Marsala (3rd c. BC)

Structural conception: shell based.

Building technique: first 11 strakes, floor timbers, second group of strakes, futtocks; in other words: shell first.

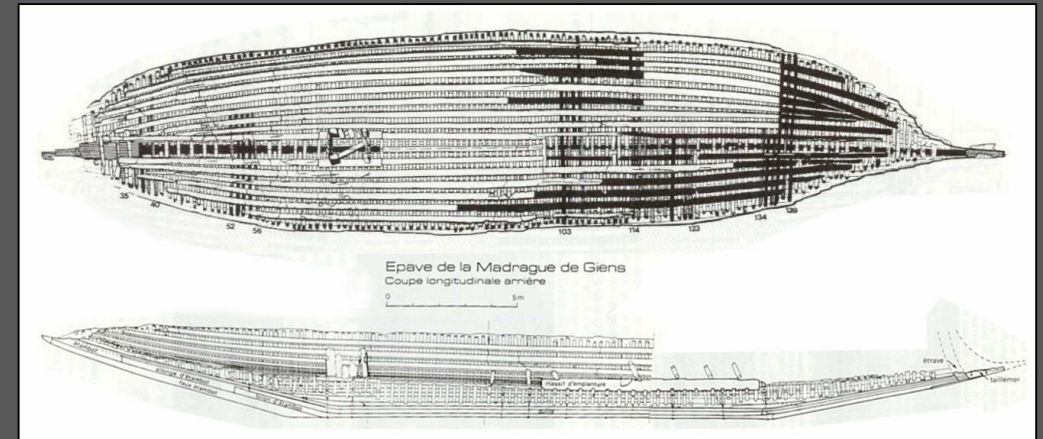


G. Patrice Pomey:

Madrague de Giens (1st c. BC)

Structural conception: shell based.

Building technique: although some of the floor timbers were fastened to the keel, it is considered purely shell first.



G. Patrice Pomey:

Anse des Laurons II (2nd c. AD)

Structural conception: shell based.

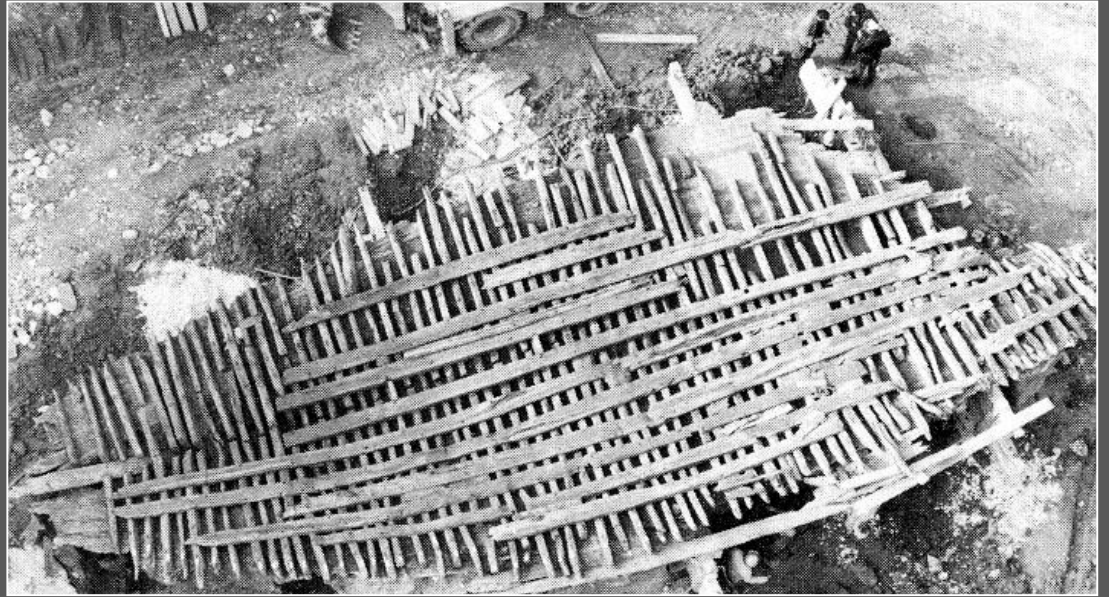
Building technique: although some opinions have been published suggesting a mixed construction it does not seem possible to consider other than a shell first construction.

G. Patrice Pomey:

Bourse de Marseille (2-3rd c. AD)

Structural conception: shell based.

Building technique: although the construction sequence proposed is based on a number of reversed pegs it does not seem likely that the (trapezoidal) garboard was affixed to the keel after the first floor timbers were in place, however, it seems possible that the upper strakes were built over the futtocks suggesting a mixed construction.



G. Patrice Pomey:

Port Vendres I (4th c. AD)

Structural conception: shell based.

Building technique: possibly mixed.

G. Patrice Pomey:

Yassi Ada II (4th c. AD)

Structural conception: shell based.

Building technique: mixed.



G. Patrice Pomey:

Yassi Ada I (7th c. AD)

Structural conception: bottom shell-based, upper works frame-based.

Building technique: mixed.



G. Patrice Pomey:

Saint-Gervais II (7th c. AD)

Structural conception: impossible to state given the fact that the ship was not fully excavated; perhaps mixed.

Building technique: mixed.



G. Patrice Pomey:

Serçe Limanı (11th c. AD)

Structural conception: Frame based.

Building technique: mixed.



H. Piero Dell’Amico’s taxonomy (conception):

1. Oral tradition
2. Partially geometric methods
3. Geometric methods

1.

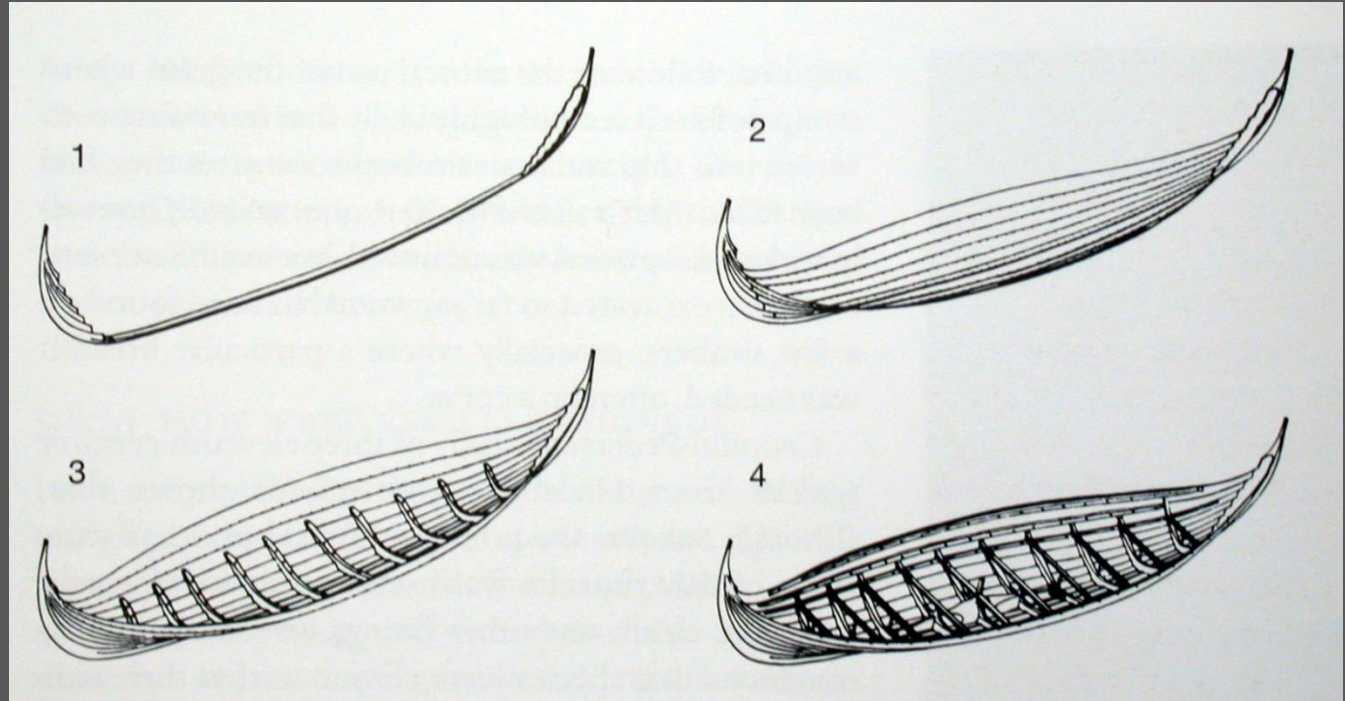
Oral tradition:

Cannot be built unless
you know how to.



1. Oral tradition:

Cannot be built unless you know how to.



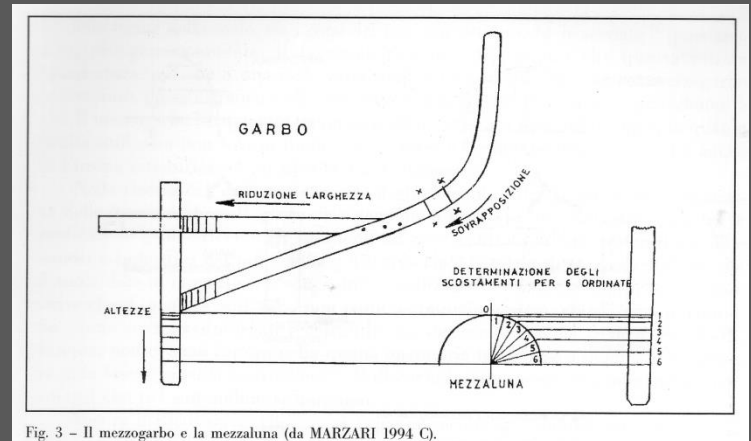
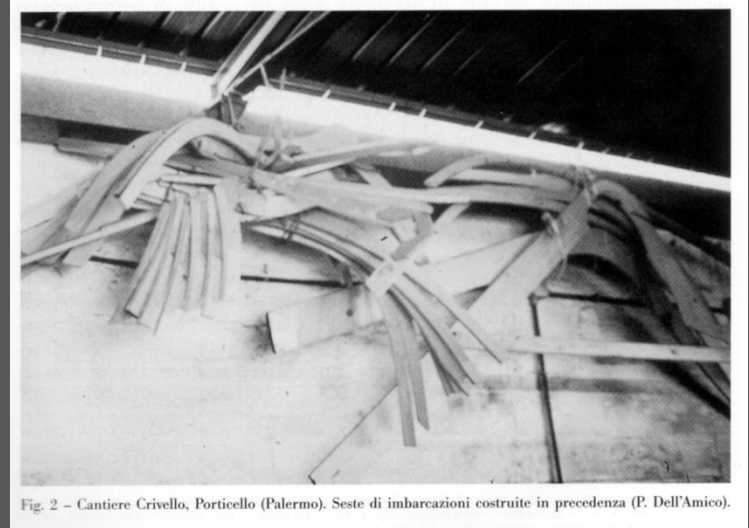
2. Partially geometric methods

There are some geometric mathematic aids, but you must know how to build ships to understand them.

Examples:

whole molding,

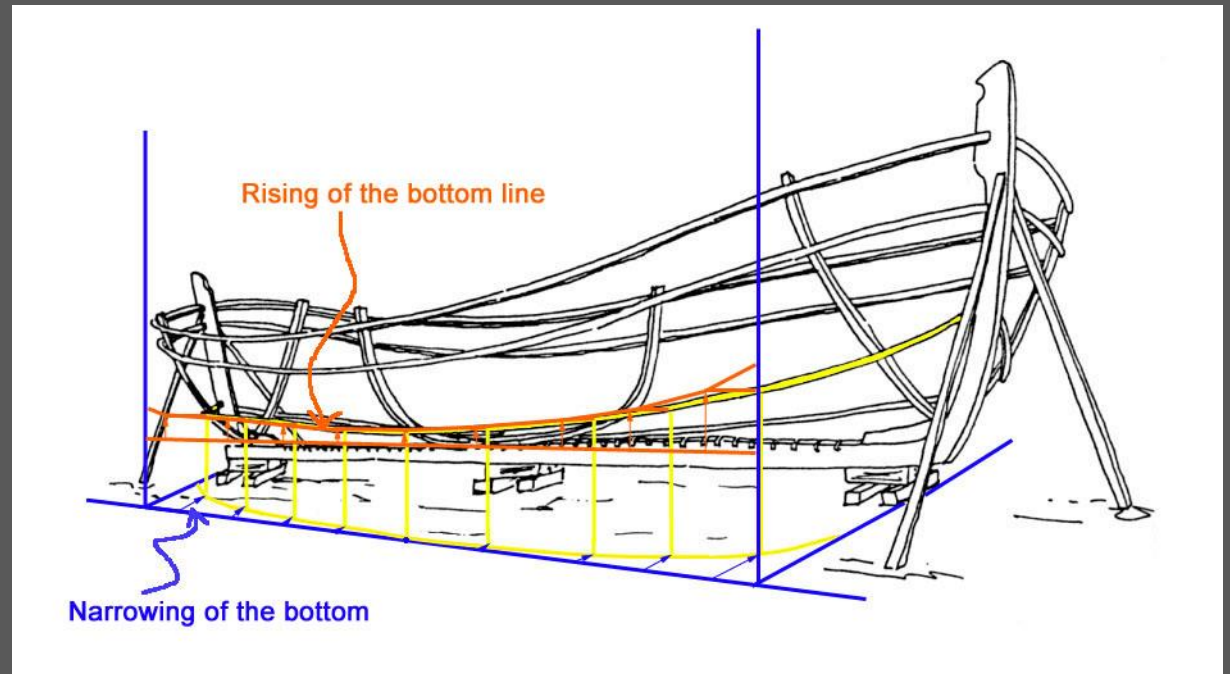
half models.



2. Partially geometric methods

Examples:

Whole molding.



2. Partially geometric methods

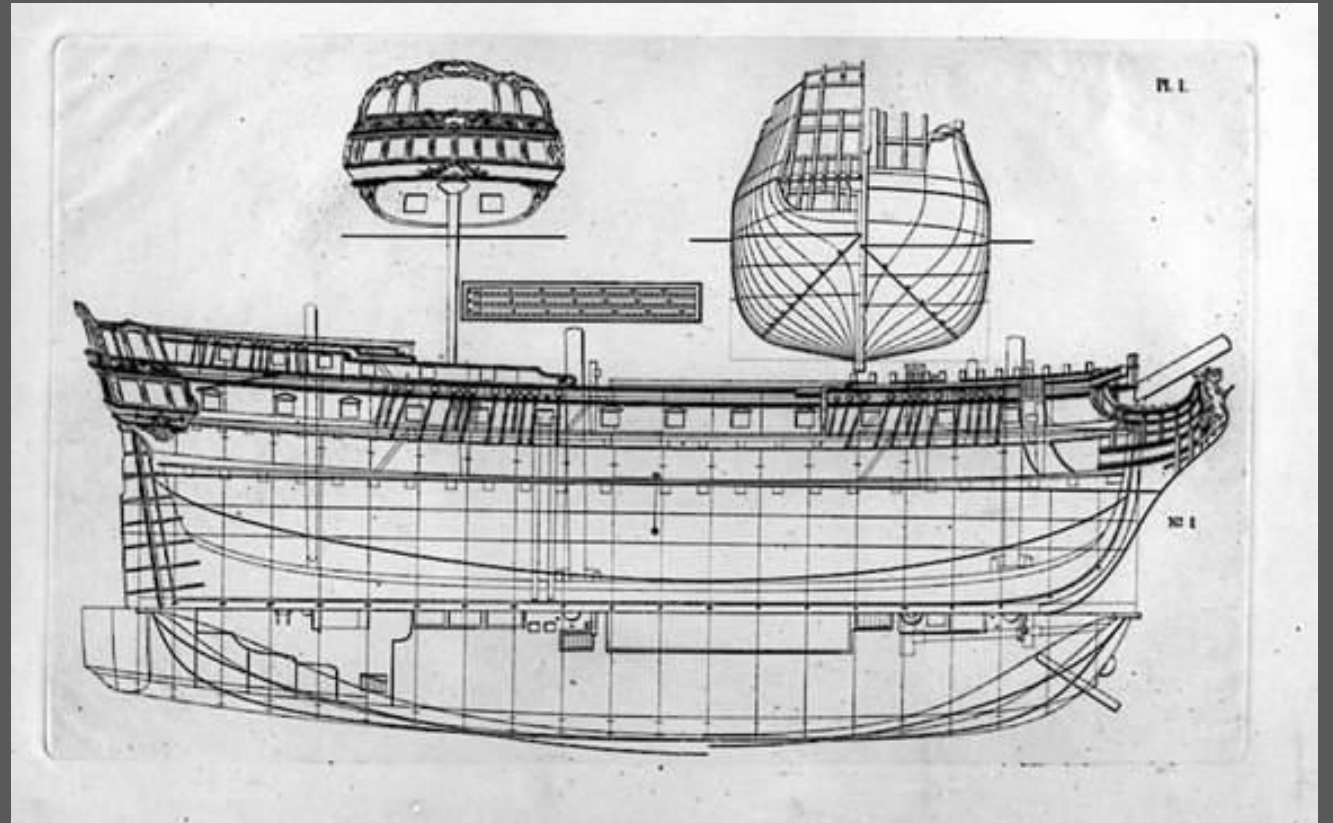
Examples:

Half models.



3. Geometric methods

Full projects. Theoretically “anyone” could build a ship from them.



Questions?