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Text of the communication “**Past and Recent Research in Nautical Archaeology at the Centre Camille Jullian, Aix-en-Provence, France**”

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by

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(France)

Dear Members of the NAS, Dears participants to this Annual Meeting, Dears Colleagues, it is an honour and a great pleasure for me to be here today, although by zoom.

2) Before to start with my presentation, I would like to remember Patrice Pomey that probably most of you know. He left us 7 March 2021, aged 78, struck down by the illness against which he had battled for several years. With his death, the scientific community has lost one of the grand masters of nautical archaeology, a discipline that he contributed to establishing and that he conducted at the highest levels. You will hear his name several times during my presentation.

I was a undergraduate student at the University of Turin, Italy, when I met for the first time Patrice. It was in 1993 during a conference held in Gela, Sicily, devoted to the Greco-Archaic seafaring in Western Mediterranean. Patrice presented the newly discovered sewn-boats of Marseilles Place Jules Verne.

Of course, as several others Italian students fascinated by underwater archaeology, I knew the book Archeologia Subacquea written with P. A. Gianfrotta. But it was so nice to have a talk with him ...

Also because Patrice was speaking a perfect Italian! Effectively he passed several years in Italy as member of the French School in Rome before getting a post at the CNRS.

After this meeting with Patrice, I decided to try to develop my knowledge in maritime and nautical archaeology, and possibly to learn French!

But today, I don't want to speak about me, I would like just to remember the kindness, generosity and willingness of Patrice. Without forgetting the pleasure I had in working with him, I must say that he was an example and that he is still behind all our current projects in nautical archaeology at the CCJ. It is therefore quite natural that I dedicate this presentation to his memory.

3	<p>In 1968, André Tchernia commenced excavation of a Roman-era wreck, Planier III (mid 1st century BCE) in Marseilles Bay.</p> <p>The first full campaign in 1969 was essentially devoted to evaluating the potential of the site and the excavation of the cargo composed of amphorae from Brindisi and pigments from Campania.</p> <p>Just few words to remember that André Tchernia, assistant professor at the University of Provence (now Aix Marseille University) and member of the Institute of Mediterranean Archaeology, nowadays the CCJ, was nominated director of the French</p>
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	<p>Ministry of Culture's newly created 'Direction des Recherches Archéologiques Sous-Marines' in 1967.</p> <p>Tchernia, a world-renowned historian and archaeologist, and a specialist in Ancient Economy, was particularly switched on to developing underwater archaeology in France, conscious of the potential of the systematic study of shipwrecks for his specific field of research.</p> <p>He also played a decisive role in the development of maritime archaeology, introducing the young archaeologist Patrice Pomey to the study of ship construction.</p>
4	<p>The following campaigns on the Planier III wreck in 1970-71 were mainly devoted to the hull study and were co-directed by Patrice Pomey (that you can see here studying very young part of the hull on the deck of the scientific vessel of the ministry of culture, <i>L'Archeonaute</i>).</p> <p>The wreck, beyond its scientific interest, played the role of a technical test site in view of excavating the Madrague de Giens wreck, the shipwreck that is generally considered as the founding project for French scientific underwater archaeology.</p> <p>In 1970, André Tchernia assembled a team within the Institute of Mediterranean Archaeology, made up of underwater archaeologists and specialist technicians from the French National Centre for Scientific Research (CNRS): the architect Jean-Marie Gassend, Michel Rival, the photographers Antoine Chéné, Gérard Revelliac. Archaeologists Antoinette Hesnard and Patrice Pomey joined the team as associate researchers.</p> <p>This was the first team of this type within either a French university or the CNRS. They became the maritime and nautical-archaeology team then attached to the Centre Camille Jullian, created in 1978 following on from the Institute of Mediterranean Archaeology.</p>
5	<p>So, from 1970, for the first time in France, photogrammetry was extensively used for the survey of the Planier III wreck, coupled with classical survey methods (plans and sections).</p> <p>Click For the hull study, a special system for marking the wooden structures was also elaborated by P. Pomey (and this is the system that we still use today).</p> <p>The systematic survey of the planking and of the means of assembling the timbers was also possible thanks to dismantling specific parts of the hull structure. This approach permitted the anatomical study of the ship structures and opened the way to further conceptual developments.</p>
6	<p>In 1972, this team of underwater archaeologists and technicians started the excavation of La Madrague de Giens wreck, located in the Hyères archipelago, east of Toulon, and dated to the mid 1st century BCE. The excavation lasted ten years and was directed by Tchernia and Pomey, assisted by Antoinette Hesnard.</p>
7	<p>The methods and techniques tested during the excavation of Planier III were developed and systematically used (magnetic survey,</p>

8	photogrammetry,
9	and hull sampling...).
10	<p>This long-term project allowed the ship to be considered from a new, anatomical perspective. The smallest elements (pegs, nails, and treenails) and the biggest ones (the keel, the planking, the frame) were studied as part of a complex floating structure, along with their deep cross-correlations.</p> <p>Thanks to the La Madrague project, Pomey started to develop most of the theories that would spark debate in nautical archaeology in the following decades:</p> <ul style="list-style-type: none"> • research on shell first, skeleton first, and mixed construction practices; • the notion of architectural types and the interdependence of shape and structure;
11	<ul style="list-style-type: none"> • the use of traditional data (literary, iconography and ethnography) to help and support the type identification and interpretation ...
12	<ul style="list-style-type: none"> • the study of tonnage and sailing qualities. Just to remember La Madrague de Giens was one of the biggest freighters sailing during the Roman Republic, bringing wine from Campania to Southern France. It was a two-masted ship around 40 m long, and could carry 400 t.
13	<p>The extent of the preserved wreck allowed a light to be thrown on both the study of the cargo, within the framework of research into maritime trade, and the analysis of the hull, in order to evaluate how these two aspects of the ship worked together, enabling the development of nautical archaeological studies.</p> <p>As a consequence of this important excavation, Pomey's research matured, and between 1980 and 1985 he established a new system for analysing ancient ships, based on the concepts of the "Principle of construction" and the "Methods of construction", referring to the notions of "conception" and "realisation" of the ships.</p>
14	<p>In parallel to the excavation of La Madrague de Giens, in 1973-1975, two of the team members, Jean-Marie Gassend and Michel Rival, participated in the excavation and study of the Roman wrecks of Port-Vendres 1 and the La Bourse de Marseille. This Imperial wreck dated to 2nd c. AD is the first wreck excavated in France in an ancient silted harbour.</p>
15	<p>In the wake of the Giens excavation, the CCJ team took on the excavation of the Roman wrecks of Grand Ribaud D under the direction of A. Hesnard (1983 – 1984) and Camarat 2 under the direction of A. Hesnard & M.-B. Carre (1987 – 1989, 1993 – 1994).</p> <p>The Grand Ribaud D is one of the ships that, between the 1st c. BC and the 1st c. AD, was built specifically to transport bulk wine in large containers (<i>dolia</i>).</p>

16	<p>From 1991 to 2000, Pomey with Frédéric Guibal, dendrochronologist of the CNRS at the Mediterranean Institute of marine and terrestrial Biodiversity and Ecology in Aix-en-Provence, launched a programme of research into the dendrochronology of ancient wrecks, which led to the re-opening and analysis of about 30 ancient wrecks from along the French Mediterranean coast.</p> <p>In the slide you can see Frédéric Guibal, Michel Rival & Patrice Pomey on the deck of the research vessel of the DRASSM <i>L'Archéonaute</i> with the Master students Stéphanie Wicha, Charles Dagneau and Julie Chastay.</p>
17	<p>This programme on dendrochronology of ancient Mediterranean shipwrecks had several objectives.</p> <ul style="list-style-type: none"> • First of all, identifying the different species of wood used in shipbuilding through systematic xylotomic analyses to try to understand the choices made by the shipwrights in relation to the different structural elements; • studying the woodworking techniques to reconstruct the processes of transformation from tree to the finished structure; • studying the origin of woods supplies, and eventually to establish dendrological correlations between different wrecks; • and, finally, building up a reference database for the north western Mediterranean species.
18	<p>In 1992 and 1993, the pre-construction archaeological excavations in Place Jules Verne, offered archaeologists, under the direction of A. Hesnard, the opportunity to excavate a large part of the ancient port of Marseilles.</p>
19	<p>On that occasion, seven ancient wrecks, of Greek and Roman dates, were discovered and excavated.</p>
20	<p>The study of these shipwrecks was entrusted to the nautical-archaeology team at the CCJ (Michel Rival, Robert Roman and directed by Pomey). All of these shipwrecks were analysed <i>in situ</i> and some of them were also recovered and conserved.</p> <p>This exceptional collection is now on display in the Musée d'Histoire de Marseille.</p>
21	<p>Although an experimental approach was applied to La Madrague de Giens for study and reconstruction, from the Jules Verne excavation onwards the use of experimental archaeology and scale models in the process of reconstruction of the ship shape and structure, and for the systems of assemblage, became systematic.</p> <p>As a result of studies on the wrecks of place Jules-Verne, new research directions could be discussed for the technical transition phenomena.</p> <p>First from 1996, on the transition between assembly techniques using ligatures to the system using mortise and tenon joints within the Greek tradition of sewn boats in Mediterranean;</p> <p>then, on the transition between 'shell construction' and 'skeleton construction'.</p>

22	The excavation in Place Jules Verne was the starting point for another long-term project, leading in 2013 to the construction of <i>Gyptis</i> , a sailing replica of the ancient Greek archaic wreck Jules Verne 9, a project directed by Pomey and coordinated by Pierre Poveda. Several articles have been dedicated to this project and have been published in the IJNA.
23	<p>By my side, it was in 1999 that I started a doctoral project at the CCJ and under the direction of Patrice Pomey. This project was focused on the Roman shipwrecks of Fiumicino in the context of the maritime port of Rome, Ostia-Portus.</p> <p>In the late years 1950, the excavations prior to the construction of the international airport of Rome brought to light infrastructure related to <i>Portus</i>, the largest port in the Roman Empire, in particular the northern pier of the harbour basin built by Emperor Claudius in the mid-1st century AD.</p>
24	During the construction work on the service roads around the airport, between 1958 and 1965, the remains of five Roman vessels were found, as well as the parts of three other ships and various artefacts.
25	They form the collection of the Museo delle Navi.
26	A new display has been inaugurated in October and you are very welcome to visit it!
27	<p>The collection is unique.</p> <p>Fiumicino 4 was a small boat suitable for use at sea. Equipped with a square sail, it was used for short-distance trade and coastal navigation.</p> <p>Fiumicino 5 was a <i>navis vivaria</i>, a special type of fishing boat. It was equipped with a compartment for keeping fish alive until they were landed. This boat had a pierced bottom for seawater to circulate. Pine wood plugs, some of which were found intact, were used to adjust the water flow.</p>
28	Fiumicino 1, 2, and 3 were <i>naves caudicariae</i> , similar in structure but different in dimensions.
29	Some depictions, dated between the 2nd and 5th centuries AD, offer a fairly faithful image of the caudicaria-type vessels.
30	The stern was high and curved, the bow slender. A cable for towing the ship from the river bank passed through a pulley at the top of the mast, which was equipped with steps to climb up. Thanks to the flat bottom and the large hold, these harbour service boats, or lighters, were used to unload large freighters and to transport goods via the River Tiber to and from Rome.
31	In 2011, I had also the opportunity to excavate and study the remains of a new wreck were discovered in Isola Sacra, near the right bank of the Tiber, front of the ancient city of Ostia, at the occasion of an extensive archaeological programme prior the construction of a new bridge over the Tiber.

	The remains, highly distorted due to post-depositional events, display some particular features in the stem area, forward.
32	The bollards at the prow indicate the need for strong mooring attachments similar to those visible in the <i>caudicaria</i> depicted in the Salerno relief. The rounded contour of the ends of the last strakes below the wale is evidence of a particular profile of the hull in relation with the presence of a transom bow.
33	The shape and the structure of Isola Sacra 1 has been reconstructed on the basis of the 3D model of the remains. A study model has also been built to study the ship shape... attachments
34	The longitudinal profile of this ship has been compared to the profile of the vessels depicted on the terracotta plaques of Isola Sacra where, according to our hypothesis, is depicted a <i>caudicaria</i> -type vessel with a transom bow, different from the <i>caudicariae</i> of Fiumicino, which had pointed bows.
35	In 2004, during my PhD, I had the opportunity to participate to the archaeological excavation undertaken in Piazza Municipio, Naples before the construction of the city's metro line 1. This huge excavation continued till 2006 with the construction of the line 6 station, providing a unique opportunity to explore the ancient Neapolitan coastal landscape.
36	In Piazza Municipio, besides the discovery of the port's impressive dredging activities and infrastructure,
37	the investigations provided evidence of seven vessels dating back to the Hellenistic era until the Roman Empire. I was in charge of the direction of the study of the ships from 2004. In 2014, Chiara Zazzaro from the L'Orientale was also involved in the study in situ.
38	The best preserved of the Neapolitan wrecks had been the object of reconstruction programmes, in part during the PhD research of Pierre Poveda devoted to the reconstruction and sailing qualities of ancient vessels under the direction of P. Pomey.
39	Always within my research on the harbour and working boats initiated with the study of the Fiumicino ships and after the study of the first 3 shipwreck found in Naples, I undertook from 2011 to 2013 the study of the 5 wrecks found in the ancient harbour of Toulon from 1987 to 1989.
40	In particular, Toulon 1 and 2 presented the particularity of a transom at one extremity. They had been intentionally scuttled and repurposed to build a wharf. Exceptionally, they appear to be the same type of boat, only the dimensions are different. The detailed study of these wrecks is nearing publication at the Presses Universitaires de Provence within a volume dedicated to the excavations of the harbour of <i>Telo Martius</i> .

41	<p>Since 2007, in association with various Croatian partners, Irena Radic Rossi of the University of Zadar, Ida Koncani Uhac of the Archaeological Museum of Istria, Marko Uhac of the Pula Conservation Office of the Ministry of Culture, Krunoslav Zubcic and Igor Miholjek of the Croatian Conservation Institute, I have co-directed archaeological research into the ancient wrecks of Dalmatia, Istria and on the river Kupa.</p> <p>Today, it will be too long to present one-by-one all these excavations and the results in term of knowledge of ancient shipbuilding and seafaring in Eastern Adriatic.</p>
42	<p>Nevertheless, one of the most important achievements has been the characterisation of a local sewn-boat tradition.</p> <p>We have studied the most ancient sewn vessel ever found in Mediterranean in Zambratija Bay in Istria. This is an extended and, possibly, expanded logboat built between the end of the 12th c. BC and the end of the 10th c. BC.</p>
43	<p>We have also studied the developments of the Adriatic sewn-boat tradition in Roman times when people living in Istria and Dalmatia, the Istrians and Liburnians, continued to build their ships using the sewing technique.</p> <p>Two articles have been recently published on the IJNA about the underwater site of Caska and the 3 sewn boats found there. Another article, signed with P. Pomey, is more general about the ancient Mediterranean sewn-boat traditions.</p>
44	<p>Always in Croatia, we are actually studying a Late Hellenistic wreck in the Bay of Parzine, island of Ilovik in the Kvarner Archipelago with the HRZ.</p>
45	<p>The ship hit a shoal and the hull broke up in several parts. In this slide, you can see the stern area and the stem area. They were found at a distance of around 20 m</p>
46	<p>This ship is particularly interesting for its dating (the 2nd c. BC), the cargo composed by amphoras containing wine and the cargo timbers,</p>
47	<p>the presence of stones belonging to the ballast, and the particularity of the hull structure.</p>
48	<p>This tenon-and-mortise built ship, probably 20-25 m long, has a wine-glass cross-section and an asymmetrical longitudinal profile. This shape is rarely attested by the archaeology although common in the iconography.</p>
49	<p>Another amazing project of the CCJ team is the study of the Late Hellenistic military ship discovered in the Black Sea by a team of the Institute of Archaeology of the Russian Academy of Sciences lead by Sergey Olkowskyi.</p>
50	<p>An article with the detailed description of the hull structure will be published soon in the next IJNA 50.</p>

41	A complete programme or reconstruction through digital and physical 3D models is in progress and the results of the reconstruction of the hull shape have been recently presented in Zadar at the sixteenth ISBSA.
52	Finally, I would like to come back to La Madrague de Giens wreck. Recently, P. Poveda together with L. Cavassa, an archaeologist specialist in ceramic study, started a three-year project with the intention to succeed in the final publication of this ten-year excavation. Several researchers of the CCJ era involved in this project. That, besides the final publication, has three main objectives:
53	First, to digitalize, organize, and study all the documentation already produced.
54	Then, to create a photogrammetry of the cargo coupled with a Geographical Information System in order to localize the fragments of the same ceramic vessel, and to identify the kitchen and storage areas on board. In this slide you can see the example of a big clay oven recovered in several fragments. Thanks to the ancient documentation and the methodology developed for this project by it has been possible to circumscribe a zone situated forward the main mast.
55	Finally, the third goal, is to create a 3D model of the hull structure. With this project on La Madrague de Giens the circle it's now complete and it's time to conclude!
56	But not before addressing my thanks to you for your attention. I hope you enjoyed my presentation of past and present researches in Nautical Archaeology in our centre C. Jullian.