

International Workshop

***The ports and port environments of
the Ancient Mediterranean***

Naples, 17-18 June 2019

ABSTRACTS

Session 1 - Function and terminology

This session will examine the ways in which the function of harbours may be conceptualised through written as well as material and iconographic sources.

Chiara Mauro (University of Haifa)

What words can tell. Pseudo-Skylax's mentions of "closed harbours" through archaeological and historical evidence

Ancient written sources have transmitted a rich body of phrases and words that refer to the maritime context. However, the actual understanding of ancient nautical jargon is far from exhaustive, due to numerous problems connected with its analysis. Traditionally, attempts to interpret nautical-related terms have adopted a strictly philological or archaeological approach and they have been focused on broadly-defined periods. In contrast, this contribution will seek to combine the study of ancient texts with other kinds of evidence (mainly archaeological and historical) for raising new research questions. In particular, we will use the Periplus of Pseudo-Skylax (a controversial text imbued with nautical knowledge) to revisit the earliest cases of λιμένες κλειστοί ("closed harbours"). Indeed, even if in modern scholarship the phrase λιμὴν κλειστός has come under much discussion, there is no agreement on its meaning. With this contribution, we will try to establish whether previous interpretations can still be considered valid or if a re-definition is needed.

Enrico Felici (Università degli Studi di Catania)

Opus pilarum: fonti, iconografia e topografia archeologica litoranea

Nella pittura murale romana, i porti (come spiega Vitruvio) e le ville marittime o lacustri sono soggetti ricorrenti. Tuttavia, entrambi questi temi ponevano alcuni problemi grafici: i porti erano infrastrutture vaste e complesse, non facili da riassumere in pochi elementi; le villae maritimae, perché fossero percepite come tali, non solo richiedevano di essere rappresentate come costiere, ma dovevano anche esplicitare fondazioni acquatiche. In entrambi i casi, queste informazioni richiedevano codici grafici che le riassumessero in un modo universalmente e immediatamente comprensibile: la più diffusa è la serie di archi costruiti su pilae immerse (*opus pilarum*). Il modello derivava dai ponti e dai pochi porti marittimi in cui venne effettivamente attuato. Nelle rappresentazioni di porti, di pontili moli e di *bases* di villae maritimae su monete, dipinti, mosaici, lampade, ecc., questo codice è stato usato ed enfatizzato non (o non sempre) come elemento di realismo ma, trasposto in un pittogramma, come sintesi simbolica per "struttura costruita nell'acqua".

In Roman mural painting, ports (as Vitruvio explains) and maritime or lake villas are recurrent subjects. However, both these themes posed some graphic problems, because the ports were vast and complex infrastructures, not easy to summarize in a few elements; the villae maritimae, so that they were perceived as such, not only needed to be represented as coastal, but they also had to show aquatic foundations. In both cases, these informations requested graphic codes for summarized them in a universal and immediately comprehensible way: the most widespread is the series of arches built on immersed pilae (*opus pilarum*). The model derived from bridges and the few sea ports where it was actually implemented: in the representations of ports, jetties and bases of

the *villae maritimae* on coins, paintings, mosaics, lamps, etc., this code was used and emphasized not (or not always) as an element of realism but, transposed into a pictogram, as a symbolic synthesis for 'structure built in water'.

Session 2 - Urban landscape

This session will focus on the different kind of sources and the written archives of harbour cities, examining aspects of trade, economy, intellectual exchange within the urban routine.

Marie Pawlowicz (Aix Marseille Université, CNRS, Centre Camille Jullian)

Le port romain de Marseille revisité: nouvelle approche et perspectives de recherches

Depuis septembre 2018, l'étude de la corne du port de Marseille à l'époque romaine (Ier – IVe s. apr. J.-C.) a été reprise dans le cadre d'une thèse réalisée au sein du Centre Camille Jullian. Fouillé entre 1967 et 1984, ce monument n'a fait l'objet d'aucune étude d'ensemble à ce jour, ce qui constitue une lacune dans la connaissance de l'histoire du port de Marseille. Les recherches en cours ont pour objectifs de comprendre ce monument (son aménagement, ses transformations, son utilisation et sa chronologie), de restituer les fonctions économiques et portuaires de ce quartier de la cité et par conséquent de mieux appréhender le rôle de la ville au sein du commerce méditerranéen romain. Afin de répondre à ces problématiques, ce contexte bénéficie d'une nouvelle approche où données anciennes et récentes se croisent pour une meilleure appréhension de cet espace portuaire et qui laisse déjà entrevoir quelques perspectives de résultat.

The study of the so-called 'harbour horn' of Marseille, during the Roman periode (1st - 4th century AD), is carried out in the framework of a PhD thesis, started in Septembre 2018 at Aix Marseille University and the Centre Camille Jullian. This monument has been excavated between 1967 and 1984, without any comprehensive study being achieved up to now, which represents a weakness for the history of the port of Marseille. The current research aims to improve the knowledge of this monument (its layout, transformations, use and chronology), to retrace the economic and port functions of this area in the city and therefore to better understand the role of Marseille within the Roman Mediterranean trade. In order to respond to these research themes, this context benefits from a new approach where old and recent datas intersect for a better understanding of this port area and which already shows some prospects for results.

Daniela Cottica (Università Ca' Foscari di Venezia)

Cristiano Tiussi (Fondazione Aquileia)

Spunti per un approccio integrato allo studio della funzionalità delle due sponde del porto fluviale di Aquileia

Le indagini archeologiche più recenti hanno permesso di meglio definire la complessità del sistema portuale fluviale di Aquileia, articolato in corsi naturali ed artificiali dotati di installazioni dislocate lungo un percorso che rendeva l'antica città circumnavigabile e connessa al mare. Al contempo, a circa novant'anni dalle indagini condotte nel secolo

scorso da Giovanni Battista Brusin su entrambe le sponde del tratto centrale del porto fluviale, sono stati recentemente avviati due nuovi progetti di scavo e ricerca, finalizzati a fornire nuovi dati ed informazioni su sviluppo e dinamiche insediative del porto fluviale, permettendo di meglio apprezzarne le specificità funzionali in rapporto con i rispettivi circostanti quartieri.

Dal 2017 infatti Fondazione Aquileia ha avviato un nuovo progetto di ricerca finalizzato alla valorizzazione dell'area monumentale del porto fluviale, sulla sponda occidentale dell'antico fiume ed in stretta contiguità con il retrostante settore del foro di Aquileia (<https://www.fondazioneaquileia.it/it/cosa-vedere/porto-fluviale>). Dal 2010 invece, l'Università Ca' Foscari di Venezia indaga stratigraficamente l'antistante tratto di sponda orientale in rapporto con i circostanti quartieri periurbani. Numerosi sono i nuovi apporti e dati emersi da queste attività di ricerca ancora *in fieri*, che pongono al centro dell'attenzione il rapporto fra uomo e fiume, utilizzando un approccio investigativo interdisciplinare (https://www.unive.it/pag/14024/?tx_news_pi1%5Bnews%5D=5252&cHash=67d99340dd461d8c3985a7a29b5b6e07).

L'intervento cercherà di focalizzare in particolare l'attenzione sulle specificità funzionali che sembrano sempre più chiaramente emergere, per i settori indagati, dello studio congiunto delle sistemazioni dei due corrispondenti tratti spondali. All'articolato sistema di banchine, rampe ed edifici per lo stoccaggio che caratterizzano la sponda ovest si contrappone, sulla sponda orientale, un sistema caratterizzato dalla presenza di un muro di sponda interrotto da gradinate acquee, funzionali alle esigenze di un quartiere a vocazione artigianale e produttiva che per alcuni secoli cerca di sfruttare a proprio vantaggio la presenza dell'acqua, cercando di controllarne l'idrodinamismo.

Anna Gutgarts (University of Haifa)

Communication, Trust, and the Formation of Multi-Layered Urban Communities in the Medieval Mediterranean

Two concomitant processes shaped the Mediterranean during the high middle ages (11th-13th centuries), namely urbanization and the expansion of the frontiers of Latin Christendom. This yielded rapidly growing urban centers, that were inhabited by extremely diverse populations, and were often characterized by geo-political and social instability. The implications of this complex social configuration on such issues as ethno-religious and cultural encounters, or long-distance trade networks, received considerable scholarly attention. Yet the challenges that such conditions presented to the formation of municipal mechanisms and promotion of urban development are still often overlooked.

This paper will aim to address the reciprocal connection between the changing cityscapes of the medieval Mediterranean, and their social and institutional circumstances through the case study of Frankish Acre. Acre reveals a tension between gradually intensifying municipal and legal mechanisms, aimed to increase the level of social cohesion among an extremely heterogeneous population, and constant instability, which has disintegrating and decentralizing effects. This was manifested in the changes that took place in Acre's cityscape, as rising tensions between the different groups in Acre's population led to the fragmentation of the cityscape. Yet if previously this process was considered to encompass almost exclusively to the dominions of the Italian communes, this paper will argue it was far more extensive, resulting in the division of

the cityscape into the port area, and an outer ring, the two developing almost independently of one another, thus reflecting social and institutional stratification. Based on this case study, the paper will aim to address new methodological approaches and a new theoretical framework for the study of urban centers in the medieval Mediterranean.

Renard Gluzman (University of Haifa)

The Practice of Libamento: Relieving Cargos on the Open Sea outside of Venice's Port

In the early decades of the sixteenth century access to Venice via water was becoming increasingly awkward due to the silting of the channels and basins. Despite consistent efforts to keep the waterway (fousa) at the entrance of the port of San Nicolò open to vessels with large draught, the shallow waters imposed serious obstacles, and even peril in foul weather. Fully loaded round ships and even medium-sized vessels were obliged to unload part of their merchandise to reduce their draught before approaching the channel leading to the do castelli, the city's watery gateway. Often carried out at open sea, this procedure was known as libamento (from the verb libare), meaning to lighten a ship by unloading part of its cargo, in this case onto smaller carriers – raft-type boats called lembo or libo (the thirteenth-century term), and flat-bottomed burchi, piatti, zattere, tugs and pilot boats in early modern Venice. As it was, most accidents involving either the loss or damage to merchandise occurred right here, during the unloading stage: the merchandise would fall to the water or get wet by rain, and parcels would just disintegrate while being lowered into smaller carriers. Because the liabilities incurred were so often disputed, notarial and legal documents present us with comprehensive descriptions how this often-tricky operation was carried out. In this paper I will present several such cases and discuss the intervention of the state in the process.

Session 3 - Culture and identity

This session will examine the ways in which various aspects of cultural interaction and self-representation were formed within the populations of harbour-cities.

Ehud Arkin (University of Haifa)

Assaf Yasur-Landau (University of Haifa)

Coastal Communities and Maritime Adaptation at the Coast of the Carmel During the Iron Age

The wide collapse of Mediterranean systems during the 12th century BCE required societies to re-invent themselves, adopting new, and sometimes not so new, survival strategies. By combining underwater and terrestrial archaeology, we chart the coastal and maritime adaptation of communities along the Carmel coast to new social, political and economic conditions, in the wake of violent population displacement, the disruption of trade networks and the disintegration of central authority.

Since 2016 we have excavated the submerged Iron Age harbor of Dor in cooperation with the University of California – San Diego / Scripps Institute and the Tel Dor Excavation Project. The picture which emerges through our excavations and previously unpublished underwater surveys is one of resilience and, eventually, prosperity. This

prosperity owes much to local initiative, new trade patterns which overlie traditional maritime routes, and improved environmental conditions. These are aspects which persist until they too are eclipsed by larger political powers who modify both strategy and landscape in their own image, to varying degrees of success.

Daniela Giampaola (Soprintendenza Archeologia Belle arti e Paesaggio per il Comune di Napoli)

Parthenope, Neapolis e la fronte del porto

The paper concerns the theme of the coastal landscape of ancient Naples and its employment dynamics over time, linking the data already known from historical and archaeological literature to new elements uncovered from excavations conducted following the path of the subway lines created along the coastal strip where the sites of *Parthenope* and *Neapolis* were located.

Neapolis is the new *polis* founded in the late 6th or early 5th century BC, *Parthenope* the previous Greek settlement founded by the inhabitants of the city of Cumae on the hill of Pizzofalcone at the end 8th century BC.

This contribution runs through the protohistoric precedents, dealing with the archaic and classical phases of *Parthenope* and *Neapolis*, up to the Hellenistic age when an important refunctionalization of the harbour basin uncovered in piazza Municipio (Municipio station) was carried out.

The theme of the chronological and topographical articulation of the two sites of *Parthenope* and *Neapolis* is developed by interpolating the environmental and archaeological data of the settlements and the harbour with those of the material culture which contributed to define the chronology and dynamics of their relationship.

Eleonora Bedin (University of Haifa)

Harbour Cities as Vehicle of Cultural Identity: the Case of Hellenistic Gaza and Ashkelon

The strategic position of the port cities of Ashkelon and Gaza within the geography of the Near East made them crossroads of trades and cultures from the Early Bronze Age onwards. As junctions between the *Via Maris*, the trade route that run along the coast connecting Egypt with Phoenicia, Syria, and Anatolia, and the frankincense route that stretches from the Mediterranean through the Negev until India and beyond, Gaza and Ashkelon had experimented a continuous passage of peoples that had shaped their cultural and religious horizons.

However, the two cities proved the maintenance of a strong local identity through time shown by the survival of their ancestral deities, as well as the self-representation left by their citizens around the Mediterranean. Through the analysis of Hellenistic epitaphs of Ashkelonite and Gazan merchants dead abroad, the continuity of worshipping of local deities, and the syncretism that involved them, Ashkelon and Gaza will be presented not only as junctions and cross-roads of identities, but also as carriers and vehicles of a strong cultural originality. Moreover, from this analysis, also the extent of their intrinsic Mediterranean dimension will emerge.

Session 4 - Ship-Harbour interaction

This session will examine in which way it is possible to relate harbours to ships using archaeological, iconographical and written sources.

Emmanuel Nantet (University of Haifa)

Drafts and Depths: Which Ships for Which Harbours?

"When Hiero heard that, of all the harbors it was to call at, some would not accommodate the ship [the Syracusia] at all and others were risky, he decided to send it as a gift to King Ptolemy in Alexandria." (Athenaeus 5.209b, trans. L. Casson).

At first sight, it might seem puzzling to read that Hiero built such a large superfreighter that she could not enter most harbours.

However, the depth of the harbours has always been a crucial problem for ship captains, as well as the draft of the ships for the harbour authorities. As it is located in the junction of two research fields, this issue has long been overlooked. For decades, ship archaeologists did not include harbours as a crucial parameter, as if the boat was a self-sufficient floating object on the waters, just like harbour archaeologists did not consider that ships should be taken into account, as if harbours could exist without boats. The past decade has shown several studies which insist upon the close relationships between ships and harbours (Boetto 2008, Corré 2009, Nantet 2010, 2016).

Therefore, the assessment of this issue requires at first an attentive examination of the problem. How crucial was it for the captains and harbour authorities? Did the ancient, medieval and early modern boats and harbours have to face this issue in the same way? What sources may evidence this problem?

Then, it will be necessary to bring measurements in order to provide a concrete evaluation of the problem. What was the depth of the harbours? How can it be assessed? As for the draft of the ships, what was it? How can it be measured?

Eventually, the presentation, that relies on a recent workshop which took place in Port-Vendres, France (April 19th, 2019), will focus on the solutions to that problem. What could the harbour authorities perform in order to maintain the depth? First, they edicted regulations so that waste produced by the harbour activities shall not deposit and fill the bottom. Which authorities could these activities revert to? Can sources evidence how these regulations were followed? The harbour authorities could also use dredge boats in order to remove the waste from the bottom. How did these techniques work? How efficient were they? How much did they cost?

La tyrannie du tirant d'eau. La mesure du problème et ses conséquences

« Hiéron ayant appris que tous les ports étaient soit incapables d'accueillir le navire [la Syracusia], soit dangereux, décida d'en faire don au roi Ptolémée et de l'envoyer à Alexandrie » (Athénée 5.209, d'après Fr. Salviat).

À première vue, il peut paraître étrange de lire que Hiéron a construit un navire si grand qu'il ne pouvait pas entrer dans la plupart des ports. Toutefois, la profondeur des ports a toujours été un problème majeur pour les capitaines de navires, et le tirant d'eau des navires pour les autorités portuaires. Comme cette question se situe au croisement de deux domaines de recherche, elle a longtemps été négligée.

Pendant des décennies, les recherches en archéologie navale n'ont pas intégré les ports comme un paramètre essentiel de leur réflexion. Au fond, le bateau était un objet autonome flottant sur les eaux sans lien avec le port. Quant aux études en archéologie

portuaire, elles se sont attachées à décrire les structures uniquement, comme si les ports pouvaient exister sans navires. La dernière décennie est revenue sur ces fragilités, comme en témoigne plusieurs études qui ont insisté sur les relations étroites entre navires et ports (Boetto 2008, Corré 2009, Nantet 2010, 2016).

La question de la relation entre tirant d'eau et profondeur des ports suppose d'abord un réexamen attentif du problème. En quoi cette relation était-elle essentielle pour les capitaines et les autorités portuaires? Les bateaux et les ports antiques, médiévaux et modernes ont-ils été confrontés de la même manière à ce problème ? Quelles sources permettent d'aborder cette problématique ?

Il sera ensuite nécessaire des données concrètes afin de mesurer la réalité du problème. Quelle était la profondeur des ports ? Comment celle-ci peut-elle être évaluée ? Quel était le tirant d'eau des navires ? Comment peut-il être mesuré ?

La communication, qui s'appuie sur la récente organisation d'une journée d'étude à Port-Vendres (19 avril 2019), s'efforcera d'aborder les solutions apportées pour régler ce problème. Par exemple, que pouvaient entreprendre les autorités portuaires pour maintenir la profondeur des bassins et l'accès aux quais ? Ils ont bien sûr édicté des réglementations afin que les déchets produits par les activités portuaires ne se déposent pas au fond : à quelles autorités ces activités étaient-elles confiées ? Les sources permettent-elles de prouver que ces réglementations ont été suivies d'effet ? Les autorités portuaires pouvaient également utiliser des bateaux-dragues pour éliminer les déchets accumulés sur les fonds : quelles étaient les techniques employées, leur efficacité, leur coût ?

Moshe Bram (University of Haifa)

Deborah Cvikel (University of Haifa)

Yoav Me-Bar (University of Haifa)

Josef Rott (University of Haifa)

Maritime Transportation of Cedar Logs in the Levant during Antiquity

Cedar wood was a precious raw material in Antiquity, and was used for high-quality items, such as furniture, coffins, ships, palaces, and temples. The main source of cedar in the Levant was Lebanon, where it grows naturally at elevations above 1,400 m. Evidence of maritime transportation of cedar (the Bible, Wenamon's voyage and the Palermo stone), shows that it was exported by sea from ports in Lebanon to Jaffa and the Nile Delta. Cedar wood could have been transported as trunks or as sawn/split planks. For the purpose of the current work, that of sawn/split planks was chosen. Considering the dimensions of sea-going merchant ships of the period, two methods of transportation were examined: (1) stowing the timbers on deck, and (2) towing them behind the ship.

The work reported here had two phases: 1) – the theoretical estimation of the effects of both methods on the sailing performance of the vessel, especially its speed; and 2) – using the replica of the 400 BC Ma'agan Mikhael ship for practical trials of towing and/or stowing on deck. In evaluating the possibility of stowing the timber on deck, ballast, stability and efficiency were estimated; while for towing, parameters such as manoeuvrability and reduction of sailing speed due to the extra drag and increase in weight of the timber due to water absorption, were checked. Calculations of stability and the amount of ballast needed show that deck stowing of four or six cedar beams, measuring 23 m long, with a cross-section of 40×14 cm, was feasible.

Irena Radić Rossi (University of Zadar)

Giulia Boetto (Aix Marseille Université, CNRS, Centre Camille Jullian)

Ancient harbours of Dalmatia and the reuse of ships in harbour construction

Pliny (NH, 16.20) and Suetonius (Claudius, 20.3) have told us the story of the great ship that Caligula had built for the transport of the obelisk now in the Vatican, which was later sunk by Claudius after being filled with pozzolana. It was reused as the foundation of the lighthouse of the new seaport he was building north of Ostia. This exceptionally large vessel would have had a deadweight of 1,300 tons and would have transported, in addition to the obelisk, 130,000 modii of lentils.

Otello Testaguzza (*Portus. Illustrazione dei porti di Claudio e Traiano e della città di Porto a Fiumicino*, Rome, 1970) attempted to recognize the traces of Caligula's ship and some other smaller boats in the concrete of the northern pier of the port of Claudius at Fiumicino, however, his identifications do not correspond to the archaeological reality and the location of Caligula's ship remains, for the moment, hypothetical.

In recent years, numerous underwater excavations carried out at multiple sites in Dalmatia attest to the systematic reuse of boats as building materials, a practice widely used in the Mediterranean during Antiquity and later periods, as testified by both historical documents and archaeological finds.

The sites of Caška on the island of Pag and Kaštel Sućurac near Split offer remarkable examples of boats sunk voluntarily after being filled with stones. The examination of these wharves not only tells us about new types of harbour constructions, but provides valuable data on the characteristics of the original ships.

Pline (NH, 16.20) et Suétone (Claud., 20.3) nous ont transmis le récit du grand navire que Caligula avait fait construire pour le transport de l'obélisque qui se trouve aujourd'hui au Vatican, et qui fut ensuite coulé par Claude après avoir été rempli de pouzzolane. Il allait servir à la fondation du phare du nouveau port maritime qu'il était en train de construire au nord d'Ostie. Ce navire de taille exceptionnelle aurait eu un port en lourd de 1 300 tonnes et aurait transporté, en plus de l'obélisque, 130 000 modii de lentilles.

Otello Testaguzza (*Portus. Illustrazione dei porti di Claudio e Traiano e della città di Porto a Fiumicino*, Rome, 1970) a voulu reconnaître les traces du vaisseau de Caligula et de quelques autres bateaux plus petits dans le béton du môle septentrional du port de Claude à Fiumicino, toutefois ses identifications ne correspondent pas à la réalité archéologique et l'emplacement du navire de Caligula reste, pour l'instant, hypothétique. En revanche, ces dernières années, les nombreuses fouilles sous-marines réalisées en Dalmatie dans des sites portuaires attestent de l'utilisation systématique de bateaux comme matériaux de construction, selon une pratique bien répandue en Méditerranée durant l'Antiquité et les époques postérieures comme le témoignent les documents historiques et les découvertes archéologiques.

Ce sont surtout les sites de Caška sur l'île de Pag et de Kaštel Sućurac près de Split, qui nous offrent des exemples remarquables de bateaux coulés volontairement après avoir été remplis de pierres. L'examen de ces appontements nous renseigne non seulement sur des types inédits de constructions portuaires, mais fournit de nouvelles données sur les caractéristiques des navires d'origine.

Session 5 - Infrastructure, storage and logistics

This session will use the archaeological, iconographic and written sources to explore the functional aspects and the logistical organization of the port areas.

Iván Fumadó Ortega (Universitat de València)

Approdo, santuario, magazzino. La rete commerciale fenicia nel Mediterraneo occidentale

Milena Mimmo (Alumna LabexMed, Centre Camille Jullian)

Évelyne Bukowiecki (École Française de Rome)

L'Urbs e i suoi porti. Magazzini e dinamiche di stoccaggio tra Ostia, Portus e Roma

Situato alla foce del Tevere, il sistema portuale Ostia-Portus, provvisto di una fitta rete di magazzini, assicurò per tutta l'Antichità la ricezione delle enormi quantità di merci provenienti dal Mediterraneo e destinate, attraverso il trasporto fluviale, a provvedere ai bisogni della megalopoli di Roma, posta a circa 30 km nell'entroterra. Il numero elevatissimo della popolazione dell'*Urbs*, stimata tra 800.000 e 1.200.000 persone, richiese la massima efficienza di questo sistema di rifornimento, al quale Roma stessa contribuiva grazie ai suoi numerosi approdi sul fiume e alla coesa rete di stoccaggio urbana.

Fino alla metà del I secolo d.C., Ostia fu la tappa fondamentale per la ricezione e lo stoccaggio delle merci provenienti dal Mediterraneo e dirette ai distretti urbani del *Portus Tiberinus* e dell'*Emporium*. Fu solo nel 42 d.C., con l'avvio del grandioso progetto di Claudio per un nuovo porto marittimo di Roma, che il sistema di ricezione e di redistribuzione delle merci, destinate al rifornimento urbano, prese una rilevanza degna della capitale dell'Impero, con la pianificazione di un gigantesco complesso di stoccaggio di circa 10 ha (Magazzini c.d. Traiane). Posto sul mare a circa 3 km a nord di Ostia, Portus raggiunse una nuova espansione nella prima metà del II secolo d.C., con la creazione del bacino esagonale interno, dotato su ciascun lato di altri magazzini. In sintonia con la maggior ricettività del sistema portuale alla foce del Tevere, anche nella capitale vennero potenziate le aree destinate allo stoccaggio, iniziando a sviluppare una fitta rete di magazzini anche nel *Trastiberim*, posto sulla riva urbana destra, di fronte all'*Emporium*. Sia a Roma che a Ostia, moltissimi magazzini vennero costruiti nel secondo secolo d.C., introducendo anche nuove tipologie planimetriche e sviluppando forme di stoccaggio specializzato; altri magazzini vennero invece completamente restaurati. Migliorarono in questo periodo anche le nozioni tecniche per garantire le migliori condizioni di conservazione durante lo stoccaggio con l'utilizzo, ad esempio, di dispositivi architettonici specifici.

Questo processo di miglioramento della rete di magazzini sia urbani che portuali, raggiunse la massima efficienza in età severiana durante la quale vennero programmati numerosi importanti restauri e interventi destinati ad aumentare le capacità di stoccaggio al chiuso, come accadde, per esempio, sia nei Magazzini c.d. Traiane di Portus, che nei Grandi Horrea di Ostia o negli *Horrea Piperataria* a Roma.

Questa presentazione cercherà di mettere in luce le dinamiche comuni messe in atto nelle operazioni di ricezione e di stoccaggio delle merci, che emergono sempre più chiaramente dalle recenti ricerche e che testimoniano la grande sincronia operativa dei tre centri portuali (Ostia, Portus, Roma), impegnati nella grande sfida per l'approvvigionamento dell'*Urbs*.

Located at the mouth of the Tiber, the port system Ostia-Portus, provided with a dense network of warehouses, ensured the reception of huge quantities of goods from the Mediterranean throughout the entire Antiquity and destined, through river transport, to provide for the needs of the megalopolis of Rome, located about 30 km inland. The very high number of the population of the *Urbs*, estimated between 800,000 and 1,200,000 people, required the maximum efficiency of this supply system, to which Rome itself contributed thanks to its many landing places on the river and the cohesive urban storage network.

Until the middle of the 1st century AD, Ostia was the fundamental point for the reception and the storage of goods coming from the Mediterranean and directed to the urban districts of *Portus Tiberinus* and *Emporium*. It was only in 42 AD, with the launch of Claudio's grandiose project for a new sea port of Rome, that the system of reception and redistributing of goods, destined for urban supply, acquires a relevance worthy of the capital of the Empire, with the planning of a gigantic storage complex of about 10 ha (Magazzini so-called Traianeï). Located on the sea, about 3 km north of Ostia, Portus reached a new expansion in the first half of the 2nd century AD, with the creation of the internal hexagonal basin, equipped on each side with other warehouses. In tune with the greater receptivity of the port system at the mouth of the Tiber, in the capital, the areas destined for the storage were also strengthened, starting to develop a dense network of warehouses also in the *Trastiberim*, located on the right urban bank, in front of the *Emporium*. Both in Rome and in Ostia, many warehouses were built in the second century AD, also introducing new planimetric typologies and developing forms of specialized storage; other warehouses were instead completely restored. In this period the technical knowledge also improved to guarantee the best storage conditions in these buildings with the use, for example, of specific architectural devices.

This process of improving the network of urban and port warehouses, reached maximum efficiency in the Severian age, during which numerous important restorations and interventions were planned to increase indoor storage capacities, as happened, for example, both in the Magazzini so-called Traianeï of Portus and in the Grandi *Horrea* of Ostia or in the *Horrea Piperataria* in Rome.

This presentation will try to highlight the common dynamics implemented in the operations of receiving and storing goods, which emerge more and more clearly from recent research and which testify to the great operational synchrony of the three port centers (Ostia, Portus, Rome), engaged in the great challenge for the supply of the *Urbs*.

Vittoria Carsana (Soprintendenza Archeologia Belle Arti e Paesaggio per il Comune di Napoli)

Le strutture portuali di Neapolis in età imperiale

Le evidenze relative al bacino portuale di *Neapolis* sono emerse nei diversi settori del grande scavo di piazza Municipio, realizzato in occasione della costruzione delle stazioni di linea 1 e 6 della metropolitana cittadina. L'area di scavo corrisponde al settore sud/sud-ovest di una più ampia insenatura, estesa fra il rilievo di S. Maria di Porto Salvo e il basso promontorio sul quale in età angioina è eretto Castel Nuovo, ubicata tra l'insediamento di *Parthenope* degli inizi del VII secolo a.C. e il pianoro di *Neapolis*, la città nuova fondata alla fine del VI-inizi V secolo a.C. Questa parte della baia fu utilizzata con certezza come porto dal III secolo a.C., come testimoniano tracce di dragaggi e la costruzione di strutture di terrazzamento delle pendici della collina retrostante.

In età augustea il porto e l'area circostante sono oggetto di una nuova organizzazione, documentata da importanti opere infrastrutturali, che si inseriscono nel più ampio programma di interventi edilizi che interessa *Neapolis* e l'area flegrea. Lo scavo ha messo in luce una banchina in opera cementizia e un molo foraneo che fungeva da chiusura artificiale del bacino e protezione dell'insenatura dai venti meridionali. Alla stessa epoca risale un asse viario realizzato lungo il margine occidentale del bacino, identificabile con la *via per cryptam* nota dalle fonti, che collegava *Neapolis* al suo porto e proseguiva verso i Campi Flegrei.

Anche la fascia costiera circostante è interessata in età imperiale da una intensa urbanizzazione con la realizzazione di un'edilizia, probabilmente di iniziativa pubblica, caratterizzata da edifici termali.

L'esplorazione dei fondali, con il rinvenimento di relitti, manufatti organici legati alla mariniera, e di una notevole quantità di materiali ceramici, contribuisce a documentare la continuità dello scalo neapolitano per tutta l'età imperiale, fino agli inizi del V secolo d.C., quando questa parte del bacino si insabbia e la linea di costa e il porto avanzano verso est.

Archaeological remains of the *Neapolis* port were brought to light in different sectors of the large excavations in Municipio square, executed for the underground stations construction (lines 1 and 6). The excavation area is located in the south/south-west sector of a larger bay that extends from S. Maria di Porto Salvo to the promontory, where Castel Nuovo was built later in Angevin age. The port is located between the original settlement of *Parthenope* in 7th century B.C. and *Neapolis* plateau, the new city founded in late 6th and early 5th century B.C. This area of the bay becomes the harbour from 3rd century B.C, as proved by dredging traces and by the construction of terracing structures of the slopes of hill behind.

In Augustan age the harbour and the surrounding area are object of a reorganization, witnessed by important infrastructures found, that are part of wider construction interventions realized in *Neapolis* and Phlegraean Fields. The excavations brought to light a quay *in opus cemaenticium* and the outer pier that was used as an artificial closure of the basin and protection from southern winds. Along the western coastline of the basin, a road of the same age is found and identified as the *via per cryptam*, known from ancient sources, that connected *Neapolis* to its harbour and continued to Phlegraean Fields.

An intense urbanization interested also the surrounding coast in the Imperial age, with the realization of a thermal building, probably from a public initiative. In the sea bottom explorations relicts, organic marine manufactures and a great quantity of pottery contribute to document the activity of the Neapolitan harbour during Imperial age until early 5th century A.D., when this part of the basin was silted up and the coastline and the harbour moved to east.

Jean-Jacques Malmay (Aix Marseille Université, CNRS, Institut de Recherche sur l'Architecture Antique)

Réflexions sur l'accostage des bateaux et sur le débarquement des biens et des personnes dans les ports antiques

Un des principaux problèmes posés par l'étude des magasins du front de mer occidental de Délos fut de comprendre la relation que ces édifices entretenaient avec la mer et par

là même les voies maritimes. L'examen de leurs vestiges s'est avéré assez peu satisfaisant pour confirmer la présence d'un quai ou d'une grève entre les magasins et le chenal de Délos. À défaut d'une étude géomorphologique approfondie, ce problème a surtout donné lieu à une réflexion plus générale sur les divers modes d'accostage des bateaux et de débarquement des personnes et des marchandises dans les ports de l'antiquité gréco-romaine. Cette démarche alternative consiste à épuiser le champ des possibilités sur le sujet en invoquant non seulement la documentation archéologique mais aussi, quand cette dernière s'avère peu satisfaisante, des pratiques et des équipements de périodes plus récentes, antérieures à la Révolution industrielle. Pour l'heure, il ne s'agit bien évidemment pas de mener une étude exhaustive sur ce thème mais d'énumérer et de tenter de comprendre les diverses pratiques portuaires - accostage à quai, halage sur grève, ancrage en mer, rupture de charge par de petites embarcations, transport ou bardage sur terre, etc. - et leurs équipements afférents - quais, bittes d'amarrage, grèves avec ou sans voie littorale, échelles d'échouage, mécanismes de halage, treuils, machines de levage, passerelles de débarquement, etc. L'étude de ces pratiques et de ces installations devrait assez naturellement conduire à déterminer plusieurs pistes de recherche explorables dans divers cadres chronologiques et géographiques. En retour, elle aura sans nul doute un grand intérêt pour mieux identifier les vestiges archéologiques d'infrastructures portuaires.