



Explore, Protect, Publicise and
Study Humanity's drowned history

The Department of Underwater Archæological Research
A pioneer in the appreciation of our sunken history, created by André Malraux





Overview Page 3

Identifying and analysing heritage at risk Page 6

The Seas Explored, History Revealed Page 8

Sharing Knowledge, Protecting Cultural Heritage Page 16

From Da Vinci to Malraux via Cousteau: The origins of the DRASSM

In our collective imagination, shipwrecks have forever fueled myths of sunken treasure. Beyond the dream, in the 20th century they proved to be extraordinary time machines. So long as historians remained land bound, the silent world remained a mystery to them. All that changed in 1943 when Jacques-Yves Cousteau and Emile Gagnan developed their scuba apparatus. Leonardo da Vinci's *homo aquaticus* had now become a reality and could explore the oceans.

Fascinated by the secrets consigned to the depths, in the 1950s several scientists began to invent a new discipline, 'underwater archæology' whilst working on the Grand Congloue site off Marseille. An intuitive genius sensitive to new trends, André Malraux understood the importance of this development. As early as 1966 he established the world's first underwater archæological research department, the DRASSM, within the French Ministry of Culture. His visionary instinct took physical form in 1967 with the building of a research vessel, *L'Archéonaute*.

The very symbol of the profession and home to several generations of underwater archæologists, *L'Archéonaute* will be replaced in 2012 by a new ship, one better suited to the new challenges of the discipline and to the exploration of the deep seas. In fitting recognition, this successor will be christened *André Malraux*.

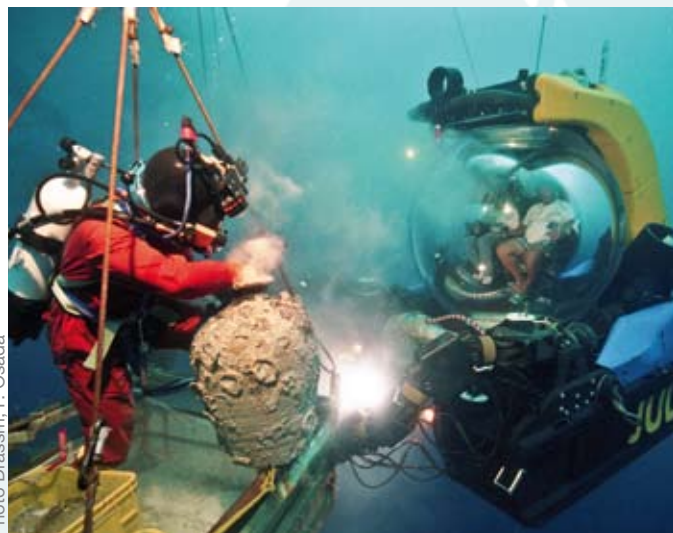


Photo Drassm, F. Osada

Diver and submersible on the Brunei wreck 15th century AD.



Photo Drassm, D. Metzger

L'Archéonaute.

The DRASSM in 2 Minutes

- **Responsible for submerged cultural heritage**, the Department of Underwater Archæological Research (DRASSM) **directs research at a national level.**
- It employs a team of 37 researchers and administrators.
- **Its base, Marseille**, is the historic capital of diving and the worldwide cradle of underwater archæology.
- The DRASSM manages a maritime zone of global dimensions: an **exclusive economic zone of 11 million km²**, from the Atlantic to the Pacific and from the Indian Ocean to the Mediterranean.
- **It administers and develops a substantial cultural heritage** of great typological and chronological diversity, from the Cosquer Cave (28,000 BP) to Saint Exupéry's Lightning P38 (1944).
- Since its creation, the DRASSM has carried out the professional evaluation, directed the study, or supervised the excavation of more than **1500 underwater archæological sites** in mainland France, French overseas departments and territories as well as foreign countries (Brunei, Egypt, Gabon, Libya, Malta, Pakistan, Philippines, Solomon Islands, USA, among others).
- The Department is highly respected abroad and is unique in its deep-diving experience. It is the oldest underwater cultural heritage management service in the world.
- Its expertise is recognised in the evaluation and study of sites as varied as shipwrecks, prehistoric lacustrine habitats, fluvial development projects and inundated caves.
- **The DRASSM participates on a regular basis in programs oriented toward the reconstruction of climatic variations** from Prehistory to our own times.
- **Its plans to expand its role as a training centre for future generations of underwater archæologists.**
- Discoveries as spectacular as the **Agde bronze statues** or the **bust of Cæsar** uncovered in September 2007 at the bottom of the Rhône River in Arles continue to confirm the 1928 predictions of Salomon Reinach that the sea is the world's largest museum.

THE 12 LABORS OF THE DRASSM

Responsible for the application of **the Heritage Code** (Book V, Title III, Chapter 2 et Title IV, Chapter 4), the DRASSM ensures the protection, study and the development of underwater cultural heritage (UCH) together with the other government bodies representing the State at sea (Maritime Prefectures, Maritime Affairs, Customs, etc.).

EXPLORING & DISCOVERING

Exploration & Archæological Operations

- 1** The DRASSM lists and evaluates the entire panoply of discoveries and maritime cultural remains within its remit: **49 shipwrecks inventoried in 1966, nearly 5,800 in 2010; an estimated 20,000 along the coasts of Metropolitan France alone.**
- 2** The DRASSM grants survey and trial excavation authorisations, evaluates planned excavation requests and oversees archæological operations in the public maritime domain.
- 3** The DRASSM directs surveys, evaluations and planned excavations.
- 4** The DRASSM occasionally works beyond mainland French borders at the request of foreign governments in assessment or excavation operations.

DISCOVERING & ANALYSING

Orientation of Evaluation & Research

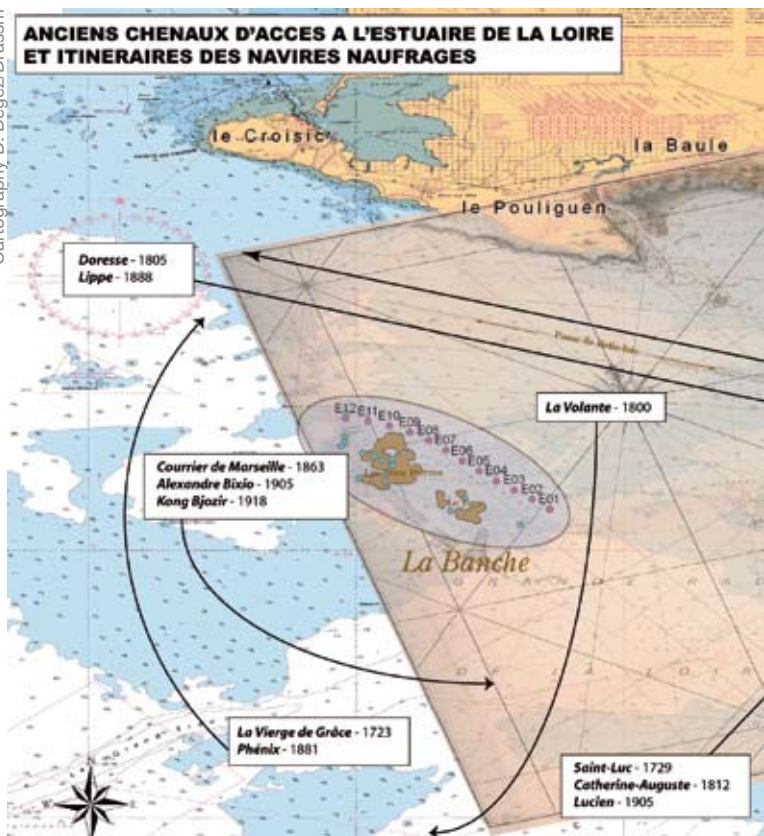
- 5** The DRASSM oversees preventive archæological projects in the public maritime arena: aggregate dredging, wind farms, coastal development, ports, dykes, anchorages, aquaculture, outfalls, gas pipelines, etc.
- 6** The DRASSM maintains a maritime sites record, the “Archæological Map” in order to ensure improved protection of maritime cultural remains and to better define research priorities.
- 7** The DRASSM, on behalf of the National Archæological Research Council assesses requests for compensation submitted by site discoverers.



Aber Wrac'h 1, 15th century AD.

Cartography D. Dégeaz/Drassm

Photo Drassm, F. Osada



Preliminary survey in accordance with the guidelines for preventive archæology.



TRAINING & RAISING AWARENESS

Education of Participants & Partners

- 8 Each year, **the DRASSM** manages over 500 requests for dispensation from the requirement for a professional diving qualification on the part of volunteer scientific divers active in the public maritime domain.
- 9 **The DRASSM** is active in training archæologists and divers in archæological excavation practices: on-site orientation, documentary resources, co-direction of Masters students.

SHARING & PROTECTING

Knowledge & Resource Availability

- 10 **The DRASSM** shares information through its annual scientific summary report, scientific meetings (the annual DRASSM open house, conferences, etc.), lectures and exhibits (“Cæsar: the Rhône Remembers”; “The Lapérouse Mystery”; “The Sea Remembers”).
- 11 **The DRASSM** manages collections of archæological artefacts derived from the public maritime domain and organises their distribution to museums.
- 12 **The DRASSM** serves as documentary repository for its field of activity: French underwater excavation reports and archival material, photos, videos and national and international publications.

*“Continents separate people, the sea brings them together.”
André Malraux*



Briefing during the Natière excavation.

Photo Drassm

Photo Drassm, T. Seguin



Scientific report summaries and monographs.

UNDERWATER ARCHÆOLOGY & CONSERVATION

The Strengths and Weaknesses of Maritime Cultural Remains

Nearly 60% of the remains uncovered during the study of submerged archaeological sites from the modern era consist of organic material (wood, vegetable fibres textiles, leather, seeds, etc.). While their well-preserved condition can be attributed to the humid environment in which they remained since they were submerged, those same circumstances lead to a profound alteration of their original characteristics. Thus, once on the surface they are at serious risk if not immediately returned to a comparable, if not identical environment, to that which permitted their survival. Many other materials, wrongly thought to be more stable, are subject to this same constraint. Glass, ceramics and metals cannot be stored and allowed to dry without undergoing specific conservation treatment. The DRASSM has been a pioneer in the development of such expertise.



The diversity of artefacts from the wrecks of la Hougue, (1692).

UNDERWATER ARCHÆOLOGY & PREVENTIVE ARCHÆOLOGY

The Great Challenge of Urban Archæology

The public maritime domain can no more escape the hand of human activity than can the terrestrial milieu. Along with port development in the wake of the extraordinary explosion of containerised transport (Le Havre-Port 2000), there are numerous projects linked to renewable energy, such as onshore and offshore wind farms. Construction projects also affect the marine environment due to their constant need for aggregate material, as natural terrestrial sources face relative exhaustion and the opening of new quarries encounter difficulties.

This has led to increased requests for marine aggregate extraction permits. Of more than a hundred infrastructure project requests supervised each year by the DRASSM, such extraction permits are the most significant in terms of surface area (up to 53 km²). They are sometimes located in sensitive zones in terms of maritime heritage, such as the mouths of large rivers.



Photo Drassm, T. Seguin - F. Osada

Photo Drassm, Ph. Foliot/CCJ

Le Havre-Port 2000.

UNDERWATER ARCHÆOLOGY & TRAINING

The DRASSM Directs the Creation of an International Underwater Archæology Training Centre

Recent decades have seen the uncontrolled expansion of an extraordinary human penetration of the deep ocean that underwater archaeologists considered in the 1980s as the last, inviolate repository of the most fundamental resources of their discipline. However, today it must be admitted that this vision of a protected archaeological Eden has been rendered obsolete. This is evidenced by the ongoing extension of high-seas trawling, the laying of intercontinental cables and international pipelines or more occasionally, the commercial salvage of hitherto protected deep historic wrecks such as the *Black Swann* or *Nuestra Señora de las Mercedes*, recently explored by the Odyssey Company.

The discipline was forced to react. Alerted by scientists, numerous countries are now reaffirming their wish to see their submerged maritime heritage protected and developed. However, this new desire is hindered by a serious worldwide shortage of specialists capable of applying in practice decisions made at the highest levels. There is an enormous need for training. France, whose pioneering role in the discipline is universally recognised, is constantly called upon to play a significant role. In response, the French Ministry of Culture called upon the DRASSM in 2003 to seek solutions to this need for training through a process of reflection and discussion. Supported by several DRASSM reports and guided by the extraordinary growth in demand, a program for the establishment of an international underwater archaeology training centre by 2013 has been put in place. At the same time, the establishment of such an institution conforms with articles 21 and 22 of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage that France is about to ratify. In effect, this Convention advocates the creation of specialised archaeological training institutions.

UNDERWATER ARCHÆOLOGY & THE MANAGEMENT OF ENVIRONMENTAL RISK

The Problem of Historic Shipwrecks Carrying Dangerous Cargoes

Hit hard by the 1978 wreck of the *Amoco Cadiz* and the subsequent environmental drama, France suddenly became aware of the danger of maritime accidents and their potentially lasting impact on the environment. However, measures taken even after the catastrophe failed to take into account the sad legacy of past wrecks.

For nearly two centuries, now, fossil fuels have served our propulsion needs, even as the transport of dangerous materials, chemicals and explosives continues to grow in volume, especially during periods of conflict.

Added to this unsettling situation are the fissile and toxic materials intentionally immersed during the twentieth century and the inexorable mechanism of marine corrosion that slowly devours metal hulls and containers, it must be recognised that innumerable time bombs lie in wait at the bottom of the oceans. As a result, since the middle of the 1980s the DRASSM has undertaken the creation of accurate data bases of all the potentially dangerous anthropogenic remains that litter the seabed. In the long run, they should facilitate efforts of officials to circumvent the dangers.

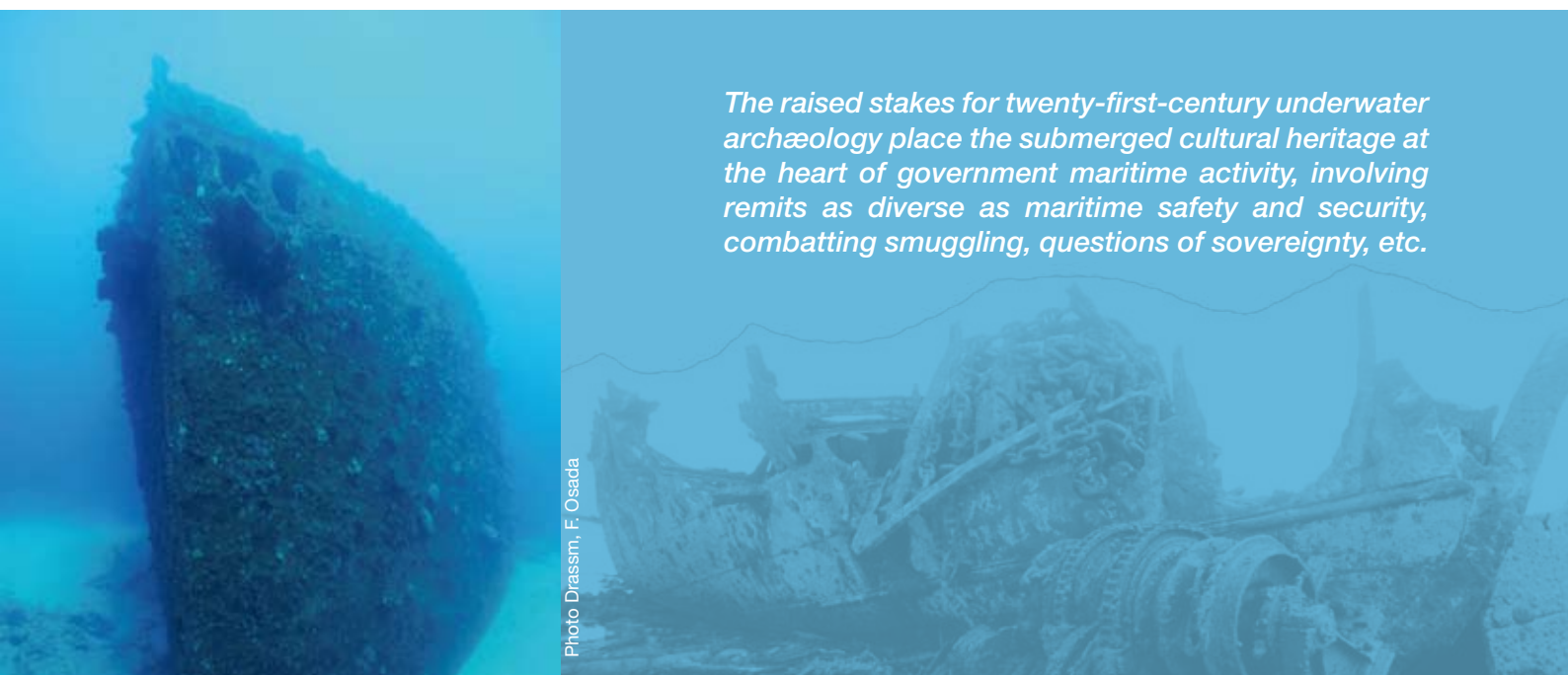


Photo Drassm, F. Osada

The raised stakes for twenty-first-century underwater archæology place the submerged cultural heritage at the heart of government maritime activity, involving remits as diverse as maritime safety and security, combatting smuggling, questions of sovereignty, etc.

Juan de Nova, wreck of a steamship in 20m of water and the wreck of the steam ship *Tottenham*, stranded on Juan de Nova's reef (1911).

UNDERWATER ARCHÆOLOGY & ECONOMIC/TOURISM DEVELOPMENT

The coastal routes of shipwrecks: towards new products of maritime culture

Proximity to the coast has always represented the greatest danger to seafarers. The shipwrecked sailor is a standard figure in coastal legend, whether inspiring compassion or the greed of wreckers among coastal populations, while the wreck itself has long been a source of local construction material.

Thus, maritime accidents have played an integral role in the history of our coasts; the DRASSM intends to slowly reintegrate them into our maritime consciousness.

Shoreline highways and byways could come to evoke famous shipwrecks, reminding visitors of the danger which the coast represents, the diversity of maritime routes and the ships and crews who plied them in every era. Through information panels or downloads via the Internet or cell phones, this history would transport the general public into the realm of maritime adventure whilst bringing to life the infinite diversity of trade within an ever changing maritime world.

Emerald Pathways: Visiting Shipwrecks *In Situ*

Visiting shipwrecks *in situ* remains a recurring desire, but one whose fulfillment is difficult to achieve. The difficulties associated with diving, the proliferation of seaweed and the absence of visibility along many stretches of coast render the task problematic to say the least, while the idea embodies popular dreams and enjoys broad public favor. The DRASSM has been studying this question for several years. Though visiting recent wrecks might appear easier because they are often less covered by bottom sediment than Medieval or Ancient wrecks, access is seldom easy because of the unpredictable nature of their environment.

On the other hand, it is easier to envisage the re-creation of ancient underwater sites using archæological material of lesser interest. The DRASSM chose this original solution in 2010 and the first model underwater site has opened to the public. If this underwater museum proves popular with visitors, others of the same type could be created in coming years.

THE MEDITERRANEAN: THE LIQUID CONTINENT, REALM OF MEMORIES

THE LANGUEDOC-ROUSSILLON: MESSENGERS FROM THE DEEP

Agde: From Promising Beginnings to the Latest Discoveries

Several masterpieces of ancient art have come down to us because they were protected by the seas. The discovery of the Agde (Hérault) Ephebe in 1964 was the first example of such treasures in French waters. Thirty-seven years later, exploration of the Languedoc coast again delivered two beautiful statues: an Eros and a young boy, accompanied by a magnificent mosaic *emblema*.



Photo: Ephebe museum, Agde



Photo J.-G. Aubert/Arc'Antique

The Agde ephebe, Alexander the Great? Roman child.

PROVENCE-ALPES-CÔTE D'AZUR: A SOUTH-NORTH OBSERVATION POINT



Photo A. Chéné/CNRS-CCJ

Painting of auks in the Cosquer cave (19,000 BP).

The Cosquer cave: A Key Example of Western Paleolithic Art

Discovered in 1991 in the Bouches-du-Rhône, these cave paintings illuminate a rarely-represented period of southern French prehistory given that coastal archaeological sites were submerged by a rise in sea level, which was nearly 120 meters lower during the Paleolithic than today. Five hundred painted and engraved images mark the two occupation periods of the cave: around 28,000 and about 19,000 years BP. The representation of marine animals (auks, fish, seal and jelly fish) offer a unique and remarkable vision of the maritime environment of the era.



Photo F. Bassemayouisse

Grand Ribaud F, 5th century BC.

Grand Ribaud F: Wine Technology and Commerce in the Archaic Period

The evaluation of the Grand Ribaud F wreck, lying in 60 meters of water off the coast of the Var, was conducted by the DRASSM between 2000 and 2002 with the logistical support of the Comex Company using the support vessel *Minibex*, the ROV *Achille* and *Remora 2000* submersible. These tools enabled the testing of new recording methods (stereo photography, photogrammetry and 3D modelling). The study of this large freighter (25 m long, containing a thousand amphoras from Cære) substantially enriched our understanding of relationships between the colonial powers of the time (Etruria and Greece) and the indigenous local populations within their spheres of influence.

From Aresquiers 10 to Trinidad: *L'Amphitrite*, Marseille and the West Indies Trade

On November 12 1839, this merchant brig had the misfortune to run into one of the most violent storms of the nineteenth century. Today the wreck evokes the foodstuffs and artisanal production of Provence as well as exotic goods (Indian fabrics, Levantine medicinal, cosmetic and hygiene products) that were traded for colonial products (sugar, coffee, cocoa, rum). This commerce was the source of Marseille's nineteenth century wealth.

*Several masterpieces of ancient art have come down to us
because they were protected by the seas.*



Packing case marked
« J. Pagniol huile surfine Marseille AF ».

Photo C. Durand/CNRS-CCJ



Glass blocks, Ouest Embiez 1, 3rd century AD.

Photo C. Durand/CNRS-CCJ



Small zoomorphic container Batéguier, 10th century AD.

Photo Y. Rigoir

West Embiez 1: Beneath the Waves, the Magic of Glass and What it Reveals

Analysis of the glass from the West Embiez (Var) shipwreck, excavated by the DRASSM, revealed a remarkable homogeneity in the composition of ancient glass. The results strongly suggest the existence of a stable, long-term source of semi-finished products. They also attest to the dependence of glass manufacturers on primary suppliers located along the southern Mediterranean coasts (the Levant and Egypt).

Carrying eighteen tons of transparent raw glass, as well as a cargo of table ware (goblets and footed wine glasses) and window glass (rectangular and *occulti*), the West Embiez 1 wreck, lost at the beginning of the third century AD, represents a unique example of the westward redistributive trade in raw glass materials.

Al Andalus: Rare and Remarkable Saracen Wrecks

The poor preservation of organic materials explains the rarity of Medieval shipwreck discoveries along our coasts. The evidence provided by four Saracen wrecks on the coasts of Provence (Batéguier 1, Agay A, Plane 3, Roche Fouras 3) is all the more remarkable for this fact.

Complementing sources mentioning the presence of Muslim communities along the Var littoral (Fraxinetum/La Garde-Freinet), they shed light on the history of maritime relations between Muslim Spain and the Christian world of the tenth century.

CORSICA AT THE HUB OF TRADE

Roman Commerce in the Depths of the Straits of Bonifacio

Some of the most important Mediterranean trade routes cross paths off the coast of Corsica. One of these is a direct line between one of the richest Roman provinces, Spain, and the capital of the empire, along which a highly diverse group of products was carried toward Rome. Lead and copper ingots loaded into the bottom of the hold were accompanied by agricultural products from the Guadalquivir Valley (olive oil, wine, olives), as well as amphoras filled with the miraculous fishery catches of the Straits of Gibraltar. Protected by the depths of the Straits of Bonifacio where it wrecked, as did so many others, the Sud Lavezzi 2 vessel apparently carried the cargo of a single shipper, judging from the epigraphic evidence of its ingots. On the other hand, the Sud Perduto 2 wreck undoubtedly represents the association of several shippers.

The numerous wrecks littering the treacherous reefs of the Lavezzi and Maddalena archipelagos demonstrate the spectacular dangers of an area that remains perilous for sailors, even today.



Photo A. Chéné/CNRS-CCJ

Spanish amphoras of Sud Perduto 2, 1st century AD.

Porto Nuovo (Porto Vecchio): Another Marble Carrier

Today a shimmering landmark for pleasure boaters, the Carrare quarries supplied architectural marble for the most distinguished buildings of the western Roman world's provincial capitals during the entire period of the Empire. Whilst in 1951, the Saint-Tropez marble wreck established itself as a pioneering site of underwater archaeology, it was almost forty years before the discovery of another wreck of its type, this time in the waters washing the coasts of southern Corsica.

The site delivered exceptionally unusual evidence regarding the identity of the vessel's passengers, notably a comprehensive toolkit belonging to two stonemasons of Middle Eastern origin and the weapon of a military officer serving as official escort.



Photo J. Chiapetti

Marble from Porto Nuovo, 1st century AD.

Dolia Wrecks: the Roman World in Search of Economies of Scale

The discovery of *dolia* carriers was a revelation for archaeologists and historians of ancient economies. Designed to remain in place in the ship's hold, these large jars containing 2,000 or 3,000 litres are the concrete expression of concern for profitability and appropriate technology (speed of handling in port, improved ratio of contents-to-container volume) in a Roman milieu perceived as lacking innovation. These ancient wine tankers were developed for the trade in bulk wine of mediocre quality between the major ports of the western Mediterranean.



Photo Arkaeos/Drassm. T. Sequin

Preparing to lift a *dolium*, Ovest Giraglia 2, 1st century AD.

From Archæology to Astrophysics: Cargo Secrets

Western coasts are not devoid of ancient shipwrecks, notably in the English Channel where the wrecks of Dover and Guernsey offer a British counterpoint to the gold torques of the Late Bronze Age discovered at Sotteville-sur-mer (Seine-Maritime) or to the Late Empire wreck uncovered in Ploumanac'h in 1983. This latter site, in the Sept-Îles archipelago (Côtes d'Armor), constitutes a rare example of the export of lead produced by the Celtic tribes of Roman Britain, the *Iceni* and *Brigantes*, in the fourth century AD. As well as the archæological study of the numerous inscription-covered ingots, the Ploumanac'h cargo, thanks to equally numerous non-epigraphic ingots, offered the DRASSM the chance to marry antiquity and today's cutting-edge technology in an almost magical manner. In the hands of physicists at the CNRS astrophysical laboratory, this lead, devoid of all residual radioactivity, is today serving basic research in its attempt to isolate dark matter in the subterranean Modane tunnel.

Finally, the small but exceptional bulwark fragment from a galley of the *Classis Britannica*, Rome's Brittany fleet, discovered on the beach at Tardingenhen (Pas-de-Calais) reminds us of the great potential of tidal zone wrecks, potentially endangered by public right of access to beaches.



Photo Ph. Mura

Lead ingots from Ploumanac'h, 4th century AD.



Photo Drassm, T. Seguin

Lowering the side scan sonar fish into the water.
European project of the Atlas of the Two Seas.

From the Channel to the North Sea: The Atlas of the Two Seas (Europe/Interreg IV-A2S Project)

Begun in 2009, this ambitious four-year project aims to develop cross-border maritime archæological heritage. It is being carried out by three of the principal European underwater archæological research and management organisations: the DRASSM in France, English Heritage in England and the Flemish Heritage Institute (VIOE) in Belgium.

The Atlas aims to establish a data base and maps of underwater archæological sites for the maritime zone bordering the three countries, all linked to a geographic information system. Local history will thus be placed into a wider general context and available resources brought together and compared: for example, information on the shipwreck site and archival material on the ships involved. Fieldwork will permit the teams to share skills and know-how before the accumulated data is shared with the general public.

Beginning in 2005, the DRASSM nurtured a precursory project, the Archæological Atlas of Maritime Cultural Remains of the Atlantic Arc. This consists of a methodical inventorying of shipwrecks integrated into a GIS, supported by a vast network of professional and amateur researchers working within a common framework. In 2008 and 2009 this was followed by the establishment of similar projects along the coasts of Provence and Languedoc.

Martinique: From Aubagne to Doban, Ceramics Across the Sea

Situated in the Saint-Pierre Bay, the site known as the Quincaillerie (Hardware) Gouyer pontoon deposit may be related to the wreck of a trading schooner sunk at the time of the Mount Pelée eruption in 1902. During this volcanic event a cinder cloud buried the port of Saint-Pierre, causing 30,000 deaths. Saint-Pierre, “pearl of the Antilles” and the island’s capital, drew merchant ships from all around mainland France, especially Provence. Ceramics from Provence were those most frequently encountered during the Gouyer pontoon excavation: kettles and pans from Vallauris, *tians* (Provençal basins) from Saint-Zacharie, jars from Biot and Aubagne ceramics (“Doban” in Antilles French). The 2010 site evaluation was an integral part of an interregional research project, “Pottery from the French Islands of the Americas, Local and Imported,” uniting the DRASSM, the Martinique DRAC, the CNRS (LAMM) and the non-profit group Arkæos.

The Eparses Islands: Rich Underwater Archæological Potential

Toward the end of the 1980s, the DRASSM began looking to French possessions in the Mozambique Channel and in the Mahoran area (Bassas da India Mission 1987, Saint-Denis-Réunion Exhibition 1992). This interest bore fruit in the form of participation in the “Eparses 2009” mission of *Marion Dufresne* organised by the French Austral and Antarctic Territory (TAAF). This operation resulted in surveys of the coral reef plateau fringes of French islands in the Mozambique Channel, as well as at Tromelin.



Mass of *tians* (large earthenware dish), casserole pots and *poêlons* (heavy earthenware or iron saucepans) in Saint-Pierre, Martinique.

Photo Drassm/Lamm, Ph. Groscaux/CNRS-LAMM

Guyana: A Look at Inland Waters

The dense network of rivers and streams crisscrossing the Guyanese landscape makes it prime territory for fluvial archæology.

The occupational remains of Amerindians along the riverbanks (axe polishing stones, engraved rocks) find a submerged echo in the watercourses themselves (ceramics, wooden and stone tools), whose study has barely begun. Recent surveys have underscored the strong ties binding the large agricultural properties, the “plantations”, and the network of waterways which constituted the only practical means of communication in this tropical forest universe during the colonial period. In 2009, the DRASSM carried out a long study of these inland waterways.



Anchor of *Sussex* (1738) on the plateau of the Bassas da India reef.

Photo Drassm, M. L'Hour

By reconstructing ancient changes in climate, its contributing factors and human-environment interactions, DRASSM archæologists contribute to today’s debates on climate change.

INLAND WATERS: LANDLOCKED THROUGH TIME

Lake Habitats: Collaborations in Climate Modelling

In addition to classic excavations such as the Medieval settlement and Neolithic village of Lake Paladru in Isère, as well as numerous systematic site inventories and evaluations, DRASSM archæologists have participated in several projects in the large lakes of the Alps and the Jura along with environmental scientists (Climasilac, Pygmalion, JurAlp, etc.). By reconstructing ancient changes in climate, its contributing factors and human-environment interactions, specialists involved in this research contribute to today's debates on climate change.

Re-emergence: Specific Procedures for Studying Water Cults

While water cults are well documented since Antiquity around springs and the monuments dedicated to them, such practices surrounding the principal karstic re-emergence have only recently been confirmed in places like Douix de Châtillon, Fontaine des Chartreux, Fontaine de Vaucluse. With this goal in mind, the DRASSM has developed techniques appropriate for working in flooded subterranean environments, where access is always difficult.

Wrecks and River Transport: Resources for Shipwreck Archæology

Remains of small craft are often found in inland waterways. These consist primarily of dugouts, whose use is documented from the Mesolithic to the Middle Ages. The architecture and age of riverine wrecks vary: the so-called Port Berteau II seventh-century fluvio-maritime coaster in Charente, the fifteenth-century cog in the Canche (Nord-Pas de Calais), the seventeenth-century transport barge at Bredannaz in Lake Annecy and the large Lake Lemman boat from the nineteenth century in Saint-Gingolph (Haute Savoie). The archæology of seagoing vessels opens windows not merely on maritime economic history, but also on the history of technology, ship construction and the emergence of such vessels.



Lake Bourget.

Photo Drassm, E. Champelovier



Evaluation in the Fontaine de Vaucluse.

Photo Drassm, E. Champelovier



Barge in lake Annecy, 17th century.

Photo Drassm, E. Champelovier

Rivers (bridges, fords, fisheries, etc.): an Area for Multidisciplinary Studies

Through the ages, rivers and streams have served diverse purposes such as irrigation and food, communication and a source of energy. This offers the archæologist a multitude of research subjects. Today, their study is not limited to the watercourse itself, but takes into account the wider environment and its change over time. This level of understanding requires interdisciplinary approaches to which history and archæology furnish the chronological framework. Such studies, in which the DRASSM participates fully, are an integral element in new modes of water-course management.

CULTURE 2000: the Danube, the Ljubljanica, the Charente Cooperative Research into European Rivers

Within the European Culture 2000 program, three countries, Hungary, Slovenia and France, represented by the DRASSM, compared their techniques for fluvial heritage research and protection during co-operative survey and excavation projects. The discovery in Taillebourg (Charente) of a few rare Viking artefacts (decorated fishnet weights, anchors, rings, axes, swords) constitutes the material evidence confirming the numerous written references to the fearsome Scandinavian raids that ravaged French rivers and coasts during the ninth and tenth centuries.



Foundation piles of the Medieval bridge at La Charité-sur-Loire.



Drawing of the piles from the remains of the Chassenard bridge, in the Loire.

Photo Drassm, A. Dumont

Photo P. Moyat

SEAS OF THE WORLD: A STRONG INTERNATIONAL PRESENCE

USA: *La Belle*, discovered in Texas, is returned to the French Flag

Uncovered in 1995 in Matagorda Bay on the gulf coast of Texas, this vessel participated in the 1686 expedition directed by Robert Cavalier de la Salle to establish a colony at the mouth of the Mississippi in the name of Louis XIV.

Directed by Texas archaeologists with the occasional collaboration of DRASSM specialists, the excavation of this site led to the ratification of a Franco-American accord in which Washington recognised France's property rights over the wreck as a vessel of state under the French flag.

USA: a French-American Partnership to Evaluate *Griffon* in Lake Michigan

Constructed by the French explorer René Cavalier de la Salle and launched on the Niagara River in 1679, the *Griffon* is said to owe its name to the griffins decorating the coat of arms of the Count of Frontenac, governor of New France. The *Griffon* disappeared with its six-man crew during its maiden voyage on Lake Michigan. La Salle had remained ashore. In 2004 an American researcher found a shipwreck which might be that of the long-lost vessel.

Extended negotiations between France and the United States, in which the DRASSM was intimately involved, ended in 2009 with the acknowledgement by the state of Michigan of the validity of French arguments and the recognition of France's rights over the *Griffon*. The 2010 site evaluation by an American team may be followed by several annual excavation seasons by a French-American team helped by the DRASSM.



Excavation of *La Belle* (1685) surrounded by a cofferdam.

Photo Drassm, F. Osada



Kendi vase, Chinese porcelain.

Brunei: The "Shipwreck Project" Reveals the Splendors of the Fifteenth-Century Sultanate

Sixty-three meters deep, 140 international specialists from diverse backgrounds, 4,600 pieces of Ming blue-and-white porcelain, 2,200 jars from China, Thailand and Vietnam, bracelets and glass ingots, several gongs and metal bars...

Directed by the DRASSM, the exhaustive excavation of the junk, lost at the end of the fifteenth century on the Borneo coast, and the exhibits that followed it in France, Asia and Australia, constitute the fruit of an ambitious project uniting the collective will of the Brunei authorities, the French Government and the oil company, Elf (today Total).

This shipwreck illustrates a fabulous period in the history of the Sultanate of Brunei when this small kingdom established itself as the centre of maritime commerce in the South China Sea.

Photo Drassm, F. Osada

Gabon: *Mauritius*, A vestige of the Conquest of Asia by Dutch Merchants

Excavated by the DRASSM, the wreck of this large merchant vessel was discovered in 1985 during a bathymetric survey requested by the Elf-Gabon Company in the vicinity of its Cape Lopez tanker terminal near Port-Gentil. Built in Europe, loaded in Asia and lost in Africa, during its second return voyage from the East Indies (1609), with a precious cargo of pepper and zinc ingots, as well as some blue-and-white porcelain from the time of Wanli, one of the last Ming emperors, *Mauritius* is the oldest excavated vessel from the famous VOC, the Dutch East India Company.

For this reason, it represents important evidence from the early days of the great economic and seafaring adventure which lasted nearly two centuries, during which dynamic Dutch merchants established a veritable commercial empire.



Photo P. Enault

Excavation of *Mauritius* (1609).

Italy: *Danton* - a Deep Sleep of a Century

In 2008 the Galsi Company was conducting preliminary surveys for the laying of a gas pipeline between Algeria and Italy when it discovered the wonderfully preserved remains of the French battleship *Danton*, sunk in 1917 off Sardinia in over 1,000 meters of water.

The remains of about 300 sailors, officers and the commander of the battleship still lie in the wreck. The DRASSM intends to conduct a new remote evaluation within the next few years.



Digital image of *Danton* obtained from multibeam side scan sonar data. Galsi/Fulgro contract.

Taiwan: French Experience in the Service of World Underwater Heritage

In March 2007 a DRASSM team carried out the evaluation of an archaeological site in the Penghu Archipelago port of Makong, in the heart of the Straits of Formosa. This work was done at the request of and in collaboration with the Taiwanese Government. A series of lectures given by DRASSM archaeologists at Tainan University led to sharing the DRASSM's decades long experience with scholars and professionals of the National Center for Research and Preservation of Cultural Remains.

Two delegations from the Taiwanese Ministry of Culture, led by the minister himself, subsequently visited the French city of Saint-Malo to meet with the DRASSM team excavating the Natière site. The two countries took this opportunity to ratify an administrative arrangement envisioning the support of DRASSM specialists in the creation of a similar department in Taiwan.



Photo Drassm, T. Seguin

Recovery of a gun from Vanikoro.

Solomon Islands, Vanikoro: the Lapérouse Mystery, Investigation in the South Pacific

In 1785, a great, globe-straddling voyage of discovery left France at the behest of Louis XVI. With some of the most eminent scientists of the day aboard, the mission of the frigates *Boussole* and *Astrolabe* was to compete with Englishman James Cook's expeditions around the world. After three years at sea and a final landfall in Australia's Botany Bay in early 1788, the expedition mysteriously vanished. It is said that Louis XVI worried over the fate of Jean François de Galaup, Count Lapérouse, until the last moments of his life. It was only in 1827, however, that an Irish navigator, Peter Dillon, stumbled on the remains of the two vessels on the island of Vanikoro in the southern part of the Santa Cruz Archipelago of the Solomons. With the support of the DRASSM, the final excavation seasons conducted at Vanikoro by the New Caledonian non-profit group Salomon finally eliminated the last doubts surrounding the fate of this great maritime adventure of the European Enlightenment. The 2008 exhibition at the National Maritime Museum in Paris, organised by the DRASSM and the museum, drew over 200,000 visitors in six months.

According to UNESCO, almost three million shipwrecks lie beneath the world's waters.

THE DRASSM AS RESOURCE CENTER Knowledge and Skills Made Available to All

PATRIARCHE, National Archæological Map of the Littoral Zone: Managing Cultural Remains

The creation of a national archæological map is one of the DRASSM's primary missions, part of its quest for knowledge and the protection of cultural heritage. Therefore, the Ministry of Culture has equipped its archæological services with a single, geo-referenced data base covering every known element of archæological heritage on French territory. Deposits are cross-referenced to documentary sources, protective regulations and archæological operations.

Processing and displaying the data as a geo-referenced map allows the latest information to be used in a variety of ways: research, administration, documentary distribution, land-use planning, etc. A great deal of the information drawn from the government's archæological map and its computer applications will be accessible on the internet through the Cultural Heritage Atlas.

The Archives Section: Thousands of Shipwreck Files

The DRASSM's archives section is responsible for centralising all documents touching upon maritime cultural remains within the French public maritime domain, as well as those dealing with French flagged wrecks lost in foreign or international waters.

It is also home to the results of archival research conducted by passionate volunteers, such as the Philoux Holdings, which includes 1800 references drawn from a large number of archives over the course of forty years by Mr. Gérard Philoux.



Extract from the National Archaeological Sites map.



The DRASSM library.

The Library: 6,500 Titles and Over 5,500 Offprints

The holdings of the highly specialised DRASSM library cover the fundamental areas of the department's responsibilities: sub-sea archæology, fluvial and lacustrine archæology, maritime history, shipbuilding history, shipwreck events and their remains, the history of diving, amphoras, metallurgy, artillery, preventive conservation, etc.

Enjoying an extensive work space, the library welcomes researchers, archæologists and students by appointment; its holdings are in the process of being digitised and will be put on line progressively.



The Palm/Arkaeos Atlas.

The Atlases: Three projects publicising and distributing knowledge of Maritime Heritage

The Archæological Atlas of Maritime Cultural Remains of the Atlantic Arc, the PALM Atlas (Archæological Heritage of the Mediterranean Littoral: Provence-Alpes-Côte d'Azur), Atlas of the Maritime Cultural Remains of Hérault, as well as a large European program, the Atlas of the Two Seas: English Channel and North Sea, all use digital technology to link information and image banks to map holdings. Today they constitute, along with the Patriarche database, which includes them all, the most efficient research and development tool for improved management of France's underwater heritage. Thus, they represent the fundamental driving force behind the creation of a maritime atlas of national or trans-national scope. In addition, they are particularly useful in raising the general public's awareness of its maritime past.

The Preventive Conservation Section: Managing Collections, Training Excavators

In 2010 the DRASSM created a preventive conservation section now responsible for the management of collections of archæological artefacts uncovered accidentally or during underwater evaluations and excavations. In addition to this vast mission, the section's specialised personnel are responsible for training excavators in the recovery and initial conservation of artefacts in the field and for creating a *vade mecum* of initial conservation in underwater archæology.

This versatile section will enable the building of strong bonds among the different people engaged in the researching and publicising maritime cultural remains, such as volunteer excavators, professional archæologists, conservation laboratories, museum conservators or collections managers.



Photo Drassm. T. Seguin

Preventive conservation on the Natière excavation.

The Milles Depot: An Artefact Storage and Study Facility

Inaugurated in March, 2006, the Milles Regional Archæological Depot, shared by the DRASSM and the Provence-Alpes-Côte d'Azur Regional Archæological Service, consists of a vast ground-floor space and a mezzanine equipped with movable storage shelves. An adjoining building holds areas for artefact cleaning and drying, while offices can accommodate researchers who have come to study the finds from underwater excavations along the arc of the French Mediterranean.



Photo Drassm. S. Cavillon

Milles depot.

Photo/Video Library, Photo Laboratory: A Stock of 100,000 Documents

During the 42 years of its existence, the DRASSM has evaluated, directed the study or overseen the excavation of more than 1,500 underwater archæological sites in mainland France, its overseas departments and territories or in foreign countries. At the same time, its documentary holdings, which cover not only history but also scientific developments and the major accomplishments of the discipline, are among the largest and most diverse in the world. In addition to shipwrecks, these data concern submerged dwelling sites, flooded decorated caves, silted up ports, abandoned anchorages and isolated finds, among other subjects. They deal with themes as diverse as maritime history, economic and commercial history, the history of science and technology or the history of daily life, from Antiquity, and even prehistoric times, up to the present.

Similarly, the full range of artefacts share space in this collection including amphoras and Norman stoneware, Roman swords and bronze cannons, glass vials and perfume bottles of horn, marble statues and bronze travellers'icons. Finally, the development of excavation techniques is amply illustrated, from the earliest underwater dredges and lifts concocted by Jacques-Yves Cousteau to two-person submersibles, as well as magnetometers, and side-scan sonars. In order to preserve and facilitate access to this invaluable collection, in 2006 the DRASSM began digitising 90,000 still images, 255 videos of all types and hundreds of scientific files and excavation reports. This work is being accomplished with the aid of the national digitisation program supported by the Ministry of Culture; the results are being progressively added to the "Memory" database of the Ministry of Culture, accessible on line.

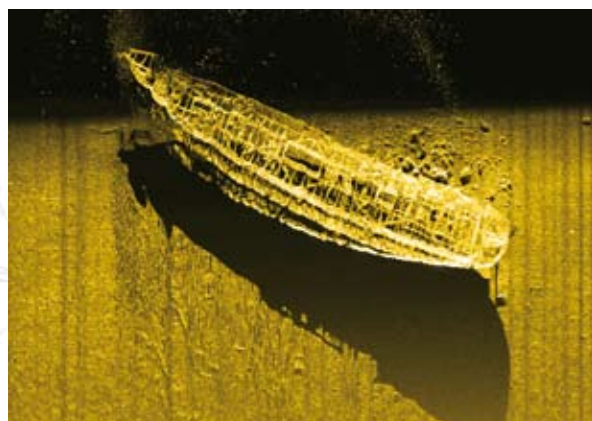
The DRASSM's documentary holdings are among the largest and most diverse in the world.

THE DRASSM: PROSPECTION AND SURVEY Tools Serving Cultural Heritage

Remote Sensing Equipment: Armoury of Research Tools

Today, most diachronic or thematic survey projects use specialised detection equipment, such as side-scan sonar or magnetometers. These tools often furnish results that are decisive in locating and identifying anomalies that might turn out to be maritime cultural remains.

They allow the coverage of extensive areas and the inspection of deep zones, even in poor visibility. They also permit the accurate positioning of identified targets. These instruments require a certain expertise and interpretive finesse, often requiring refined supplementary analysis. The DRASSM has recognised the necessity of these remote sensing methods for inventorying, managing and studying the cultural heritage of the maritime realm.



Sonar image of *Saint-Dominique* (1897).

Document Drassm, Denis Degez

André Malraux, the DRASSM's Research Vessel of the Future

After creating the DRASSM in 1966, André Malraux, then Minister of Cultural Affairs, provided the new organisation with an archaeological research vessel: *L'Archéonaute*.

Home to several generations of underwater archaeologists, *L'Archéonaute* spent forty years crisscrossing the Mediterranean before age rendered it incapable of standing up to the rigorous demands of the DRASSM's missions. Begun in the autumn of 2006, a long naval architectural study has led to plans for its successor. The thoroughly modern design of the new research vessel, *André Malraux*, should allow it to undertake all the prospection, survey, evaluation and excavation projects incumbent upon the DRASSM, whether in coastal waters or on the high seas, in the Mediterranean as well as in the Atlantic, the English Channel or the North Sea.



Model of *André Malraux*.

Conception, A. Méroz Photo Drassm, S. Cavillon

Lune, Proof of Progress in Excavation Techniques

Discovered in the spring of 1993 by the IFREMER submarine, *Nautile*, the *Lune* wreck has lain in 90 m of water off Toulon since 1664. It sank in minutes, carrying to the bottom nearly a thousand military personnel, all its bronze and iron artillery pieces and every bit of its equipment.

Immediately after its discovery, the wreck of this French royal ship was assessed by the DRASSM, with the support of IFREMER. It was then decided to mothball the wreck until new excavation techniques and the necessary significant logistical means were in place to ensure a successful study.

The discipline having evolved, the DRASSM has been working since 2008 to make the project a reality. *Lune*, undoubtedly one of the most important and best preserved wrecks in the world, should thus become an experimental laboratory for the development and testing of excavation methods indispensable for the emerging discipline of deep-water archaeology.



IFREMER's *Nautile* during the evaluation of the *Lune* wreck.

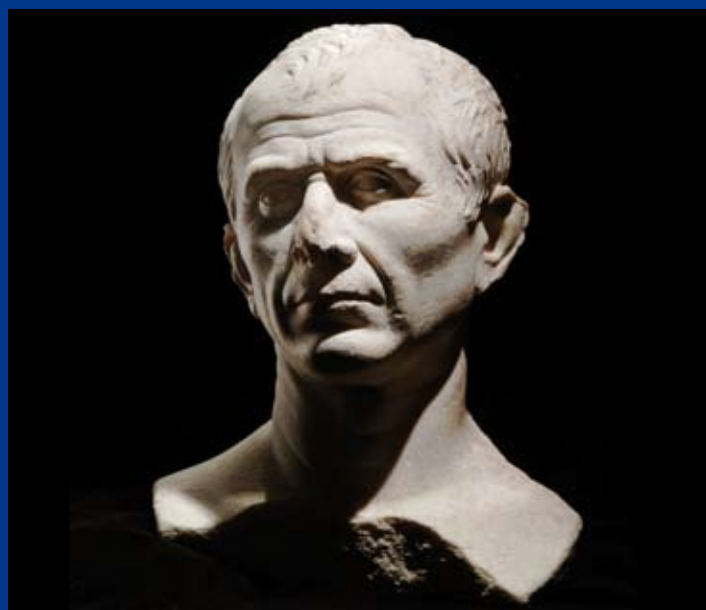
Photo Drassm, L. Long

The Lune Project, a twenty-first century laboratory for underwater archaeology.

THE DRASSM INITIATES CULTURAL EVENTS Major Exhibitions and Outstanding Cultural Sites

“Cæsar: The Rhône Remembers Twenty Years of Excavations in the River at Arles”

The Rhône has served as a major artery to inland territories since earliest Antiquity, uniting the sea and the waterways irrigating the heart of Europe. Ships from distant shores progressively enriched the city of Arles, which achieved the status of Roman colony. The exhibition organised in 2009 and 2010 by the DRASSM and the Museum of Ancient Arles laid out twenty years of the DRASSM’s activity in the river and its estuary. Recognised by the Ministry of Culture as serving the national interest, the exhibit drew nearly 400,000 visitors.



Bust of Caesar found in the Rhône in 2007.

Photo, departmental museum of Antiquity, Arles, J.-L. Maby

“The Sea Remembers (La mer pour mémoire): the Underwater Archæology of Atlantic Shipwrecks”

Symbol of terror or divine will, the shipwreck slowly came to occupy a significant place in the maritime world of coastal populations. Insinuating itself into the collective imagination, it spurred the interest of adventurers and jurists, inventors and captains of industry. Capsules frozen in time, shipwrecks are history’s sunken witnesses. Today’s archæologists are doing their utmost to study their lessons.

Conceived and organised by the DRASSM to appear in eight western French museums from 2005 to 2009, the exhibit “The Sea Remembers” offered over 250,000 visitors the most extensive synthesis ever put together on 40 years of underwater archæological research into the shipwrecks of the Channel and Atlantic Coast. This inter-regional exhibition was recognised as serving the national interest by the Ministry of Culture.



Exhibition «The sea remember».

Photo Drassm, T. Seguin

“The Privateers of the Natière (Saint-Malo)” <http://www.epaves.corsaires.culture.fr>

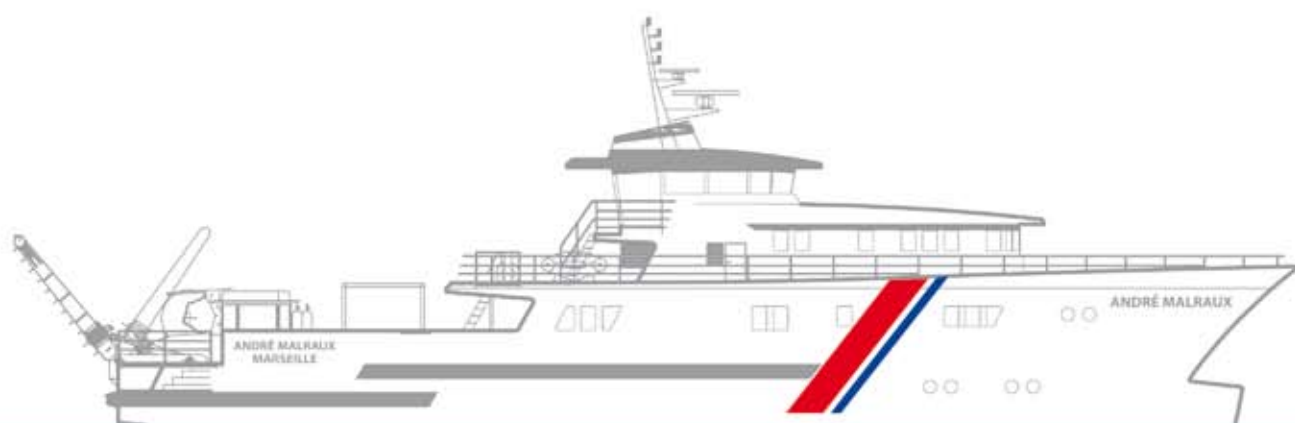
After “The Lake Peoples” (the first farmers), “The Colletière Excavations” (farmer-knights of the year 1000) and “Archæology Beneath the Seas”, the Ministry of Culture’s Department of Research, Higher Education and Technology and the Sub-Directorate for Archaeology completed its panorama of underwater archæology’s contribution to historical knowledge with an Internet site dedicated to the DRASSM’s excavations of the Natière shipwrecks (named the Ministry of Culture’ Outstanding Sites of 2010).

These sites open an extraordinary window on the lives of sailors, privateers and merchants who created Saint-Malo’s wealth in the seventeenth and eighteenth centuries, while writing one of the grandest pages in French maritime history.



Uncovering a barrel of pine tar, Natière 2 wreck (1749).

Photo Drassm, T. Seguin



Ministry of Culture and Communications

General Directorate of Cultural Heritage
Sub-directorate for Archæology

Department of Underwater Archæological Research

147 plage de l'Estaque
13016 Marseille
tel: + 33 (0)4 91 14 28 00 / fax: + 33 (0)4 91 14 28 14
email : le-drassm@culture.gouv.fr

