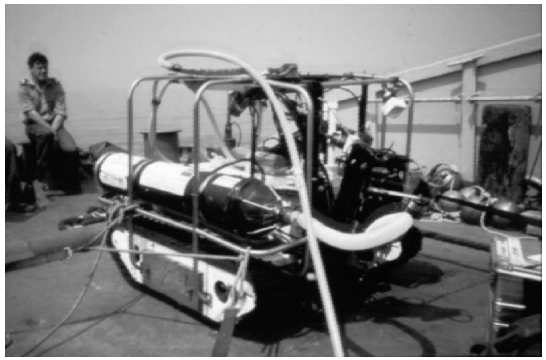
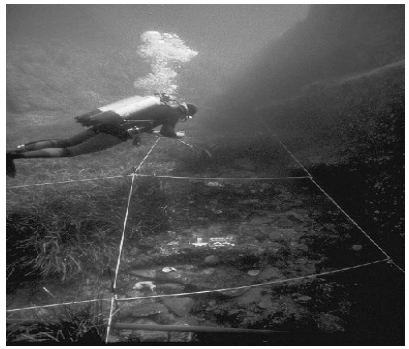
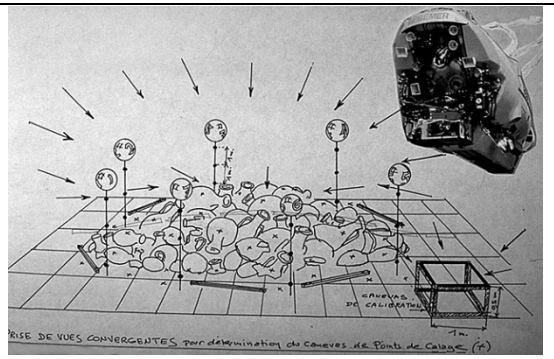
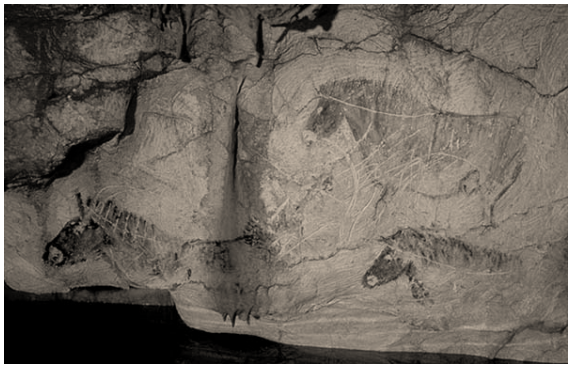
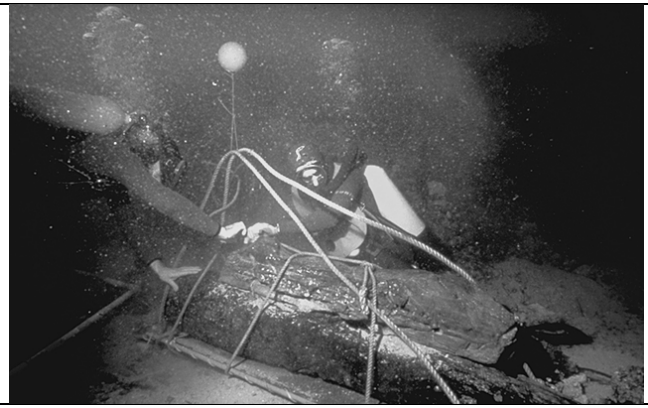
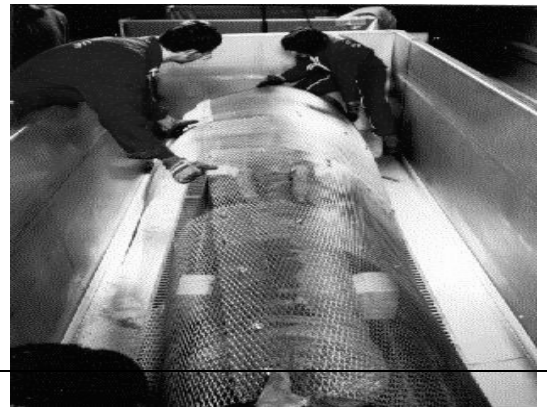
Maritime Archaeology Methods

Archaeological Method	Description	Illustration
Integrated Navigation & Prospecting	This arrangement consists of a **magnetoscope** linked to a **navigational system and a sounder** which feed information into a **software program** installed on a Macintosh computer. The method used to detect a ferrous mass under water is to find an anomaly in the Earth's magnetic field with a magnetoscopic probe towed by a ship. While a systematic survey has as its goal the discovery of shipwrecks and their pinpoint location, it can also establish that a certain zone is clear of wrecks. For that reason, precision navigation and complete data collection are imperative.	
Robotic Craft	The robot can accomplish the following tasks: · movement at the bottom of the sea · navigation and positioning · exploration, observation, and taping of video images · seizure of objects · use of an aspirator nozzle	
Saturation Diving	**T**he constraints of air diving limit the exploration of certain sites. A large number of shipwrecks resting at relatively great depths (between 60	

	and 80 metres) have already been explored with traditional diving techniques. However, with these one can only conduct elementary documentation or short examinations under difficult and always dangerous conditions. One solution that allows methodical excavations at these depths is the so-called saturation diving, which uses different gas mixtures to prolong work times. During his immersion, the diver reaches an equilibrium of dissolved gasses so that his decompression profile remains independent of the duration of his dive. Linked to the surface with a turret, he travels to the depth of the worksite in a high-pressure trunk, and only undergoes a single decompression at At the moment, saturation diving and the logistics involved are too expensive for the budgets of most excavations. Thus, this kind of operation is only feasible for shipwrecks that are of interest to the mass media and dispose of exceptional budgets.	
Undersea excavation	The site is first cleared of excess undergrowth. Once the site is cleared, a reference grid is installed on the site which aids in calculations and registration of data: the most conventional technique is to place an **orthogonal quadratic grid** of nylon cables or PVC tubing, creating lattices of 2 X 2 or 4 X 4 metres. The next step is the methodical exploration of	

	the shipwreck. This involves the use of powerful underwater vacuum cleaners. The objects are directly numbered, then a number is placed in a photograph. Following this, the objects are lifted. These data are written on PVC tablets that are covered with a sheet of synthetic paper on which one can write with an ordinary ball-point pen.	
Virtual Excavation	Virtual methods of excavation use photographic equipment and computer software to record and examine a site. Advantages of this method include: · operations can be conducted at great depths; · sites can be studied without raising or displacing objects; · the complete site can be memorized, allowing archeologists to work on it as many times as they wish.	
Scientific dating of organic material	**W**ith the help of nuclear physics and particle accelerators, minute samples of carbonized pigments were used to establish the date of the prehistoric paintings in the <u>Cosquer Cave</u>. This is how the researchers determined that the grotto had been visited during two periods separated by a large timespan, 18,500 and 27,000 years ago. During the first sojourn, 27,000 years ago, humans covered the walls with finger tracings	

	and imprints. The paintings and engravings of animals date from the second visit. The dating was established using the Tandetron (low-radiation accelerator) of the Gif-sur-Yvette centre, on quantities of organic matter weighing less than a milligram. This method, which can be applied to organisms that were alive during a specific period or are derived from living organisms, such as charcoal, is based on the measurement of the radioactive carbon 14.	
Dendrochronology- dating of ship's structure	**D**endrochronology is a process that allows a highly precise dating of archeological sites containing wood. It is particularly appropriate for the dating of wood found during undersea excavations.	
Electrolysis- method of treating materials	**E**lectrolysis, used alone or with other techniques, makes the cleaning of the surfaces of certain soft metals, such as lead or silver, possible. It also allows the cleaning of metallic surfaces that are inaccessible by other means, such as the interior of a bronze cannon. Correctly employed, this technique is immensely helpful in the **cleaning** of particular metals. Most importantly, it **stabilizes** and **decontaminates** them, because of the effect it has on chlorites,	

	which occur in great quantities in ancient metals.	
Lyophilization- method used to stabilize woods that have been saturated with water	**A** process of simply drying by evaporation can have catastrophic results on archeological leathers and woods saturated with water. Instead, a combination of chemical treatment and controlled drying or lyophilization is applied. Lyophilization is a drying technique for which the sample is frozen, and its solid moisture (ice) is then under low pressure directly converted to a vaporous state, bypassing its liquid form. The vapors are condensed on a rod that is kept at a very low temperature. Lyophilization is an efficient and gentle method of drying ancient woods and leathers. Still, to assure freezing without damage to the pieces, they must be protected by a low-temperature agent which is introduced in impregnation baths. At the moment, the most often used products are glycol polyethylenes.