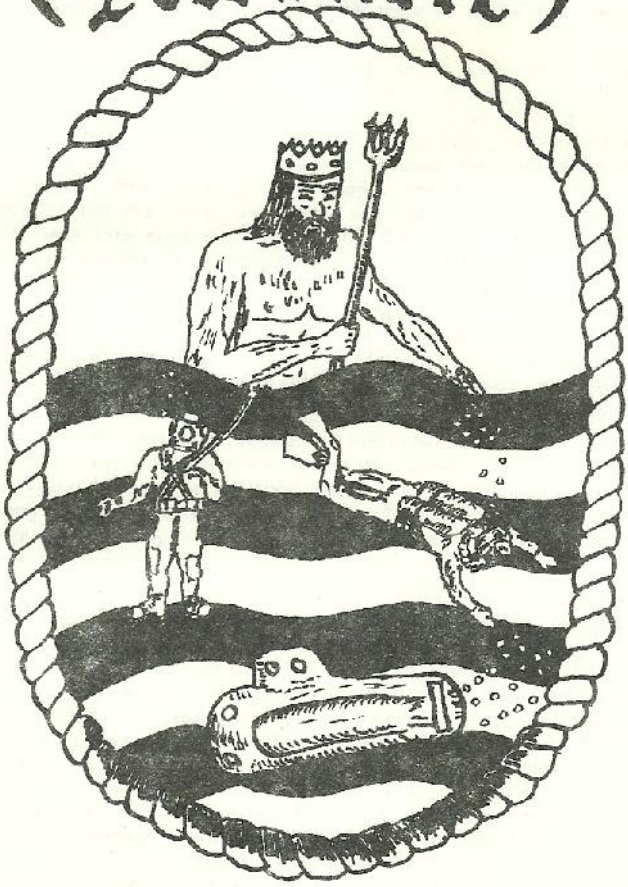
Fleet Diving Unit (Atlantic)



History Of Diving

HISTORY OF DIVING

History gives no record of the date when diving first began or whom the first divers may have been, but man's curiosity probably led him into the water and under it's surface at a very early stage. Like some of the early pearl and sponge divers, the first divers probably used no equipment at all except perhaps a stone to get them to the bottom more rapidly. Although unaided divers have achieved some remarkable depths and durations, it is not likely that the early divers exceeded 1 or 2 minutes of submergence or 80 to 100 feet of depth.

Written records provide accounts of some very ancient diving exploits. Most of these were connected with naval warfare, for example, Xerxes is said to have used combat divers. Over 400 years before before Christ, Herodotus told the story of Scyllis, a famous Greek diver who was employed by Xerxes to recover treasure from sunken Persian ships. When the job was done, the conqueror decided to detain Scyllis but the diver went over the side during a storm, threw the whole fleet into confusion by cutting the anchor cables, and then completed his escape by swimming 9 miles to Artemisium. Alexander the Great used divers to destroy the boom defences of Tyre about 333 BC., and Aristotle wrote that Alexander himself descended in some sort of diving bell. Divers were used in at least six naval battles and sieges between 400 BC and 1795 A.D. In the early 1800's Spanish warships still carried men whose duties were swimming and diving for the fleet, although no breathing appliances were used.

Several of the ancient accounts indicate that crude means of supplying the diver with air were sometimes used. About 77 AD., the historian Pliny referred to military divers who breathed through tubes which were supoprted at the surface by a float. In a famous treatise on warfare written about 375 AD., Vegetius described diving hoods equipped with air pipes.

Interest in diving increased after 1500, and many different rigs were designed. In 1511, the book written by Vegetius in 375 AD., was printed, and a drawing of the diving hood described by him (fig. 1) became the first design for a diving dress to be found in a printed book. Even before this, Leonardo Da Vinci had sketched diving outfits and hand fins along with submarines and flying machines. In 1524, Vallo designed a leather helmet which was slightly more advanced than that of Vegetius. This one at least provided eye-ports, and it's leather pipe was reinforced with iron rings and held up by a disk shaped float. If they were ever built, such rigs could not have been used in water much over the divers head. In 1680 Borelli designed an outfit (fig. 2) which probably would have been the first self-contained diving apparatus. – – if it had been built, and if it could have been used, which is unlikely.

Although little of the equipment designed before 1800 was very practical, the underwater accomplishments of the period were surprising in many ways. A primitive snorkel submarine (propelled by by 12 oarsmen) was making regular trips on the Thames around London about the time the Pilgrims landed in America. Diving bells and crude diving helmets were used for work on wrecks as deep as 60 ft., and reasonably practical air pumps were developed before the end of the 1700's.

The advent of compressors started the development of diving as we think of it to-day. With the ability to maintain an air pocket against greater and greater pressures for longer and longer times came the physiological problems of working under pressure. As each problem was encountered, its solution was sought through the combined efforts of the scientists and the men willing to try again. The divers of the 1800's were true adventurers advancing into the unknown. They had no knowledge of how well their equipment would work or against what tests it would be pitted. They had no knowledge of what the pressure, the compressed air or the combination of the two would do to them, and the harbours around Europe were just as black then as they are now. We owe much to these individualists.

One of the most famous divers of the 1800's was Alexander Lambert. His most noted exploit took place when a tunnel, which was being built under the Servern River in England, flooded in 1880. Using the forerunner of the oxygen rebreathing apparatus, he went alone down a vertical shaft and far into the tunnel through masses of floating debris. In order to shut an iron door so that the tunnel could be pumped out, he was forced to return to the surface to get a wrecking bar. On his second trip into the blackness he finished the job. Three years later, the tunnel flooded again and Lambert was hired to repeat the job. He tried to use the same equipment, but this time he was poisoned either by the high oxygen content or carbon dioxide. He barely managed to escape with his life, but he tried again the next day using a surface-supplied rig and completed the job. In 1885, Lambert forced his way through 3 decks and into the strongroom of a wreck at 162 ft. He recovered nearly half a million dollars in gold, but the job gave him a case of the bends which forced him to retire. There was as yet no adequate decompression tables, which were developed by Professor Haldane and his associates in 1907.

In 1878, another Englishman by the name of H.A. Fluess designed the first successful self-contained breathing apparatus (fig. 3). As the name implies, this type of apparatus was a completely self-contained unit which was secured to the diver by means of a harness. This system dispenses with the need for an air hose connected to a compressor on the surface, the diver being equipped instead with small high pressure cylinders containing compressed air, oxygen or oxygen nitrogen mixture.

The elimination of the cumbersome air hose made the self-contained apparatus particularly suitable for work in confined spaces such as flooded mines and tunnels, and it was in this capacity that it originally found its most extensive use.

During World War II the development of a new type of underwater warfare brought about a requirement for self-contained equipment which would permit divers to go to greater depths and provide them with a greater range of operation. Experimentation and extensive research soon provided the underwater swimmers (frogmen), charioteers and disposal divers with self-contained equipment which enabled them to accomplish heretofore impossible feats.

The versatility of self-contained equipment makes it ideal for certain types of underwater operations.

Self-contained breathing apparatus may be classified under two headings, the closed circuit sets using oxygen or oxygen and nitrogen mixtures and the open circuit sets using compressed air. Closed circuit sets are the recirculating type in which the exhaled gas passes through a carbon dioxide absorbent and is rebreathed by the diver. In the open circuit sets, using compressed air, the exhaled air is exhausted into the water, therefore eliminating the necessity of a carbon dioxide absorbent.

Divers are often required to search large areas of rivers, harbours, and harbour entrances as well as ships bottoms. In most cases speed is essential and the divers must be able to cover the area thoroughly in a minimum amount of time. During World War II this problem was attacked and solved by the clearance diving personnel of the Royal Navy. They developed various search schemes and several types of self-contained diving gear which enabled them to search a variety of areas in a quick and efficient manner.

Past experience in Clearance Diving has proven that the self-contained diving equipment is far superior to the standard diving dress for this type of work.

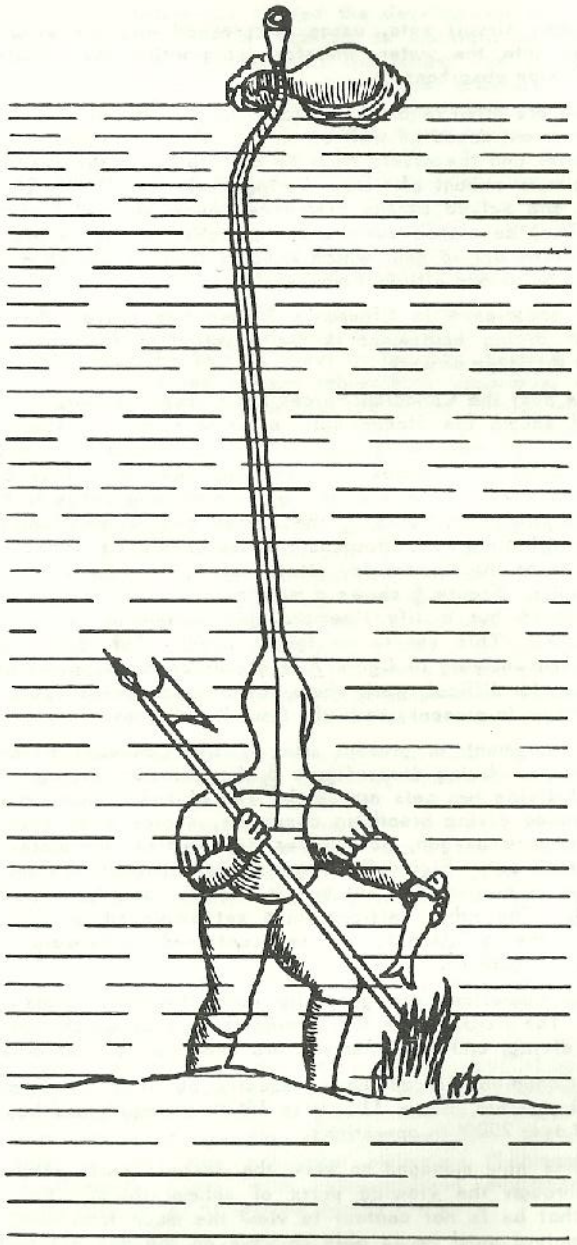
In the past the Canadian Forces have used a variety of equipment. Figure 4 shows the Sladen suit, or more commonly known to most divers as "clammy death". A "closed circuit", or semi-closed circuit breathing apparatus is used with this rig. This bulky suit allowed the diver to use a couple of sets of long Johns to help withstand the cold. In figure 5, the closed circuit breathing apparatus is shown with a dry suit. Woolens are also used under the suit. This set still serves as the present day attack set, but wet suits have replaced the dry suits. Figure 6 shows a mine recovery set, which is partially self-contained but a life line provides telephone communication to the surface. This set is no longer used. The disco lightweight diving outfit showing in figure 7 is a surface air supplied apparatus. It was used for difficult work where plodding equipment was necessary. It is no longer in present use in the Canadian Forces.

The equipment in present use by the Canadian Forces is the USN deep sea diving dress figure 8, for standard diving. For self-contained diving two sets are used. The closed circuit set known as the clearance diving breathing apparatus, serves a dual role. When used with pure oxygen, no bubbles are omitted, therefore it serves as an attack set. Figure 9. When oxygen nitrogen mixture is used, it becomes a semi-closed set and it may be used for mine recovery. Figure 4. The other self-contained set employed by the Canadian Diver is the S.C.U.B.A. or self-contained underwater breathing apparatus. Figure 10.

Diving operations are generally conducted from boats or diving tenders. The FDU(A) has four diving tenders of which two are used for deep diving, and the other two are used for self-contained diving.

The Canadian Forces have recently obtained a six-man, deep diving submersible, figure 11. It is 19'2" in length and has obtained a depth of over 2000' in operations.

Man has now managed to view the deepest parts of the world's oceans through the viewing ports of submersibles. For the same reasons that he is not content to view the moon from afar, he shall not be content until he is able to walk on the deepest parts of the ocean floor. Breathing mediums are even now being developed that will enable him to do this. The day may well arrive when mankind will be as at home in the sea as he is now on land.



—Diving Hood of Vegetius

Figure 1

Fleuss' design.

Borelli's design.

Figure 3

Figure 2

Figure 4

Figure 5

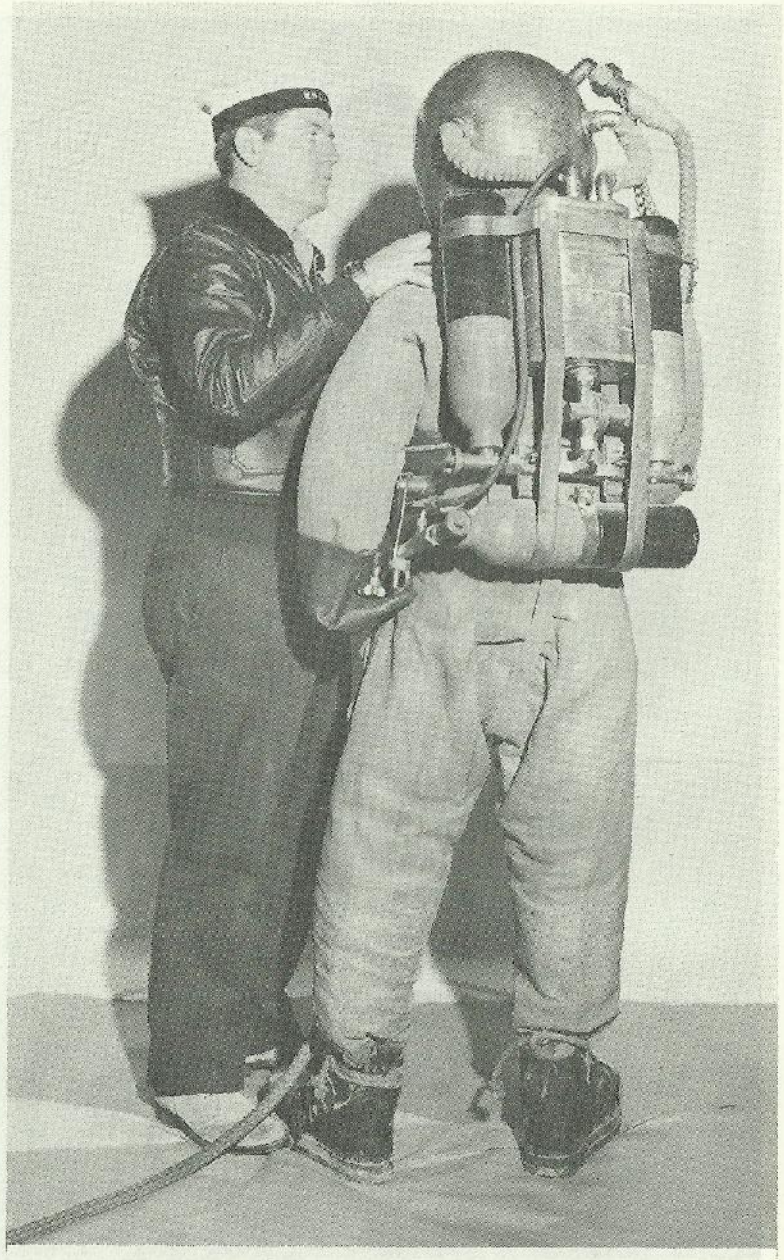


Figure 6

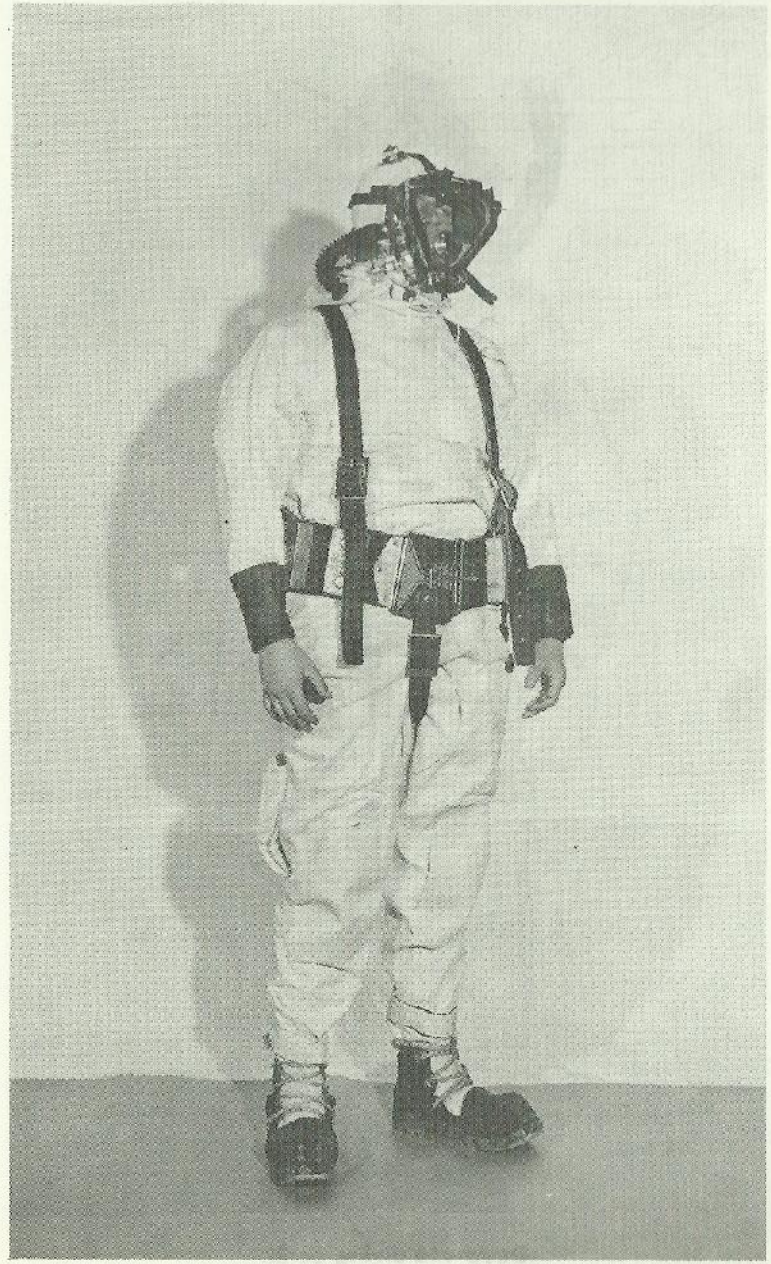
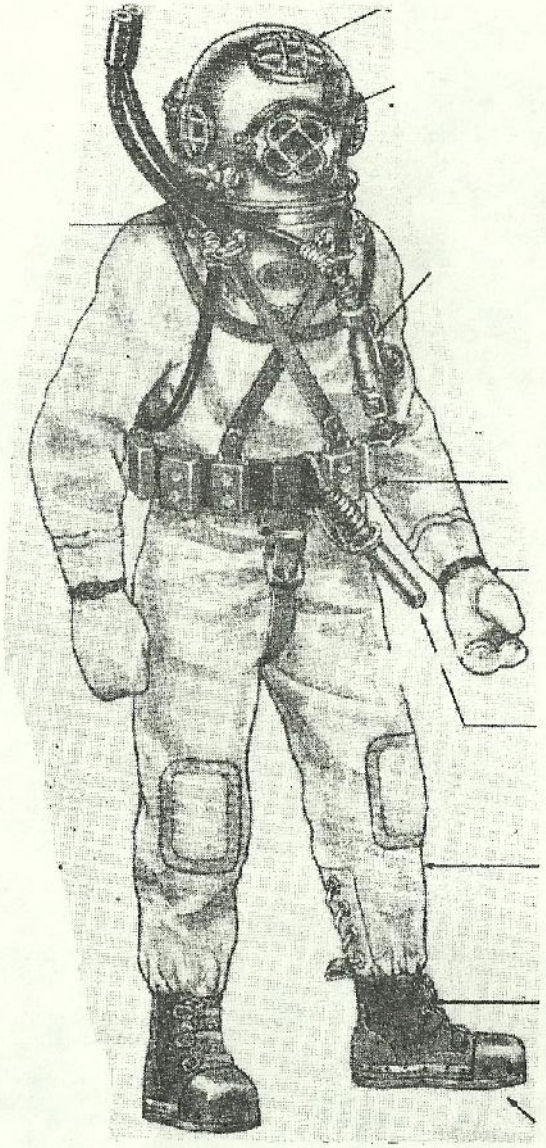


Figure 7



Deep-sea diving outfit.

Figure 8

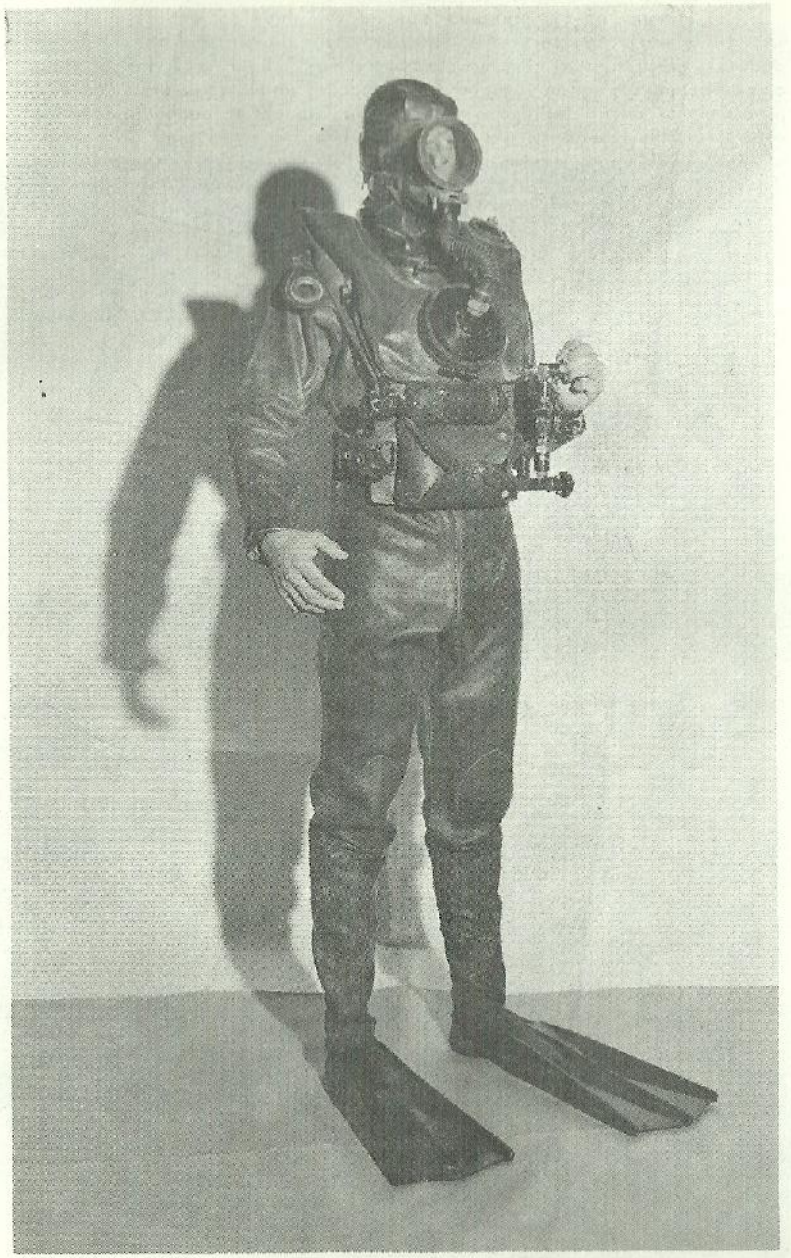


Figure 9

Figure 10

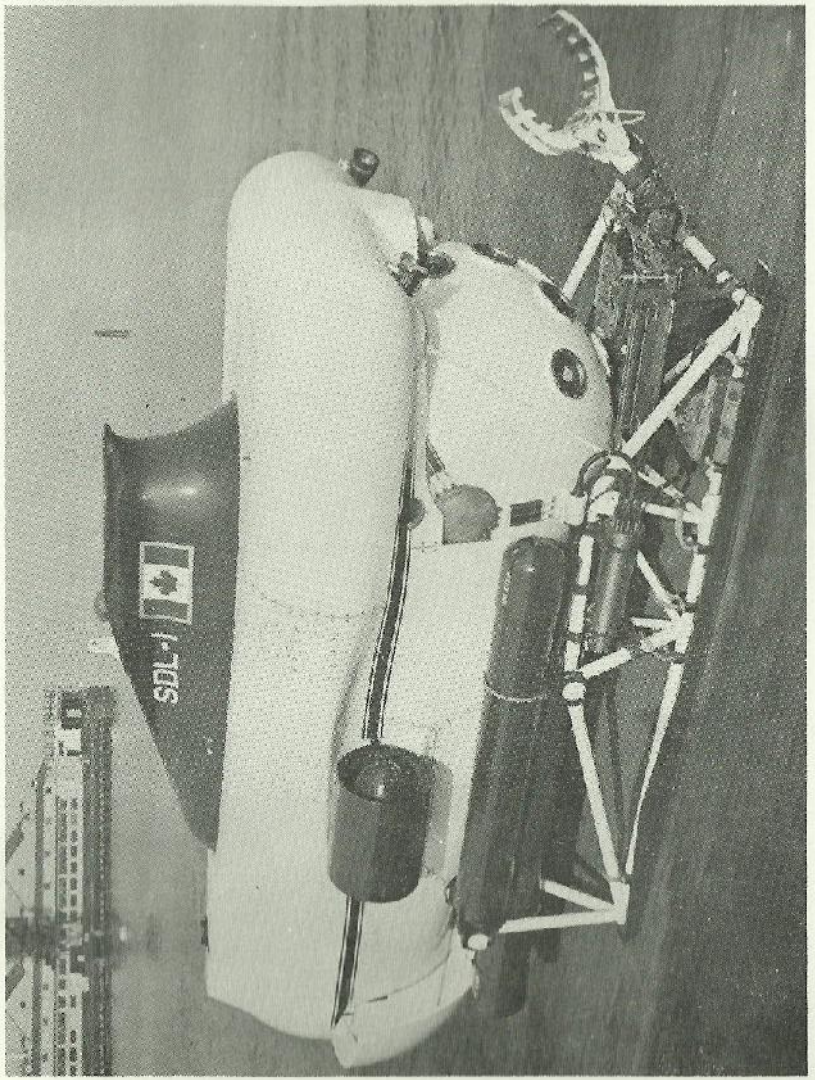


Figure 11