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**THE DEVELOPMENT OF EQUIPMENT
for
UNDERWATER EXPLORATION**

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Man's survival on this planet may well depend on his understanding of the oceans and his ability to inhabit and explore the underwater world. Today, man is faced with the need to solve problems of world-wide scope including that of providing food for an exploding population, that of finding new sources of minerals, oil, and natural gas, and that of developing sophisticated underwater military equipment.

There is evidence that even before the dawn of history man was diving into the seas. Early historians indicate the use of underwater breathing aids such as vases and tubes. Beginning in the sixteenth century the diving bell was developed and elaborated, in accordance with the same basic principle of physics that was applied in the use of the earlier vases. Early in the nineteenth century, the combination pressure-resistant helmet and watertight, flexible diving suit replaced the diving bell. This diving equipment was used for nearly all submarine work through World War II and is still sometimes used today. In 1943 Jacques Yves Cousteau invented an underwater breathing unit that provided the diver with compressed air from cylinders harnessed to his back. For the first time, man was able to move freely under water for more than a few minutes at a time.

Exploration of the deeper regions of the oceans was first undertaken by Charles William Beebe in a heavy, pressure-resistant sphere called a bathysphere. In 1934 Beebe descended

below the level of light to a depth of slightly more than half a mile. Professor Augustus Piccard built the bathyscaph, Trieste, in 1953. In 1960 Jacques Piccard descended in it to a depth of almost seven miles, thereby proving that man could probe the deepest regions of the oceans if he was encapsulated in a hermetically sealed, pressure-resistant vessel with a self-contained air regeneration system.

Modern trends in oceanology stress ocean engineering. Research by aerospace companies has shown the adaptability of aerospace technology to the construction of underwater equipment. A few deep sea vessels have been built. Others are either in the planning stages or under construction. Another development in modern undersea exploration is the establishment of undersea dwellings. It is hoped to use these dwellings to make possible extension of the depth limit of free divers and elimination of time-consuming periods of decompression, a necessary precaution against attacks of the bends when returning to atmospheric pressure.

The use of helium combined with air may soon extend man's living depth to beyond 600 feet and his working depth to beyond 1000 feet. The wealth of the entire continental shelf would then be within his reach. In view of man's need for comprehensive knowledge of the world under the oceans, it is imperative that he continue to expand the techniques and equipment that will enable him to descend into and utilize all its regions.