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KRUCKER, KATHLEEN ANN. A History of the Motivations for Underwater Diving as Depicted in Selected Literature. (1976) Directed by: Dr. Tony Ladd. Pp. 81.

The purpose of this study was to trace the historical development of the motivations for underwater diving. The data base for the investigation was selected literature, which included ancient sources and modern documents.

From the review of literature, the following questions were formulated: 1) Why and how did man begin underwater diving?, 2) What motives prompted the continuation of man's pursuit of underwater diving?, and 3) What effect did technology have regarding new motivations for underwater diving?

All passages related to underwater diving were extracted from books, periodicals, museums, and unpublished papers. Interpretations of meaning and significance of diving accounts were made.

The findings for question one showed that man was motivated to begin underwater diving to obtain food, to gain material resources, and for military reasons. The data concerning question two demonstrated that man was motivated to continue underwater diving for possible material gains, for purposes of military gains, to explore new and unknown frontiers, and to pursue scientific investigation. The findings of question three showed that as a result of improvements in diving equipment, man was motivated to engage in underwater diving as a sport or source

1

of recreation. The literature also showed that many divers were motivated to express their feelings and thoughts on underwater diving.

A HISTORY OF THE MOTIVATIONS FOR UNDERWATER DIVING
AS DEPICTED IN SELECTED LITERATURE

by
Kathleen Ann Erucker

A Thesis Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Physical Education

Greensboro
1976

Approved By

George H. Hild

1977, Laud., Ph.D.

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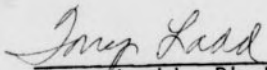
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3 May 1976
Date of Acceptance by Committee


Tony Ladd, Ph.D.

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My appreciation goes to all who aided and encouraged the completion of this text, especially Jang, Joan, Martha, my parents, and Kelly Russell.

APPROVAL PAGE

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are they
 Who venture beneath the sea?
 Today's vikings
 Climbers of underwater Everests
 Free-fallers of inner space
 Who negotiate terms
 With ancient ocean rites
 Their depth-contoured journey
 Carries them naked
 Where sea's purple ink
 Writes dangerous warnings

Who are these men
 of yesterday and today
 Who discuss tomorrow's explorations
 In distant weedless whalehalls

They are you and I
 And the Columbus in us
 Continually calls
 To
 sunless
 valleys
 of the deep.¹

People in various civilizations have harboured a store of emotions, inspirations, and fears about the sea. The intensity of these feelings has spurred man to challenge and explore the sea in every conceivable way, including the pursuit of underwater diving. Such emotions have also served as a source for literary and artistic expressions. It is through these expressions that the

¹Joe MacInnes, *Under the Sea* (New York: Dodd, Mead & Company, 1974), p. 4.

modern researcher is able to examine the motivation for man's attempts to conquer the sea.

CHAPTER I

The investigations and explorations of Captain

INTRODUCTION

Jacques Cousteau, authority and pioneer in underwater

research, has revealed a new world of men beneath the sea. Who are they? Who venture beneath the sea? Today's vikings . . . Climbers of underwater Everests . . . Free-fallers of inner space . . . Who negotiate terms With ancient ocean rites Their depth-contoured journey Carries them naked Where eon's purple ink Writes dangerous warnings . . . Who are these men of yesterday and today Who discuss tomorrow's explorations In distant weedless whalehalls . . .

They are you and I And the Columbus in us Continually calls To sunless valleys of the deep.¹

People in various civilizations have harboured a store of emotions, inspirations, and fears about the sea. The intensity of these feelings has spurred man to challenge and explore the sea in every conceivable way, including the pursuit of underwater diving. Such emotions have also served as a source for literary and artistic expressions. It is through these expressions that the

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modern researcher is able to examine the motivation for man's attempts to conquer the sea.

The investigations and explorations of Captain Jacques Cousteau, authority and pioneer in underwater research, have received much public attention. Cousteau has revealed an underwater world of beauty and inspiration. Mankind, however, has engaged in underwater diving and has explored the ocean depths for centuries despite many obstacles and personal risks. Diverse motives have led to the pursuit of underwater diving. For some, the motives have related to the securing of food, the location of treasures or the pursuit of military victory. For others, the quest for exploration, the search for knowledge, or the pursuit of solitude has enticed divers into the underwater world.

Today, underwater diving is an emerging sport and recreational pursuit. Much new interest, awareness and attention is being given to the fascinating and beautiful world of the underwater diver. Diving schools and clubs are very popular. It is speculated that the growth of such outdoor sports as underwater diving can be attributed to the desire of members of today's transient and complex society to seek and make contact with the natural environment. For some, the motive is to escape the complex man-made environment and descend into the solitude and natural domain of the eternal sea--a place to find internal harmony

and to make contact with a major portion of our planet Earth.

Although man has engaged in underwater diving for thousands of years, the question arises as to why man has and continues to engage in underwater diving. Why did men venture beneath the seas? What are the motivations for descending into the unknown and sometimes hostile depths of the underwater world?

STATEMENT OF THE PROBLEM

This study traces the historical development of the motivations for underwater diving. Selected literature, including ancient sources as well as selected modern documents, comprise the data base for the investigation.

From the review of the literature, the researcher formulated the following questions:

1. Why and how did man begin underwater diving?
2. What motives prompted the continuation of man's pursuit of underwater diving?
3. What effect did technology have regarding new motivations for underwater diving?

The related findings for questions were explored through data sources and are given in Chapters II, III, and IV.

Although the investigator has attempted to trace the development of underwater diving from its origin to its modern form, only information directly related to the motivations for underwater diving were used.

ASSUMPTIONS UNDERLYING THE STUDY

The following assumptions underlie the study:

1. All accounts of and references to underwater diving which were obtained from modern documents are records of real events.
2. The literature consisting of printed books, papers, and periodicals was selected on the basis of availability, and practicality.
3. The nature and subject of this study lends itself to beneficial and valid use of secondary source materials.
4. All modern documents used for this study were written by writers who possess knowledge of and/or a specialty in one or more aspects of underwater diving.
5. A few ancient sources used for this study could not be traced to their primary source. However, these secondary sources deserve citation and should be considered as important notes to early motivational aspects of underwater diving.

SCOPE OF THE STUDY

Although the investigator has attempted to trace the development of underwater diving from its origin to its modern form, only information directly related to the motivations for underwater diving were used.

The investigator did not pursue the areas related to the submarine or submarine diving.

All accounts of underwater diving will be mentioned only as they have occurred or occur in the oceans and seas.

SIGNIFICANCE OF THE STUDY

As an avid underwater diver, this writer has found the water-filled environment to be a source of enjoyment and excitement as well as a world of beauty and inspiration. Though these feelings are of a personal nature, it would appear that other divers have experienced similar feelings about diving. This study, then, examines the feelings of other divers and also attempts to express them.

There is no source which primarily explores the motivations of past and present underwater divers. Sources are scattered and this study brings these sources together. This study emphasizes the motivational aspects for the development and the continued pursuit of underwater diving.

DEFINITION OF TERMS

1. Aqua-Lung (or scuba) - The Aqua-Lung is a tank of breathable air which is carried on the diver's back.
2. Closed-circuit Scuba - Closed-circuit scuba is a type of scuba in which the diver inhales compressed air and completely exhausts this inhaled air back into his air supply. The air is recirculated or rebreathed.

3. Compressed-air Scuba - Compressed-air scuba refers to a supply of air which is carried by the diver or which is supplied to the diver via a hose.

4. Face Mask - A face mask creates an air space between the diver's eyes and nose, and the water. The face mask covers the diver's eyes and nose with a clear lens and enables him to see underwater.

5. Fins - Fins, or flippers, are placed on the feet to add propulsion and power to the kick.

6. Goggles - Goggles operate on the same principle as the face mask. Goggles only create an air space between the diver's eyes and the water.

7. Open-circuit Scuba - Open-circuit scuba is a type of scuba in which the diver inhales compressed air and completely exhausts this inhaled air into the surrounding water. No recirculation and rebreathing of air occurs.

8. Regulator - A regulator is a device which reduces the scuba tank pressure of compressed air to the surrounding water pressure. The regulator follows the principle that the diver must inhale and exhale at the same pressure.

9. Scuba - Self-contained underwater breathing apparatus.

10. Scuba Diving - Scuba diving refers to diving under the water with the aid of some type of scuba and breathing while under the surface.

11. Skin Diving - Skin diving refers to diving under the water with lungs filled with air inhaled from above the surface.

12. Snorkle - A snorkle is a hollow tube which permits the diver to breathe air while submerged by holding one end in the mouth and permitting the other end to remain out of the water.

PROCEDURES

A preliminary review of literature demonstrated that a considerable amount of information could be found related to underwater diving. A formal outline was submitted and approved by the Graduate faculty in the Department of Health, Physical Education and Recreation at University of North Carolina at Greensboro.

The researcher extracted all passages related to underwater diving from books, periodicals, museums, and unpublished papers. The resource centers used were:

1. University of North Carolina at Greensboro Library.
2. University of North Carolina at Chapel Hill Library.
3. University of Arizona Humanities and Science Libraries.
4. Queen Mary Museum, Long Beach, California.
5. Larry McElroy, unpublished paper.

6. Tucson School of Scuba Diving, Tucson, Arizona. After all information was extracted, organized, and classified, the researcher realized there was a profuse amount of information on underwater diving. This information included accounts of underwater dives, underwater equipment, technical aspects of underwater diving, techniques of underwater diving, and submarine diving.

After a second organization and classification of diving accounts, the investigator noted few accounts dealing primarily with the motivations of past and present underwater divers. A new outline was organized emphasizing the motivational aspects of underwater diving.

Interpretations of meaning and significance of diving accounts were made, and the findings were organized and placed in Chapters II, III, and IV. Chapter V includes a summary of the findings.

CHAPTER II

WHY AND HOW DID MAN BEGIN UNDERWATER DIVING?

Are there not, . . .
 Two points in the adventure of the diver,
 One--when, a beggar, he prepares to plunge,
 One--when, a prince, he rises with his pearl?
 --Robert Browning²

When and where man first entered and submerged beneath the ocean's surface is not precisely known. Evidences of the first divers are scattered among archaeological findings and literary passages dating to the B.C. era.

The first evidence of man's exploration of the sea consists of shells.³ That man engaged in early diving can be established through the findings of archaeological expeditions which have uncovered evidences of shells, mother-of-pearl ornaments, and reliefs depicting underwater diving. Mother-of-pearl inlays in the ruins of Bismaya suggest that man was diving as early as 4500 B.C.⁴ Archaeological expeditions have also uncovered shells from Mesopotamia dating to 4500 B.C. According to Edmund Burke,

²John Bartlett, Familiar Quotations (11th ed.; Boston: Little, Brown and Company, 1941, p. 484.

³Pierre and Jean Rivoire DeLatil, Man and the Underwater World (New York: G. P. Putnam's Sons, 1956), p. 33.

⁴William Beebe, Half Mile Down (New York: Harcourt, Brace & Co., 1934), p. 27.

these findings must have originally come from the sea floor.

Archaeological findings in and around Mesopotamia have included a considerable amount of mother-of-pearl used in ornamentation. It is impossible to gather much of this beautiful material without diving for the shells which are its source.⁵

Archaeological evidence of diving does not emerge again until around 3200 B.C. in the Theban Sixth Dynasty in Egypt. During this period, mother-of-pearl was used more extensively than it was earlier in Mesopotamia and Bismaya. Burke again cites the necessity of using underwater divers to recover shells used for mother-of-pearl inlays and art work.⁶ According to Robert Marx, a void of over a thousand years exists in the history of diving. This void ends in 3200 B.C. with the discovery of carved mother-of-pearl ornaments. The shells from which these ornaments were made could have been obtained only by diving.⁷

The ancient Sumerian civilization, predecessors of the ancient Babylonians, "created the epic of the hero Gilgamesh," in which Gilgamesh "plunges under the sea in

⁵Edmund Burke, The Diver's World (Princeton, New Jersey: D. Van Nostrand Company, 1966), p. 1.

⁶Ibid.

⁷Robert F. Marx, They Dared the Deep: A History of Diving (Cleveland: The World Publishing Company, 1967), p. 13.

search of a magical seaweed."⁸ Although Burke feels it would be difficult to assert that the Sumerians were divers,⁹ tablets from Sumer tell the story of Gilgamesh. Gilgamesh, a hero of 2500 B.C., dived to find the herb of eternal life. When he found it, Gilgamesh fell asleep because he was exhausted by his dive; and while he slept, the herb of eternal life was stolen from him.¹⁰

The Assyrian Empire, an ancient empire in West Asia, is noted by historians for its bas-reliefs. These reliefs depict men underwater who are using long tubes connected to goat-skin bladders filled with air.¹¹

The Cretans, in the twenty-fifth century B.C., worshipped a diving god by the name of Glaucus. Greek fishermen and sailors also worshipped Glaucus.¹² Glaucus purportedly possessed seaweed that contained magical properties and served as the patron god of Greek divers, fishermen, and sailors.

Passages from classic literature reflect the existence of underwater diving. Homer's Iliad refers to the

⁸Burke, p. 1.

⁹Ibid.

¹⁰Cousteau, p. 9.

¹¹Burke, p. 1.

¹²Howard E. Larson, A History of Self-Contained Diving and Underwater Swimming, Office of Naval Research under Committee on Undersea Warfare, Publication No. 469 (Washington D.C.: National Academy of Sciences, National Research Council, 1959), p. 4.

death of Hector's driver, Cebrienes, at the hands of Patrocles, as falling to death like the plunge of a diver. Patrocles describes Cebrienes's death:

Bless me! nimble insooth is the man, so lightly he timbles! Yea, if perchance he were sailing the deep sea, teeming with fishes, Many, me thinks, this man might sale [sic] by his fetching up oysters. Leaping off from the ship, e'en though it were boisterous weather--So on the plain doth he lightly dive from out his war-car. . . .¹³

In Aeschylus's The Suppliant Women, the King makes a reference to underwater diving when he says, "Now, like a diver plunging to the deep, I need some saving thought;"¹⁴ Aeschylus makes another reference to underwater divers by citing their strict training habits and abstinence from alcohol. The divers, according to Aeschylus, ". . . dared not allow their keen and far-seeing eyes to be dimmed by the use of wine."¹⁵

Aristotle pondered some of the physical problems that underwater divers experienced:

Why is it that the ear-drums of divers burst in the sea? Is it because the ear, as it fills with water, is subject to violent pressure. . . .? Why do divers tie sponges round their ears? Is it in order that the sea may not rush violently in and burst the ear-drums?¹⁶

¹³Homer, The Iliad, xvi.355.

¹⁴Aeschylus, The Suppliant Women, 55.

¹⁵DeLatil, p. 45.

¹⁶Aristotle, Problemata, vii.960-61.

These early references and evidences of underwater diving indicate that underwater diving did exist very early in time. These early primitive divers had a variety of reasons for beginning underwater diving.

MAN BEGAN UNDERWATER DIVING TO OBTAIN FOOD

To pinpoint and discern who the first underwater divers were and where they first dived is difficult. Perhaps it is not so important to do this, rather it should be noted why these first underwater divers dived. The literature indicates that a very basic and indispensable motive for early underwater diving was for the obtainment of food.

Howard Larson states his ideas on who the first divers were and why they first dived:

Where, when, and how man first went underwater, or returned to it, we cannot say. The first evidence of any life (sea life, be it noted) is generally dated about one and one-half billion years ago. Man is believed to have emerged from the tangle of evolution about one million years ago. Thus, some time within the past million years or so man made his first underwater excursion. It is probably safe to assume that these early underwater dives were to obtain food.¹⁷

Marx also states that although we do not know where the first divers dived, the first divers sought fish, mollusks, crustaceans, and other foods from the sea.¹⁸

¹⁷Larson, p. 4.

¹⁸Marx, p. 13.

Larry McElroy states that in the beginning of underwater diving "man's . . . primary objective was food . . . and the need to swim and survive underwater was a means to this end."¹⁹

Rick Carrier views the presence of oyster and deep-water shells as evidence that ancient man ". . . dived, and got . . . food from the sea."²⁰ According to John Sweeney, the ancient peoples of the Mediterranean and the Malayan Peninsula dived under the ocean to obtain "a wealth of food . . . from the depths . . . [and] could plummet to the sea bed, often to depths of 100 feet, . . ."²¹

Perhaps the motive of obtaining food is all too obvious. But, to the first underwater divers, this motive was basic and essential.

MAN BEGAN UNDERWATER DIVING TO GAIN MATERIAL RESOURCES

The literature indicates that underwater divers began diving for monetary reasons, as well as for food.

¹⁹Larry McElroy, "Motivations for Skin and Scuba Diving" (paper read at the Second International Conference on Underwater Education, Santa Ana College, October 23, 1970).

²⁰Rick and Barbara Carrier, Dive (New York: Wilfred Funk, Inc., 1955), p. 4.

²¹John Sweeney, Skin Diving and Exploring Underwater (New York: McGraw-Hill Book Company, Inc., 1955), p. 67.

Sponges, mother-of-pearl shells, oysters, and coral were highly prized commodities for trade in the classical world.

"Greek divers provided the classical world with most of its sponges--even as they do today."²² Sponges had a variety of uses, and there are numerous references to sponges in Homer's Iliad and Odyssey. During Homer's time, sponges were used for cleaning, spreading wax, applying compresses, and padding the inside of soldiers' helmets.²³

Sponge-divers were the first divers to systematically engage in their diving activities.²⁴ It appears, however, that sponge-diving was no easy task and demanded a great deal of physical stress from the divers. Oppian describes the ordeal of the sponge-divers: ". . . there is none worse nor any work more woeful for men."²⁵

Pierre DeLatil combined the words of Oppian, Aristotle, and Pliny to describe the work and ordeals of the sponge-diver:

The first diver to go down attaches a cord to his middle He has only two tools: . . . a very sharp curved knife . . . and a heavy stone. Taking a deep breath of the air . . . he then dives down. Thanks to the weight of the heavy stone he has with him he plummets down rapidly. Despite the fact that his ears are full of oil and covered by

²²Burke, p. 2.

²³The Iliad of Homer, 230; The Odyssey of Homer, 5, 371, 413, 418.

²⁴DeLatil, p. 44.

²⁵Oppian Colluthus Tryphiodorus, 509.

oil-soaked sponges they begin to pain him. At the same time his temples, his eyes and his chest are taken as though in a liquid vice. He hits the bottom rather than lands on it.

He makes for the rocks and discovers the sponges he is seeking. They grow on the underwater rocks and they seem to be part of the submerged reefs. Without losing a moment he darts at the sponges, vigorously wielding his knife, As soon as he has severed the sponge from the rock he pulls the cord to let his companions above know that he must now be pulled to the surface as quickly as possible.²⁶

Aristotle sheds light on a rather gruesome practice by the sponge-divers when he asks, "Why did sponge-divers slit their ears and nostrils? Is it in order that the breath may pass more freely?"²⁷

Besides diving for sponges, these early divers recovered mother-of-pearl shells, oysters, murex shells (the source of a purple dye used for dying cloth), and red coral. A Frenchman, Dr. Louis Boutan, referred to the existence of pearls in Ceylon and India dated 550-540 B.C.²⁸ These pearls were highly sought after and were "obtained principally by divers."²⁹ Pliny's Natural History mentions pearl divers in a chapter entitled "How pearls are found:" "the divers, they say, take special

²⁶DeLatil, pp. 46-47.

²⁷Aristotle, p. 961.

²⁸Larson, p. 4.

²⁹Ibid.

care to find these oysters . . ."30 Chinese Emperor Yu received pearls acquired by divers as tribute from the coastal regions of his realm."31

Of all the valuables indigenous to the sea, the most highly prized was red coral which was used for jewelry and ornaments. This red coral served as an item of commerce and trade between China and the Mediterranean countries, for the Chinese desired it very much. Red coral was also exported to India. With this establishment of trade in red coral by the Mediterranean countries "the gathering of coral became a permanent activity throughout the Mediterranean."32

Diving for red coral (and for oysters) was more difficult than diving for sponges. The coral divers had to do more searching on the ocean's bottom and had to dive much deeper. Red coral is found in moderately deep water, as Marx notes in comments regarding the skill of the coral divers:

. . . red coral is seldom found in water shallower than 100 feet and diving to such a depth without the aid of any breathing apparatus is no mean feat. The early divers had nothing like the equipment the modern diver takes for granted--they were free divers. . . . How deep these divers were able to go and how long they were able to remain submerged we do not know, but we estimate that a

30Pliny, The Natural History, 434.

31Marx, p. 14.

32DeLati1, p. 49.

dive of 100 feet for red coral must have taken at least two or three minutes, and it is very likely that the ancient divers were able to go deeper and remain under longer.³³

That these ancients dived with no protection or apparatus such as goggles would seem to make their exploits even more arduous.

Although a main monetary motive for early diving was the securing of valuables indigenous to the sea, divers submerged to work in harbors and rivers and to recover sunken treasures. The literature indicates that there were numerous divers available for a variety of tasks. Besides diving for treasures, many underwater divers found the area of underwater construction in shipping and anchoring to be very lucrative.

Underwater divers increased in number and became very competitive. Corporations were formed in order to obtain contracts for jobs. The Emperor of Rome, during the second century B.C., granted a concession to one of these corporations to conduct all diving operations along the Tiber River.³⁴

An early account of using diving to obtain sunken treasures comes from Herodotus who writes of a Persian diver named Scyllias. Scyllias had been employed by Xerxes, the King of Persia, to recover a large amount of

³³Marx, pp. 14-15.

³⁴Ibid, p. 17.

treasure lost from Persian galleys during a battle against the Greeks. The Persians were shipwrecked during a storm off Mount Pelion and were waiting to attack the Greeks, who had been surrounded by the Persians at Aphatae. Scyllias recovered the treasure, but apparently Xerxes refused to give Scyllias his share by reneging on his promise, and kept Scyllias aboard his galley. Scyllias escaped and went to the Greeks. Herodotus writes:

Now the Persians had with them a man named Scyllias, a native of Scioné, who was the most expert diver of his day. At the time of the shipwreck off Mount Pelion he had recovered for the Persians a great part of what they lost; and at the same time he had taken care to obtain for himself a good share of the treasure. He had for some time been wishing to go over to the Greeks; but no good opportunity had offered till now, when the Persians were making the muster of their ships. In what way he contrived to reach the Greeks I am not able to say for certain: I marvel much if the tale that is commonly told be true. 'Tis said he dived into the sea at Aphatae, and did not once come to the surface till he reached Artemisium, a distance of nearly eight furlongs.³⁵

Herodotus expressed skepticism at the distance of Scyllias' swim. He says: "Now many things are related of this man which are plainly false, but some of the stories seem to be true. My own opinion is that on this occasion he made the passage . . . in a boat."³⁶

Diving for treasures was widespread. During the third century B.C. in Rhodes,

³⁵The History of Herodotus, 434.

³⁶Ibid.

. . . there were special laws regarding divers and their share of any treasure brought up from the bottom of the sea. Treasure found at a depth of 16 cubits (four fathoms, or 24 feet) or more, entitled the diver to one-half the value of the treasure; at eight cubits, to one-third; and at two cubits, to one-tenth.³⁷

Divers were very accessible and were hired to carry out a variety of tasks. Plutarch writes of an amusing story involving Mark Antony and Cleopatra. Apparently, Mark Antony went out fishing one day with Cleopatra. When Antony caught no fish he became angry and secretly commanded divers to swim under water and keep his hook supplied with fish. Cleopatra discovered his ploy, however, and asked Antony to come fishing the next morning:

A number of people came to the haven, and got into the fisher-boats to see this fishing. Antonius then threw in his line and Cleopatra straight commanded one of her men to dive under water before Antonius' men, and to put some old salt-fish upon his bait, like unto those that are brought out of the country of Pont. When he had hung the fish on his hook, Antonius thinking he had taken a fish indeed, snatched up his line presently. Then they all fell a-laughing. Cleopatra laughing also, said unto him: . . . this is not thy profession: thou must hunt after conquering of realms and countries.³⁸

One of the motivational factors causing man to begin underwater diving was monetary gain. The first underwater divers ". . . brought to the surface, long before the time of Christ, some of the untold riches that

³⁷Larson, p. 5.

³⁸Plutarch, Selected Lines from the Lives of the Noble Grecians and Romans, 122-23.

enhanced the coffers of ancient princes."³⁹ Whether they dived for valuables in the sea, recovery of treasures, or for construction work, these early divers sought material resources.

MAN BEGAN UNDERWATER DIVING FOR MILITARY REASONS

The beginnings of underwater diving were attributed to yet another motivation. The literature indicates that the use of divers during naval warfare was a common practice. Underwater divers were employed in the art of war. Military divers were used by the Greek, Egyptian, and Levantine navies before the time of Christ.⁴⁰

Thucydides mentions the use of divers during the seige of Syracuse (414 B.C.). The Spartans were trapped and surrounded by their enemies, the Athenians, on the island of Sphacteria. "Being surrounded by the enemy the problems of supplies were urgent. They [the Spartans] solved it with the aid of divers."⁴¹ The Spartans wanted their divers to work at night. They dived under water past the Athenian vessels, to carry back supplies:

. . . as [the Spartans] were expert at diving,
[they] swam over through the harbour, dragging after

³⁹Sweeney, p. 67.

⁴⁰Ibid, pp. 67-68.

⁴¹Thucydides, History of the Peloponnesian War, 371.

them . . . bottles filled with poppies mixed up with honey and the powder of linseed.⁴²

During this same siege, it appeared that the defenders of Syracuse (the Spartans or their allies) had placed and driven stakes into the harbor to prevent the Athenian vessels from entering. The Athenians tried to remove these stakes, but to no avail. Many of the stakes were submerged beneath the water and could not be seen. Athenian divers attempted to saw off these stakes, but the Syracusans merely drove in more stakes.⁴³

A short time later, during Alexander the Great's world conquest, divers were utilized during the siege on the Egyptian city of Tyre. Both Alexander's forces and the defenders of Tyre made frequent use of underwater divers.⁴⁴ The defenders of Tyre employed divers to destroy a blockade of timber and to sever the anchor chains of Alexander's ships.⁴⁵ The forces of Alexander used divers for demolition work and destroyed the boom defenses of the port.⁴⁶ Philo of Byzantium, writing on the military mechanics of the Alexandrine Age, describes what had to be done to prevent attack by underwater divers:

⁴²Thucydides, p. 371.

⁴³DeLatil, pp. 56-57.

⁴⁴Marx, p. 19.

⁴⁵Larson, p. 5.

⁴⁶Burke, p. 2.

To prevent anchor ropes being cut by divers in shallow waters metal chains should be used, and to prevent divers from piercing the hulls of ships sentinels armed with tridents should be placed on deck to watch for divers below the surface.⁴⁷

Perseus, the last King of Macedonia, used divers during the Battle of Pydna in 168 B.C. During Perseus's defeat, he panicked and ordered that his treasure at Pella be cast into the sea. Perseus later changed his mind and ordered divers to recover the treasure, which was almost entirely recovered. Livy recorded Perseus's actions regarding this matter.

Perseus at length recovered his courage from the panic. . . . So great was the king's shame at this panic of his that he ordered the divers secretly to be put to death, . . . so that there should be no one having knowledge of so crazy an order.⁴⁸

The poet Lucan, who wrote of the struggle between Caesar and Pompeius in 49 B.C., mentions Caesar's use of divers during his besiegement against Marseilles. Lucan refers to a diver, Phoceus, who was highly skilled and would perform salvage work and enemy sabotage.

. . . Phoceus above all others proved his skill.
Well trained was he to dive beneath the main
And search the waters with unfailing eye;
And should an anchor 'gainst the straining rope
Too firmly bite the sands, to wrench it free.
Oft in his fatal grasp he seized a foe
Nor loosed his grip until the life was gone.⁴⁹

⁴⁷DeLatil, p. 57.

⁴⁸Livy, 121.

⁴⁹The Pharsalia of Lucan, 85-86.

DeLatil suggests that the "finest exploit of anti-quity goes to the credit of the citizens of Byzantium."⁵⁰ During a siege on their town by the Romans under the leadership of Septimus Sevetus (146-211), the Byzantium divers

. . . not only cut the anchor ropes of enemy ships unperceived, but also attached grappling hooks to their keels. All they had to do then was to pull the ropes and draw in the anchorless ships, seizing the supplies they found on board. One can well imagine the astonishment of the Romans when, in the words of Cassius Dio, they saw 'their ships moving of their own accord without being blown along by the wind or propelled by oars.'⁵¹

The military operations in which divers were used were usually for the sabotage of enemy vessels or for reconnaissance missions. Divers performed reconnaissance missions by going into enemy ports to determine the enemy's strength.⁵²

Early accounts of military divers used by the Scandinavian countries can be traced to the first century A.D. Like their predecessors, these divers cut holes in the bottoms of ships, cut anchor chains and cables, and engaged in other works of military sabotage. During this time, the king of Sweden sought a famous Danish pirate named Oddo who had controlled the area's waters. Swedish divers,

⁵⁰DeLatil, p. 58.

⁵¹Ibid, pp. 58-59.

⁵²Marx, p. 19.

operating at night, cut holes in the bottom of Oddo's ship. During the ensuing panic by Oddo and his crew, the Swedes attacked and killed the pirate and his crew.⁵³

The strength and actions of a country's military often dictates that country's affluence and well-being. That divers were used to assist many military actions, during the time when diving was beginning, testifies to the fact man was also motivated to begin underwater diving for military purposes.

Searching for food or riches, the first underwater divers conquered the fear that primitive man felt toward the ocean. Peaceful and warlike uses set the beginnings of man's pursuit of underwater diving.

MAN WAS MOTIVATED TO CONTINUE UNDERWATER DIVING FOR POSSIBLE MATERIAL GAINS

⁵³Carrier, p. 5.

⁵⁴Harman, *Underwater Diving* (New York: New American Library, 1955), p. 426.

CHAPTER III

WHAT MOTIVES PROMPTED THE CONTINUATION OF
MAN'S PURSUIT OF UNDERWATER DIVING?

There is, one knows not what sweet mystery
about the sea, whose gently awful stirrings
seem to speak of some hidden soul beneath; . . .
--Herman Melville⁵⁴

The beginnings of underwater diving are traceable to very early times. The first divers submerged in the oceans to secure food, to gain material assets, and to win military conquests. From these early beginnings, man has continued to pursue material gain and military victories through underwater diving. New motivations, however, have prompted man to continue his pursuit of underwater diving. The search for scientific knowledge and the exploration of the underwater frontier have lured man under the waters.

MAN WAS MOTIVATED TO CONTINUE UNDERWATER DIVING
FOR POSSIBLE MATERIAL GAINS

Potential material gains provided an impetus for beginning underwater diving. Diving for treasure or for other profit-oriented reasons encompass this motivation to secure material gains. Chance to continue securing material gains is one incentive prompting the continuance of underwater diving.

⁵⁴Herman Melville, Moby Dick (New York: New American Library, 1961), p. 456.

The possibility of recovering sunken treasures from old shipwrecks is a significant aspect of possible material gains. Sunken shipwrecks laden with treasure once carried by the Spanish, English, Dutch, and French serve as an enticement to underwater divers. Spain excelled first in the recovery of sunken treasure, perhaps because she lost so many ships containing treasures between the sixteenth and eighteenth centuries. Spanish divers often were able to recover some of these vessels, but many ships still rest on the ocean floors.

Untold riches lay buried with old shipwrecks. It is estimated that,

. . . perhaps as much as six hundred million dollars worth . . . was lost in shipwrecks and now lies buried in tons of limestone and encrusted in coral.⁵⁵

Off the coast of Florida (which served as a route for Spanish ships), scuba divers have recovered and continue to recover ". . . great hauls of Spanish riches: pieces of eight, gold bars, silver, jewelry, porcelain."⁵⁶ As Bill Slosky points out,

. . . treasure valued at many millions has been, and is now being, reclaimed from Atlantic and Caribbean waters. One of the most recent finds was

⁵⁵Jacques-Yves Cousteau and Philippe Diolé, Diving for Sunken Treasure (Garden City, New York: Doubleday & Company, Inc., 1971), p. 15.

⁵⁶Gardner Soule, The Ocean Adventure (New York: Appleton-Century, 1966), p. 8.

in the shallows off Florida's east coast, well within the range of snorkel divers.⁵⁷

The possibility of finding lost treasures has lured many to the ocean floor. Certainly stories of successful recoveries urge people to search for these lost treasures. Many detailed accounts have been written of the great sunken treasures of the world. Possibly for some, the idea of looking for treasure is just as exciting as finding it; but for others, the possibility of finding unknown riches leads them to pursue the avenue of underwater diving.

Besides diving for gold and other sources of wealth located in sunken treasures, many skin and scuba divers are prospecting for gold and other minerals. The oceans contain minerals of unimaginable wealth--gold, silver, diamonds, oil, natural gas, sulfur, iron, tin, and coal. The sea is the world's last new mining frontier.⁵⁸

The search for gold is exciting, if not rewarding. Many gold prospecting divers use scuba gear to facilitate their hunt.⁵⁹ Many geographic areas are rich in gold. One of these areas is located in Alaska, where there is a beach known for a high gold content. Burke suggests that this

⁵⁷Bill Slosky and Art Walker, Guide to the Underwater (New York: Sterling Publishing Co., Inc., 1966), p. 139.

⁵⁸Soule, pp. 52-53.

⁵⁹Lil Borgeson and Jack Speirs, Skin and Scuba Diver (Arco Publishing Company, Inc., 1962), p. 66.

beach "... should richly reward free divers [using suction pumps] It has already yielded nearly \$2,000,000."⁶⁰

Although this prospected gold is extremely valuable, the "... most successful mining of the sea to date is for oil, natural gas, and sulfur from beneath the continental shelves just offshore."⁶¹ As World War II produced improved developments in diving in the decade of the 40's and 50's, an economical motive has produced improved developments in diving in the 1960's. Commercial divers are needed for such tasks as inspecting pipe lines, cutting and welding, and maintenance work. The offshore oil industry makes great use of underwater divers:

The most dramatic and extensive use of diving is in the offshore oil industry and this has provided the economical motive for the greatly increased research development in diving in the last decade.⁶² Divers routinely dive at depths ranging from 300 to 600 feet. As the petroleum industry searches in deeper waters, it is predicted that one day divers will be able to work at depths of 1,000 to 2,000 feet.⁶³

pearl diving are indicative of this preservation. Although

⁶⁰Burke, p. 97.

⁶¹Soule, p. 51.

⁶²T. F. Gaskell, ed., Using the Oceans (Great Britain: Tonbridge Printers Ltd., 1970), p. 90.

⁶³Gaskell, p. 90. Underwater World (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1957), p. 230.

Deep sea diving and salvage schools advertise in the popular diving periodicals with lures of high paying careers. Indeed, well-trained commercial divers who understand and know how to work with commercial equipment can secure high-paying jobs. The offshore oil diver must be a ". . . mechanic, plumber, electrician and seaman . . . understand oil field terminology, know a great deal about rigging, and be able to read blue prints."⁶⁴

As many technical and physiological problems of deep diving are being solved, the commercial diving industry is beginning to produce qualified deep sea divers to fill the needs and demands of the underwater commercial industries. The future importance of divers extracting the riches of minerals and precious stones from the ocean's depths can be concluded with John Tassos's statement: "What lies beneath . . . [the extreme deep] only tomorrow's diver will reveal."⁶⁵

Even with tremendous improvements in diving equipment, it is interesting to note that some underwater divers have preserved older methods of diving. Certain aspects of pearl diving are indicative of this preservation. Although pearl diving did not become a major occupation until the

⁶⁴Cousteau, Diving for Sunken Treasure, p. 63.

⁶⁵John Tassos, The Underwater World (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1957), p. 230.

coming of the white man to the New World,⁶⁶ the Ama of Japan have dived for 2,000 years.⁶⁷

The Ama men and women are considered by the Japanese to be the true children of the sea who hold a very close relationship with fish, coral, and seaweed. The Ama men engage in catching fish, while the Ama women engage in collecting shellfish and seaweed. The Ama women are most noted for their pearl diving. Although some of the basic diving methods differ from village to village, these various Ama pearl diving methods are very similar. They free dive with only goggles or a face mask, a rope tied around their waists for the purpose of being pulled to the surface, a heavy belt to pull them to the ocean's floor, and an iron tool with which to detach oysters and shells from the rocks. Fosco Maraini has described the Ama girls as being very beautiful and noted that their "... strong, graceful bodies glided through the water with the naturalness of creatures moving about in their own element."⁶⁸ The ways of the Ama, in the words of George Kunz, owe "... absolutely nothing to modern civilization in the method of securing the pearls from the depth of the sea;

⁶⁶Marx, p. 22.

⁶⁷Ibid, p. 25.

⁶⁸Fosco Maraini, The Island of the Fisherwoman, Eric Mosbacher, trans. (New York: Harcourt, Brace & World, Inc., 1962), p. 72.

. . . and probably has been without important variation for two thousand years."⁶⁹

In other parts of the world, divers were pursuing underwater diving in order to gather pearls. In the Carribean, pearl divers became very famous for their diving exploits. Indian and Black pearl divers gathered pearls as their ancestors had done for centuries. Until the 1940's, these Indian and Black pearl divers scoured the Carribean's floor without modern diving equipment. Advanced technology and diving gear made most of these divers obsolete.

During Columbus's third voyage at the island of Cubagua near Venezuela, he discovered the existence of large oyster beds. The King of Spain ordered the establishment of pearl fisheries on Cubagua and on nearby Margarita Island. Margarita Island ". . . became the center of the pearl industry--a position it maintains today."⁷¹

With the establishment of pearl fisheries around Cubagua and Margarita, a great demand for local divers arose. However, these divers were overused and became expended--either from disease or overwork. The Spanish

⁶⁹George Frederick Kunz and Charles Hugh Stevenson, The Book of the Pearl (New York: The Century Co., 1908), p. 91.

⁷⁰Marx, p. 22.

⁷¹Ibid, p. 23.

discovered and brought in a tribe of Amerindians, the Lucayans, who possessed skill and endurance in diving. Like their predecessors, the Lucayans also became expended and the Spanish were again in need of divers. The Lucayans were decimated because of their excellent diving ability. They brought high prices on the Haitian and Cuban slave markets. The Spanish exploited the talents of the Lucayans and their race soon vanished during the great slave raids.⁷²

Pearl diving has existed since man first began underwater diving, yet some of the methods of diving that are practiced today are quite like those of the beginning divers. Besides the Ama divers, there are many Polynesian pearl divers (such as those on Okinawa) who closely rival the Ama. Many of these pearl divers today free dive as deep as 120 feet.

Besides pearl diving, treasure diving, and dive repair work, divers have found profit in other assorted tasks. Perhaps the most interesting of these tasks was one in which underwater divers were used by the Spanish ships when they arrived in Spain with treasures from the New World. Because of the high taxes levied on these treasures, divers were employed to smuggle some of the treasures past the customs officers of the king. This was done

⁷²Burke, p. 3.

by either attaching the treasure to ships' hulls during customs inspecting, or by throwing the cargo overboard and recovering it later when the customs officers left.⁷³

Another material motive for pursuing underwater diving was one which was taken up in modern times. Twentieth Century Fox and the motion picture industry began to make underwater films which centered on diving. The films, "The Frogmen" and "Under the Twelve Mile Reef," were the first major productions of underwater films and were both box office successes. These underwater productions spurred the production of Jules Verne's "Twenty Thousand Leagues Under the Sea,"⁷⁴ This and other underwater films have provided a great deal of profit for film makers and actors alike. Similarly, Jacques Cousteau's television specials have received much attention and were viewed in television's prime-time scheduling.

In recent years, the collecting and selling of tropical fish for aquariums has become a profitable business. Borgeson describes this high profit field by comparing it with a treasure dive search:

In the slit-eyed search for gold and similarly elusive treasures, many a diver overlooks the high-profit commodity that practically nudges his face-plate every time he goes down: fish In fact, considering the high cost of conventional

⁷³Marx, p. 27.

⁷⁴John Tassos, The Underwater World (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1957), p. 15.

treasure diving, it's likely that of all the underwater items susceptible to salvage, the aquarium fish can be counted on to produce the highest net profit. There are plenty of divers who make a good living as full-time pros in this field;⁷⁵

Whether motivated by the search for sunken treasures, the possibility of underwater prospecting, industrial employment, pearl diving, smuggling, or tropical fish collecting, man has continued to pursue underwater diving for possible material gains.

MAN WAS MOTIVATED TO CONTINUE UNDERWATER
DIVING FOR POSSIBLE MILITARY PURPOSES

Naval underwater divers have turned defeats into victories. Until the last century, "Spanish ships . . . carried men whose duty it was to swim and dive underwater."⁷⁶ As the centuries passed, the actual methods of sabotage and reconnaissance changed very little, "and military strategists all over the world were slow to extend the range of activities allotted to divers in warfare."⁷⁷

The late John F. Kennedy spoke a realistic truth when he said that "since the beginning of history, war has been mankind's constant companion."⁷⁸ The early use of

⁷⁵Borgeson, pp. 68-69.

⁷⁶Sweeney, p. 68.

⁷⁷Marx, p. 87.

⁷⁸Alex J. Goldman, ed., The Quotable Kennedy (New York: Belmont Books, 1967), p. 135.

underwater divers for warfare has been noted previously. As war has existed, so too has military diving.

During the Crusades, underwater divers were employed for sabotage, reconnaissance, and ship and port repair. These divers, like their predecessors, made use of primitive types of snorkels and goggles.⁷⁹ Carrier concluded that the use of divers had ". . . become so common that sometimes enemy divers met underwater."⁸⁰ Apparently, this happened in 1565 when Turkish and Maltese divers met at the siege of Malta where they began to hack at each other with hatchets.⁸¹

Perhaps the first individual to recognize the importance and full implications of military diving was Leonardo da Vinci. Leonardo designed a snorkel-like breathing tube to fulfill a request by the Venetians in order to help the Venetian divers in their war against the Turks. This snorkel-like tube floated out of the water at one end and was attached to the diver at the other end. A leather helmet with glass windows fitted over the diver's head and permitted him to see. This invention by da Vinci was rejected, however, on the grounds that the Turks, or

⁷⁹Marx, p. 87.

⁸⁰Carrier, p. 5.

⁸¹Carrier, p. 5.

any other enemy, could see the end of the tube that floated in the water.⁸²

The Venetians then asked da Vinci to design an apparatus which would permit divers to remain totally concealed in the water. Leonardo then designed the first self-contained underwater breathing apparatus (scuba). His scuba had the diver dressed in a leather suit with a bag of air connected to the chest. Thus, a tube from the diver's mouth was attached to the air bag. Leonardo made great claims for the apparatus, but it was never tested or used. Though da Vinci's scuba could never have worked because the air bag did not contain compressed air and because the system was a closed-circuit system, his realizations of the military significance of his apparatus was apparent by his refusal to divulge its secrets:

. . . and this I do not publish or divulge on account of the evil nature of men who would practice assassinations at the bottom of the seas, by breaking the ships in their lowest parts and sinking them together with the crews that are in them;⁸³

However, da Vinci did approve of revealing his snorkel apparatus because the breathing tube was clearly visible on the surface and would not be dangerous. Leonardo also

⁸²Richard Friedenthal, Leonardo da Vinci (Munich: Kindler Verlag, 1965), pp. 93-98; Larsen, pp. 12-13; DeLatil, pp. 122-125; Marx, pp. 29-31;

⁸³Edward H. Shenton, Diving for Science: The Story of the Deep Submersible (New York: W. W. Norton & Co., Inc., 1972), p. 19.

designed fins for the feet and hands in order to enable the underwater diver to swim fast and for long distances.⁸⁴

A few hundred years later, another individual also realized the possible military potential of underwater divers. In 1748, the Marquis of Worcester of England, told the king (George II) of his invention: a small (pocket-size) engine which could sink any sized ship once a diver attached this engine to the ship's hull. The Marquis's device was largely ignored because it was thought to be greatly overestimated and overpriced. This device, however, was a predecessor of the limpet mines, used in World War II by the British and Italians.⁸⁵

Divers did not begin to handle bombs until the present century. Carrier suggests that the invention of gunpowder minimized the role of underwater divers during warfare--at least until World War II.⁸⁶ Until recent wars, military motivations provided little impetus for new achievements. By 1900, however, primitive versions of open-circuit scuba and closed-circuit scuba came into existence. Closed-circuit scuba was preferred by the military since there were no signs of the divers bubbles from exhalation.

⁸⁴Friedenthal, pp. 93-98; Larsen, pp. 12-13; DeLatil, pp. 122-125; Marx, pp. 29-31; Shenton, p. 19.

⁸⁵Marx, p. 88.

⁸⁶Carrier, p. 5.

Before World War I, Italy pioneered the schooling and training of divers in the art of sabotage using explosives. Subsequently, Italy was the first country to use scuba divers in underwater warfare.⁸⁷

Italy's early success with scuba (closed-circuit) posed obvious dangers to her enemies. During World War II, Italian divers successfully carried out many missions of sabotage with explosives. The threat that Italy's scuba divers presented led other nations (including the United States) to develop knowledge and expertise in underwater military operations. At the conclusion of World War II, every combatant country was making use of military divers.

World War II probably did more for the advancement of military diving as well as for the use of underwater equipment than any other military conflict. Larson concludes that

. . . considerable knowledge of SCUBA and underwater conditions resulted from this wartime flurry of underwater activity. In some cases, laboratory experiments resulting in better equipment or more exact knowledge led to improved operations by men using scuba. More often than not, however, it was the improvisations and innovations and suggestions of the swimmers themselves that improved the equipment and techniques. Almost every phase of wartime underwater swimming received constant experimentation and revisions.⁸⁸

⁸⁷Larson, p. 37.

⁸⁸Ibid, p. 43.

As a result of World War II, new and improved diving equipment had been developed. Also, large scale organized training programs for underwater divers emerged. Today, every naval power in the world has its own group of underwater divers. The United States Navy UDT/SEAL (Underwater Demolition Team/Sea, Air, Land) team, better known as "frogmen," is considered to be the best such military unit in the world.

The Navy UDT/SEAL team has been assigned a new area of responsibility with the emergence of the space age. Specially trained divers are assigned the delicate task of securing America's manned space capsules and their precious cargo when splash down occurs in designated oceans.

Today, military diving ". . . involves mine disposal, salvage, ship attack, removal of limpet mines, propeller changing, and harbour and mooring maintenance."⁸⁹ Military personnel are constantly trying to improve the depth and endurance capabilities of underwater divers, for often divers are called on to salvage such valuable items as crashed or crippled aircraft, rockets, space capsules, or atomic submarines.⁹⁰ The underwater teams of the United States Navy also engage in equipment development and testing. It is said that the United States Navy is perhaps

⁸⁹Gaskell, pp. 90-91.

⁹⁰Ibid, p. 91.

". . . the most advanced research agency in the United States today. . . ."91 Man, therefore, continues to pursue underwater diving for possible military gains as he has done throughout history.

MAN WAS MOTIVATED TO EXPLORE
NEW AND UNKNOWN FRONTIERS

Man has often sought to explore the unknown. The ocean is one of the great unknowns. To penetrate beneath the surface of the water is like exploring outerspace. Sweeney said that although diving has its commercial aspects, ". . . it is the lure of the unknown and the longing for discovery that really drive men to seek that which has not been seen before."92

Former astronaut and aquanaut, Scott Carpenter, has described the depths of the sea as an inner space--a place to explore:

Inky Blackness, immense pressure, no breathable oxygen, and almost total silence in a vast, unexplored region; it reads like a report from an astronaut on some distant planet. But it is not; it is a description of inner space, the regions below the ocean's surface. The eternal, restless sea covers almost three quarters of the Earth. Yet we know less about what lies under the oceans than we know about the surface of the moon.93

91Tassos, p. 231.

92Sweeney, p. 13.

93M. Scott Carpenter, Inner Space (Boston: Little, Brown and Company in collaboration with Silver Burdett Company, 1966), p. 5.

Carpenter describes the unknown depths of the sea as the next great frontier.⁹⁴ Burke says of the sea, "of all . . . ever-present challenges, the sea is the greatest-- constantly changing, vast, empty and yet full, powerful beyond the dreams of man, rich here, barren there."⁹⁵

Today's skin or scuba diver can find a new world waiting ". . . under the seas, a world of wonder, bigger and more bewildering than anything he has yet known."⁹⁶

Exploring the ocean's depths is described as an adventure:

Ever since his curiosity was first aroused, man has been exploring the great land masses of the earth. He has been to the icy wastes of both north and south poles, climbed the highest mountains, crossed deserts and penetrated dense jungles. And now, in a sense, the adventure is beginning all over again.⁹⁷

That the underwater world ". . . is a challenge for every undersea adventurer to become an explorer . . .", is one author's appeal to diving.⁹⁸ This underwater world is described as an environment in which one can

. . . gaze on treasure more wonderful than diamonds, and creatures whose fantastic bodies defy the natural laws of land-born animals. There are caves, and crevasses, and deep shimmering forests; mountain ranges more magnificent than Everest; shells more intricate than lace. Underwater you will see

⁹⁴Carpenter, p. 98.

⁹⁵Burke, p. 86.

⁹⁶Gaskell, p. 111.

⁹⁷Ibid.

⁹⁸Sweeney, p. viii.

color and light artists never dreamed of, and you will succumb to the lore of lost Atlantis and the treasures of ancient Peru.⁹⁹

The skin and scuba diver enters an environment that seems to have endless boundaries filled with the potential of adventure and discovery. This environment is filled with spectacular beauty and harmonious rhythms. Sweeney often equates underwater diving as underwater explorations and describes a dive underwater as a "slip through the magic mirror that separates air from water, . . . [into] a world that even Alice, in her fantastic dream of Wonderland, did not see."¹⁰⁰

Man has pursued, and continues to pursue, underwater diving for the sheer joy and adventure of exploration. Many divers yearn to go deeper and inquire greater knowledge of the deep.¹⁰¹ Carpenter poses a rhetorical question of why underwater exploration is pursued. He answers "like the mountain peak, the oceans are there."¹⁰²

⁹⁹Sweeney, p. vii.

¹⁰⁰Ibid, p. 53.

¹⁰¹Hans W. Hannau, In The Coral Reefs of the Caribbean, Bahamas, Florida, Bermuda (Garden City, New York: Doubleday & Company, Inc., 1974), p. 44.

¹⁰²Carpenter, p. 77.

MAN WAS MOTIVATED BY POSSIBLE NEW
GAINS IN SCIENTIFIC KNOWLEDGE

To some, exploration for exploration's sake cannot stand alone as a motivation for pursuing underwater diving. Cousteau feels very strongly about the purposes and merits of underwater exploration. He feels that mankind has the abilities and needs to gain scientific knowledge about the oceans. Cousteau says:

I have long felt that undersea exploration is not an end in itself, although it is spiritually rewarding merely to be an onlooker. The privilege of our era, to enter this great medium, must produce greater knowledge of the oceans¹⁰³

Burke suggests that many divers are motivated by the desire to penetrate because of ". . . man's instinctive desire for knowledge."¹⁰⁴

The exploring of inner space has begun with various experiments on the underwater divers themselves in order to ascertain their capabilities and physical potentials. The United States Navy, Cousteau, and other groups have been investigating and researching methods for divers to live and work underwater for prescribed periods of time. Aquanauts have spent weeks and months living and working at varying depths. Captain Pitts (U. S. Navy) said that

¹⁰³Jacques-Yves Cousteau, World Without Sun (New York: Harper & Row, 1964), p. 6.

¹⁰⁴Burke, p. 86.

divers will have to live and work on the bottom of the sea for long periods of time.¹⁰⁵

Many oceanographic experts feel that extended underwater research will produce new scientific knowledge in which ". . . the returns may be many times greater and come sooner than even the most optimistic forecasts of dividends from space."¹⁰⁶ Oceanographic research will indeed provide man with many opportunities, and underwater divers will play an important role in carrying out that research. "Tomorrow's world will perforce find itself more and more sub-sea oriented. Free divers [scuba] must and will play a tremendous role in that reorientation."¹⁰⁷

The science of oceanography is presently given much attention and new importance. "Until recent years . . . oceanography was too frequently considered a branch of science having little importance except to those interested in the ocean itself."¹⁰⁸ William Herdman, a Scottish marine naturalist, defines oceanography as,

. . . the meeting ground of most of the sciences.
It deals with botany and zoology, . . . chemistry,

¹⁰⁵Soule, pp. 23-24.

¹⁰⁶Slosky, p. 185.

¹⁰⁷Burke, p. 181.

¹⁰⁸Bernard L. Gordon, ed., Man and the Sea (Garden City, New York: Doubleday Natural History Press, 1972), p. 194.

physics, mechanics, meteorology, and geology all contribute, and . . . with geography¹⁰⁹

Cousteau simply states that "oceanography is the application of all sciences to the unique environment of the sea. Its disciplines cover everything from geology to psychology. . . ."110 Divers have and will continue to perform a key role in the carrying on of much of this oceanographic research.

The science of archaeology is a graphic example of using underwater divers to gain knowledge of their field. Since the advent of safe and easy-to-use scuba equipment, archaeologists have extended their domain. Robert Silverberg states that,

Every archaeologist . . . prefers to see with his own eyes. And so a new breed of . . . archaeologists is evolving--the archaeologist--skin diver--who is not only able to make dives, but who is trained in the science of interpreting what he sees.¹¹¹

Underwater archaeologists are pursuing work that shows promises of giving new secrets and revelations of dozens of sites throughout the world. "Nearly all underwater archaeology is carried on by SCUBA-divers or skin divers. . . ."112

¹⁰⁹Gordon, pp. 121-122.

¹¹⁰Queen Mary Museum, Jacques Cousteau's Living Sea, Long Beach, California.

¹¹¹Robert Silverberg, Sunken History (Philadelphia: Chilton Books, 1963), p. 13.

¹¹²Ibid, p. 8.

Many oceanographic scientists believe that divers will play an important role in the harvesting of the oceans as a source of food. The success or failure of underwater farming will ". . . rest in the hands of . . . divers."¹¹³ Animal and vegetable food sources under the surface can be harvested in unimaginable quantities. Ichthyologists (fish scientists) pursue underwater diving to determine food sources at various depths. Fisheries have also made use of divers who have been able to make improvements in the operations of nets and other devices by watching these operations from the sea bottom.¹¹⁴ Geographers and geologists, too, prefer to see first hand that which they are exploring. In short, ". . . geologists, archaeologists, biologists, and ichthyologists are diving to the ocean's bottom to learn at first hand what the sea has been sheltering these millions of years."¹¹⁵

That underwater divers will play a significant role in scientific exploration is suggested by current research which is investigating the possibilities of breathing water. Leland Clark ". . . has produced a liquid that . . . can be breathed in place of normal air. . . ."¹¹⁶

¹¹³Burke, p. 101.

¹¹⁴Hans Hass, We Come From the Sea (London: Jarrolds Publishers, 1958), p. 271.

¹¹⁵Tassos, p. 7.

¹¹⁶Associated Press dispatch, The Arizona Daily Star (Tucson), June 2, 1974, Section C, p. 4.

Clark has demonstrated the use of this liquid by dropping rats, mice, and cats into it and has watched them breathe normally. Clark has completed his animal clinical work and ". . . hopes to move into human testing."¹¹⁷

Walter A. Robb, a General Electric Company researcher, has devised various silicone-rubber films ". . . in effect, . . . an artificial membrane . . .",¹¹⁸ which would coat the lung enabling oxygen and carbon dioxide to pass through and without water passing through. Slosky commented on this possibility:

The diver . . . [would be able to] obtain the necessary oxygen from water and to dispose of his exhaled carbon dioxide in the same medium. A permeable microporous membrane allows oxygen to be drawn in and carbon dioxide to be discharged, but prevents liquids (water) from entering.¹¹⁹

Although the time when man might be able to successfully and efficiently breathe water is probably many years away, one cannot deny the eventual possibility of such occurrence.

The possibility of breathing hyperoxygenated liquids is being conducted. Dr. Joannes Kylstra states that although ". . . man is certainly able to breathe liquid, there are problems to be overcome in order to make the

¹¹⁷Associated Press dispatch, p. 4.

¹¹⁸Carpenter, p. 93.

¹¹⁹Slosky, p. 186.

system feasible for working divers."¹²⁰ Kylstra has conducted experimental work with such a breathing liquid on a diver:

A diver volunteered to breathe water in one lung, while the other was supplied with oxygen A liquid 'breath' of 500 ml of saline . . . , was exchanged seven times. The diver, who was conscious throughout, felt no noticeable difference between the fluid-filled and gas-filled lungs. There is no reason to suppose, therefore, that both lungs could not cope equally well when fluid-filled.¹²¹

Cousteau has predicted that within 50 years men-fish or Homo Aquaticus will be able to survive underwater without the use of today's breathing apparatus--which only permits divers to work underwater for short periods of time. According to Robert Chapman, Homo Aquaticus

. . . would have his lungs sealed off. They would be filled with a special fluid to prevent them from collapsing under outside pressure and instead of breathing in the normal way he would have his blood oxygenated by means of a chemical device surgically implanted into the body.¹²²

Many of today's ocean scientists suggest that man is a great adapter. This capability is a reason for putting man on the bottom of the sea to engage in scientific exploration. Man rather than machines can better explore the sea:

¹²⁰Fareoq Hussain, Living Underwater (New York: Praeger Publishers, Inc., 1970), pp. 24 & 27.

¹²¹Ibid, p. 24.

¹²²Gaskell, p. 109.

Whatever technological systems can be developed to assist man's exploration of the oceans . . . must be implemented but they should be used only to complement the work undertaken by man.¹²³

Indeed, "men-fish" are a long time from actualization. But Carpenter has said that it would help immeasurably if man could breathe oxygen from the water, for men must be put on the sea floor as free agents. Divers may one day be able to breathe oxygen right out of the oceans' waters.¹²⁴ Perhaps Soule summed this possibility up best:

To get breathable oxygen from the water instead of being drowned by the sea would change man's entire relation to the sea. And it would give him all the time in the world to remain below the surface and explore the depths.¹²⁵

In stark contrast to the possibility of breathing water or diving to great depths with the use of various gas mixtures, the scientific community is beginning to take great interest in record dives based solely on lung power. Enzo Maiorca of Italy and Jacque Mayol of France have been trading depth records since 1973. Mayol currently holds the breath-holding record free dive--a dive of 316 feet.¹²⁶

Scientists are taking interest in these deep free dives, for a new body of knowledge about man's apneic

¹²³Hussain, p. 14.

¹²⁴Soule, p. 254.

¹²⁵Ibid.

¹²⁶Gaetano Cafiero, "The Deepest Man in the World," Skin Diver, XXV, No. 3 (March, 1976), 28.

capabilities is beginning to emerge. Many believe that the human body is capable of going into apnea on a deep breath hold descent. Apnea indicates that the body can adjust to the special conditions of a surplus of carbon dioxide, pressure, and temperature similar to the adjustment of aquatic mammals like the seal, otter, and dolphin.¹²⁷

The obtainment of new gains in scientific knowledge may answer many needs for today's world population. Or, as in the race to the moon, these gains may harbor political and military motives as well. Regardless, the quest for new gains in scientific knowledge continues. It has been predicted that aquanauts will soon be swimming and diving at depths of 3,000 feet and that ". . . before long the regions of the earth lying underwater will be as well charted as the rest of the earth's surface" ¹²⁸ Many of these new gains will, perhaps, ". . . ultimately answer the needs of a rapidly expanding world population." ¹²⁹

¹²⁷"Men Under the Sea--Shaking the Great Hand of Nature," The Undersea Journal, VIII, No. 3 (1975), 18.

¹²⁸Marx, p. 153.

¹²⁹Ibid.

CHAPTER IV

WHAT EFFECT DID TECHNOLOGY HAVE REGARDING
NEW MOTIVATIONS FOR UNDERWATER DIVING?

. . . on crystal rocks ye rove
Beneath the bosom of the sea,
Wand'ring in many a coral grove. . .
--William Blake¹³⁰

Man has pursued and will continue to pursue underwater diving for practical, militaristic, and material reasons. As underwater diving was carried on from early times through the present, man developed equipment to make underwater diving safer and more efficient. These developments opened new depths and dimensions in underwater diving.

The rubber face mask has helped revolutionize underwater diving. The face mask permitted men to discern the underwater world for the first time.¹³¹ Pearl divers in the Persian Gulf had developed a type of mask as early as the fourteenth century.¹³² One underwater professional diver described his first underwater dive and said the face mask lured him toward the underwater world: "I held in my hand a device that would change everything, for swaying

¹³⁰Ralph L. Woods, ed., The Sea (New York and Cleveland: The World Publishing Company, 1971), p. 43.

¹³¹Tassos, p. 56.

¹³²Burke, p. 3.

lightly from my finger tips was a diver's face mask."¹³³
Cousteau described his thoughts when he used the face mask
in the ocean for the first time:

Sometimes we are lucky enough to know that our
lives have been changed, to discard the old, embrace
the new, and run headlong down an immutable course.
It happened to me . . . when my eyes were opened to
the sea.¹³⁴

Modern developments have permitted the nearsighted
or farsighted diver to have a prescription face plate
fitted to the mask. Indeed, such necessary items as the
mask and goggles opened up a new world for divers; without
them, ". . . our eyes see poorly underwater--just a blurred
approximation of reality."¹³⁵

Though it is important to be able to see under-
water, it is imperative to be able to breathe. In 1943, an
event occurred which revolutionized and hastened the devel-
opment of underwater diving equipment and provided new
motivations for underwater diving. This event was the
successful testing of the aqua-lung. The aqua-lung was
tested and perfected by Emile Gagnon and Jacques Cousteau.
These men also designed the regulator that is now part of
standard scuba equipment. Cousteau described his feelings

¹³³Joe MacInnes, Underwater Man (New York: Dodd,
Mead & Company, 1974), p. 8.

¹³⁴Jacques-Yves Cousteau with Frederick Dumas, The
Silent World (New York: Harper & Row, 1953), p. 9.

¹³⁵Tassos, p. 4.

and thoughts when he became the first human to use the aqua-lung and regulator under the water:

I thought of the helmet diver arriving where I was on his ponderous boots and struggling to walk a few yards, obsessed with his umbilici and his head imprisoned in copper. . . . From this day forward we would swim across miles of country no man had known, free and level, with our flesh feeling what the fish scales know.¹³⁶

The significance of this invention, in terms of money and freedom of movement, was described by Lumière:

Until the invention of the Aqua-Lung, only highly trained specialists could explore the deep sea. This was an expensive venture. Nowadays, at low cost and with little training, any swimmer can dive among the wonders of the deep, unhampered by hoses or lines. The automatic-demand regulator releases air only as needed, at a pressure identical to that of surrounding water, irrespective of depth.¹³⁷

Lumière also stated that the ". . . Aqua-Lung represents the greatest advance to date in underwater breathing equipment."¹³⁸ The hard-hat diver experienced clumsiness and confinement:

Not too many years ago, men who ventured beneath the waves were confined to so-called hard-hat suits. These suits were made of canvas and rubber, and the lead-weighted shoes worn by the divers weighed about 30 pounds. In addition, 80 pounds of lead were placed around the diver's waist. The brass helmet was another weight. All told, the

¹³⁶Cousteau, The Silent World, pp. 6-7.

¹³⁷Cornel Lumière, Beneath the Seven Seas (London: Hutchinson & Co., 1950), p. 81.

¹³⁸Ibid.

diver might weigh some 300 pounds on the surface, and his movements were clumsy and awkward.¹³⁹

Slosky's description of the modern scuba diver's movement describes the stark contrast to that of the hard-hat diver: ". . . complete freedom of movement can be achieved easily while gliding along underwater with a compress-air tank on your back."¹⁴⁰



Figure 1

An illustration of animated models traces the development of diving equipment from early attempts to the present day. These models are part of the exhibit, Man Reenters the Sea, in Jacques Cousteau's Living Sea aboard the Queen Mary Museum. The freedom and comfort of movement of scuba is depicted on the model swimming horizontally in the top left corner.

¹³⁹Carpenter, p. 5.

¹⁴⁰Slosky, p. 173.

MAN WAS MOTIVATED TO ENGAGE IN UNDERWATER
DIVING AS A SPORT OR SOURCE
OF RECREATION

Underwater diving, as a sport or source of recreation, traces its history for roughly 30 years. The age of the scuba diver began in 1946 when the first scuba equipment went on the commercial market. Since 1946, scuba diving as a sport has grown and has appealed to individuals of all ages and backgrounds.¹⁴¹

After World War II, an entire industry developed to meet and supply the needs and demands of the "new" underwater diver. Scuba gear, masks, fins, and snorkels appeared on the market. Hass states that,

Diving-gear and under-water cameras advertised the new sport. Comic papers and . . . shows discovered the world under the sea. Diving clubs were founded. The first international under-water hunting competitions were held.¹⁴²

Scuba and skin divers alike make up today's sport and recreational divers. Perhaps coverage of underwater diving by television, movies, and magazines contributed to the arousal of interest in underwater diving.¹⁴³

Subsequently, underwater clubs began to appear in the United States as well as in foreign countries. These clubs developed as a result of the popular new sport of

¹⁴¹Slosky, p. 171.

¹⁴²Hass, p. 266.

¹⁴³Carrier, p. 2.

underwater diving. They provide certification of underwater divers to promote safety and to provide opportunities for their divers to travel to various diving areas. In 1953 the Bottom Scratchers of San Diego, California, organized the first underwater club in the United States. Since then hundreds of underwater diving clubs have appeared in the United States alone.¹⁴⁴

Diverse activities attract people to underwater diving as a sport or recreational pursuit. Sightseeing captivates the underwater diver and captures his interest and spirit. Many underwater enthusiasts--skin divers or scuba divers--never go beyond the looking stage in their underwater pursuits. For they are, as Tassos states, ". . . simply satisfied to study life under the sea. It is forever moving; there is no static life. In the calmest seas the rooted plants keep swaying with the underwater currents."¹⁴⁵ The pursuit of sightseeing underwater could keep one occupied for untold hours.

Perhaps Tassos describes best the world of the underwater sightseers:

Practically weightless, you hang suspended in the water. A wave of the arms and you rise gently. A flip of the toes and you glide effortlessly in any direction. A gentle spring from the bottom and you "climb" a fifteen-foot underwater cliff. Then

¹⁴⁴Tassos, p. 218.

¹⁴⁵Ibid, p. 28.

you begin to understand the skin diver's fanaticism. All about you are sights unlike any you have seen before. In a blue-green world there are coral towers like giant mushroom stems, conches that carry their houses on their backs, tiny palm trees that aren't palm trees at all, but really living animals, multi-colored sea fans swaying gravely in the current, octopuses changing their color in anger, and blowfish pumping themselves up in fear. There before your face is a three-pound snapper, looking far different than he would on the dinner table or even gasping at the end of an angler's line. Thousands of tiny, brightly-colored tropical fish flit by; the grunts swim up to your facepiece and peer in, and if you squint, they dash for cover. Far above, the surface of the water is a shimmering greyish ceiling.¹⁴⁶

The fascination of looking, above all else, is stressed by

Tassos:

The first time anyone goes under the surface he becomes a looker. Before he announces himself as a spearman, he must first be a looker. He can't spear a fish unless he first seeks it. Because there is so much of interest to see, even the man who has predetermined to practice a specialty immediately upon entering the water becomes fascinated with the lure to look and look.¹⁴⁷

For many, merely exploring underwater is very exciting. One diver believes underwater exploration to be the most exciting pursuit:

Before you dive, check the time, think about it, then forget it. Time loses all meaning in this world below the surface. You will find yourself spending literally hours picking your way through this wonderland of bizarre forms and colors, with stops here and there to collect and to photograph a particularly interesting scene or specimen. Is it

¹⁴⁶Tassos, p. 5.

¹⁴⁷Ibid, p. 28.

any wonder that underwater exploration has been described as the most exciting sport of all?¹⁴⁸

To facilitate the underwater sightseer, a growing number of underwater parks have been established. Some of these parks and gardens have types of nature trails with submerged sign posts providing information of the marine life involved. The belief that the underwater world is ". . . our last recreational frontier . . ."¹⁴⁹ has led to the establishment of underwater parks throughout the world. Ciafardoni asserts the significance of present and future underwater parks:

With the advent of scuba in 1943, the American outdoorsman showed that he would venture almost anywhere to seek adventure. In a mere 30 years the sport has become so widespread that underwater parks offer the only answer for the preservation of underwater sites for future divers to enjoy. I only hope that more coastal states and countries will follow this trend toward protecting a small part of the ocean for future recreation--underwater.¹⁵⁰

In the United States numerous federal and state preserves have been designated as underwater parks. The largest such park is the John Pennekamp Coral Reef State Park off Florida in the Atlantic Ocean.

Although these underwater parks serve divers throughout the world, they also provide protection for many

¹⁴⁸Slosky, pp. 12-13.

¹⁴⁹Thomas Ciafardoni, "Underwater Parks: Keep 'em Coming!" True, LIV, No. 430 (March, 1973), 30.

¹⁵⁰Ibid.

species of sea life. Divers are not permitted to take marine specimens or disturb the marine environment.

The sightseeing diver can capture some of the beauty and wonder of the submarine world via underwater photography. Underwater photographs can be shared with friends and can serve as vivid recollections of past dives. Underwater photography has lured many photography enthusiasts as well as to motivate many underwater divers to take up the hobby. Burke argues that ". . . underwater photography has lured many people into becoming . . . divers. There is a strange unearthly quality about under-seascapes which attract people strongly, . . ."151

Elaborate and sophisticated equipment has been developed to permit dry land camera equipment to be used under water. With special housing any camera may be used underwater. In addition, many fine underwater cameras have been developed. The development of special strobes and illumination equipment are able to reveal, at deeper depths, beautifully colored fish, rocks and plants which have never been revealed by normal or large quantities of light. Lumière's words to the camera fan--or even to the person slightly interested in photography expresses the attraction of underwater photography:

. . . a whole new world is within your reach.
There is a complete range of equipment in the market

151Burke, p. 142.

for underwater photography, both for still and movie. New action, new scenery, new colours [sic] and motion, you have never seen anything like it.¹⁵²

The collection of shells or other marine specimens, though different from sightseeing or photography, can be equally enjoyable and interesting. Though one can often find interesting and beautiful shells washed upon the beaches, these shells cannot compare to the beauty and variety of specimens seen by the underwater diver. Many Marine specimens are easily seen by the underwater diver. The sanddollar, sea urchin, or starfish are interesting to collect. Lumière describes the lure of collecting:

Are you a collector of marine specimen? If not, you are bound to become one after you go down with goggles and fins once. Dozens of varieties of colourful and delicate corals abound everywhere. Shells of all kinds, colours and sizes, seastars, sea-biscuits and fans are waiting to be picked up. You will be collecting for the rest of your life once you have seen the beauty and the treasures in the realm of the reefs.¹⁵³

If one happened to be a collector of the ocean's specimens before diving, it has been said that once ". . . a collector fits a mask to his face for an undersurface dive, he will hunt shells no other way."¹⁵⁴ Collecting for scientific study or a hobby, although unlike spearfishing or photography, can be exciting and challenging.

¹⁵²Lumière, p. 16.

¹⁵³Ibid.

¹⁵⁴Tassos, p. 7.

The oceans' floor is the resting ground of many sunken ships. Diving a wreck is fascinating and can provide the underwater diver with hours of enjoyment.

Accordingly, another hobby for the underwater diver is wreck exploration. "What could be more intriguing than a dead ship, lying on its side in the sand or silt, encrusted with coral and over-grown with sea plants?"¹⁵⁵

Sightseeing, exploration, collecting and photography appeal to the underwater diver. However, underwater hunting, or spearfishing, has become a recreational pursuit and/or sport of wide appeal. According to Burke:

Underwater hunting has a great attraction for many people. Perhaps more than any other type of hunting which we know--except archery--it pits hunter against the hunted on the most equal terms.¹⁵⁶

In 1954, The United States Amateur Athletic Union recognized underwater hunting as a competitive sport. At that time, many felt that this action would lead to a widespread and indiscriminate killing of fish. However, there is ". . . no reason why generations of mankind should not be able to enjoy the thrills of the submarine chase, if each successive generation is willing to exercise restraint, sportsmanship and honesty."¹⁵⁷ The AAU has set guidelines

¹⁵⁵Tassos, p. 7.

¹⁵⁶Burke, p. 17.

¹⁵⁷Ibid.

¹⁵⁸Tassos, p. 219.

to attempt to uphold these ideals. Various forms of spearfishing contests have been held in many different regions since 1951.¹⁵⁸

Perhaps the unique thing about spearfishing is the equal terms between the underwater diver and the fish.

Tassos makes an interesting analogy of these terms:

[Spearfishing] . . . is to surface fishing what stalking a tiger on foot through the jungle with a knife is to shooting prairie dogs from a low-flying helicopter with a 16-gauge shotgun. The hunter is on as near equal terms with his prey as it is possible to get. As a matter of fact, except for man's superior weapons and brain, the fish has the advantage. He's certainly a better swimmer, his body is made to stand the temperatures and pressures, and he doesn't have to worry about compressed air tanks, face mask, or holding his breath.¹⁵⁹

Hilbert Schenck says:

There is no doubt but that hunting fish under the sea has become a sport of first rank. During the past several years more and more swimmers are finding that the curious inhabitants of the under-sea jungle make sporting and interesting adversaries. The sense of adventure, the strangeness of the sea scape, and the slow, dreamlike motion of the underwater world combine to attract all kinds of people beneath the surface.¹⁶⁰

Organized competition bans the use of scuba, and therefore pits man against fish on most equal terms. Many divers prefer to rely safely on mask, fins, and snorkel

¹⁵⁸Tassos, p. 219.

¹⁵⁹Ibid, pp. 5-6.

¹⁶⁰Hilbert Schenck, Jr. and Henry Kendall, Shallow Water Diving and Spearfishing (Cambridge, Maryland: Cornell Maritime Press, 1954), p. 123.

when spearfishing. Underwater hunting combines skill, strength, endurance, alertness, and courage.¹⁶¹

There is an emerging feeling among many skin and scuba divers toward eliminating organized and unorganized spearfishing competition. Many divers feel that a fish should be speared only if the diver intends to eat it.

The numerous pursuits of today's underwater divers are not limited to those already cited. There are areas of diving that are of special interest to many divers. Deep diving, cave diving, ice diving, wreck diving, and night diving comprise special interest activities that are pursued by curious divers using special equipment.

As sport and sources for recreation, skin diving and scuba diving have become tremendously popular. Many attractions entice the diver underwater. The development of efficient and safe diving equipment opened up many opportunities for man to pursue underwater diving for purposes other than practical, militaristic, or material. Whether these attractions be sightseeing or night diving, man was motivated to engage in underwater diving as a sport or source of recreation.

¹⁶¹Borgeson, p. 78.

MAN WAS MOTIVATED TO EXPRESS HIS FEELINGS AND
THOUGHTS ON PURSUING UNDERWATER DIVING

How farseeing Jules Verne may have been when he wrote these words to describe his undersea walk with Captain Nemo in Twenty Thousand Leagues Under the Sea: "And now, how can I retrace the impression left upon me by our walk under the waters? Words are impotent to relate such wonders!"¹⁶² It is, indeed, difficult to describe a diving experience.

Many divers feel moved to relate the wonders that exist beneath the sea. The new scuba opened up the underwater world to all who may care to enter. Yet there are those who care not to dive for treasures or to repair an oil rig:

Sea gold does not tempt me. I regard diving as a means of acquiring knowledge, not as a way of collecting loot, nor even of recovering material objects. What I seek below the surface is knowledge of man, knowledge of myself,¹⁶³

For many, there is a motivation that extends deep into the soul or psyche and is difficult to describe. In the words of one underwater diver, it is ". . . difficult to put into

¹⁶²Jules Verne, Twenty Thousand Leagues Under the Sea (Cleveland: The World Publishing Company, 1946), p. 113.

¹⁶³Philippe Diol , 4,000 Years Under the Sea (New York: Julian Messner, Inc., 1954), p. 146.

words the attraction of the undersea, although many have tried."¹⁶⁴

There appears to be an impressive, if not voluminous, amount of words devoted to the underwater divers' attempt to express his feelings and thoughts on pursuing underwater diving. Previous chapters have illustrated why man began diving and why man continues to dive. Perhaps the written words of modern divers' feelings and thoughts will offer some insight and understanding of the intrinsic world of the underwater diver--the underwater diver who often chooses to dive for non-material reasons. Although this world can only be totally known by those who dive, many divers have recorded their perceptions of this world and why they continue to enter it.

Hass believes that the sport or recreational pursuit of scuba diving offers something intangible:

Maybe our new sport has another aspect in addition to those we have talked about up to now, for it takes us, naked as nature made us, back into the domain of nature and among living animals, it puts us into a solitude from which a lot of things in the world above look somewhat different. What we are suffering from today is our ever-increasing divorce from nature. When we are surrounded by the fish and the waving tendrils of seaplants we may regain a little of our lost humility.¹⁶⁵

Diolé offers a description of the hard-to-describe feelings of diving: "Down below, where dream and action

¹⁶⁴Schenck, p. 123.

¹⁶⁵Hass, p. 275.

move silently forward, side by side, through the dense waters, man feels for a moment in tune with life."¹⁶⁶

Many divers believe the underwater world to be a challenge into which mankind must become enthusiastic and eager to enter--as to say, "[from] the world of waters we must wrest our sea personality, as from the world of earth the child must wrest his human one."¹⁶⁷

Whether it is the seeking of harmony, balance, or even escapism, Diolé poses some questions that elude to these things:

What wealth--or what perils--lie in wait for us? As yet I do not know. And of what use is all this to us today? What shall it profit a man that he shall find again the pathway of the deep? What shall it profit him to be a diver, unless it be that there, as elsewhere, he may seek the proper balance of his human state?¹⁶⁸

Diolé referred to twentieth century man as ". . . a creature so richly equipped with tools, yet so confused, so fragile. In the deep places of the waters he can find a refuge."¹⁶⁹

Some divers find a sense of peace and timelessness when diving:

The sea, in its best moments, can offer more of peace than any land. Without fuss, now, or any

¹⁶⁶Diolé, preface.

¹⁶⁷Ibid, p. 193.

¹⁶⁸Ibid.

¹⁶⁹Ibid, p. 192.

mighty preparations, we can go down into it, and there enjoy such tranquil hours as come to the suburban householder in his garden, with gorgonians for rose trees, and bream for birds. The blue serenity of mornings in the Ile de France wraps the diver as he hangs motionless.¹⁷⁰

Another diver described the underwater world as timeless and free of gravity:

It is a timeless world, and the pity of it is that you must return to the surface when your tanks approach exhaustion. It is often a struggle to force yourself to leave. Under the water, you are utterly free, free to move about as you please, upward, downward, in any direction. Only when you return to dry land do you become the slave of gravity once again.¹⁷¹

A feeling of the absence of the earth's gravity is captivating and appealing to many divers:

. . . diving is the closest thing to actual free flight that any of us will ever experience. You slide beneath the surface, and weight vanishes. You are not aware of the tanks on your back. If you go down, . . . you quickly lose all sense of being in water at all. The waves are above you. The water is utterly transparent. You look down and see the branching beauty of a staghorn coral formation. A kick of your flippers and you are gliding down, fifteen, twenty, twenty-five feet. You inspect the coral at close range, while fearless little fish of rainbow hues inspect you, sometimes actually bumping into your face mask in their curiosity. Perhaps an armada of foot-long squid, swimming in tight military formation, will pass above you. You kick your flippers again, and soar effortlessly upward for a better look.

It is as if many divers have become addicted to the experiences and feelings they get when diving and are

¹⁷⁰Diolé, p. 193.

¹⁷¹Silverberg, p. 12.

¹⁷²Ibid.

compelled to continue seeking those feelings. Some discover a sense of self-reliance:

From taking home fish for dinner to merely watching little tropical fish scamper away at the clap of a diver's hands underwater, there comes a satisfaction that is unknown elsewhere. For the diver must rely completely upon himself. He must battle unnatural elements in order to do that. He breathes packaged air in a generally unfriendly atmosphere. He must defy all the pitfalls of the sea. Yet he does this, and more, to enjoy himself in this strange world.¹⁷³

A few individuals have attempted to account for diver's thoughts and feelings--a psychology of diving. It is known that most divers experience heights of special joy or euphoria and a great sense of tranquility. In attempting to offer an explanation for these euphoric feelings, Finch, a psychologist and sportsdiver, formulated these thoughts:

As people differ, so do their reasons for euphoria. For those with strong creative or artistic senses, the sheer beauty of the under-sea is appealing. The awe which is frightening to some is fulfilling to others. We may feel a sense of expansion or growth of personality. Noncreative people may be stirred by looking at this world that is so different from anything they have seen elsewhere.¹⁷⁴

Psychologically, divers do not appear to be individuals who are basically competitive or basically noncompetitive in their pursuit of other activities. Phyllis

¹⁷³Tassos, p. 23.

¹⁷⁴Phyllis Minick, "Mind Beneath the Sea," Skin Diver (December, 1971), p. 41.

Minick suggests that underwater diving attracts both the competitive and noncompetitive individual:

In our political world that is built, in part, on competition among men, those who enjoy noncompetitive diving are immersing themselves in aloneness in a friendly, though alien, environment. For the competition seeker, there are the unfamiliar barriers and the challenges from creatures that live there. One cannot help but wonder what divers think of when confined beneath the sea for long periods of time. And how do divers who go to depths of 5000 feet feel about the crushing weight that surrounds them and the darkness through which they move?¹⁷⁵

Most divers, at one time or another, experience an unexplainable feeling of apprehension or fear on a particular dive. These feelings have been called "the uglies." Finch defined "the uglies" as:

' . . . a human anxiety experience that occurs underwater while diving with scuba that can be described as feelings of fright, terror, panic, awe or foreboding. This would exclude experiences or moments related to any real danger; anxiety over a real threat!¹⁷⁶

A diver who might get the uglies, often will not know why. However, a case of the uglies does not prevent the underwater diver from re-entering the world which continually brings him feelings of joy, tranquility and harmony.

Some divers may be individuals who seek eustress. Eustress is a term given to activities that have elements

¹⁷⁵Minick, pp. 41 & 70.

¹⁷⁶Ibid, p. 40.

of thrill, risk, and excitement.¹⁷⁷ The characteristics of eustress include physical challenges, stressful situations, and elements of risk.¹⁷⁸ Underwater diving could certainly be an activity pursued by those who seek eustress. Berlin suggests that divers might ". . . wish to experience either a bit more or a different type of stress. . . ." ¹⁷⁹

As a motivational factor, eustress needs to be investigated and researched. According to Berlin:

We have hardly investigated the phenomenon of eustress. Its relationship, if any, to other motivational factors might help us to understand better the individual stress-seekers and the activities which have special appeal to them.¹⁸⁰

Regardless of the state of mind or variety of emotions expressed by divers, an inscription in Cousteau's Museum of the Sea offers a universal summation of today's diver and his feelings:

Since the time of the ancient Sumerian hero Gilgamesh, who dived for the seaweed of Eternal Life, men have dreamed of returning to the sea. Today men descend in diving dress . . . , with cameras, lights and a variety of tools to work or explore for pleasure or inspiration.¹⁸¹

¹⁷⁷Pearl Berlin and others, The American Woman in Sport, The Social Significances of Sport Series (Reading, Massachusetts: Addison-Wesley Publishing Company, 1974), p. 365.

¹⁷⁸Dorothy V. Harris, "On the Brink of Catastrophe," Quest, XIII (January, 1970), p. 35.

¹⁷⁹Berlin, p. 365.

¹⁸⁰Ibid.

¹⁸¹Queen Mary Museum.

With the developments of efficient and safe diving equipment, men have indeed "returned to the sea." As a result of modern equipment, underwater diving has become a sport or source of recreation. Divers pursue a multitude of underwater activities. Many of these divers have endeavored to express their feelings and thoughts on the underwater world.

Throughout the centuries, the sea has played a significant role in the life of mankind. The oceans have served as a route of travel, a source of food, a theater for military operations, an avenue for recreation, and a repository of wealth producing fishes. Certainly, the sea will continue to play a critical role in the future of mankind.

Much knowledge about the oceans has been discovered. Yet, as Rachel Carson contends, "between the sunlit surface waters of the open sea and the hidden hills and valleys of the ocean floor lies the least known region of the sea."¹⁸³ Beneath the surface of the sea lies a new frontier—a frontier covered by a shroud of dimly lit water in its shallow areas, and sunless water in deep areas, darkened since the world began.¹⁸⁴

¹⁸²Woods, p. 6.

¹⁸³Rachel L. Carson, *The Sea Around Us* (New York: Oxford University Press, 1951), p. 37.

¹⁸⁴ibid.

CHAPTER V

SUMMARY

My soul is full of longing
For the secret of the sea
And the heart of the great ocean
Sends a thrilling pulse through me.
--Henry Wadsworth Longfellow¹⁸²

Throughout the centuries, the sea has played a significant role in the life of mankind. The oceans have served as a route of travel, a source of food, a theater for military operations, an avenue for recreation, and a depository of wealth producing riches. Certainly, the sea will continue to play a critical role in the future of mankind.

Much knowledge about the oceans has been discovered. Yet, as Rachel Carson contends, "between the sunlit surface waters of the open sea and the hidden hills and valleys of the ocean floor lies the least known region of the sea."¹⁸³ Beneath the surface of the sea lies a new frontier--a frontier covered by a shroud of dimly lit water in its shallow areas, and sunless water in deep areas, darkened since the world began.¹⁸⁴

¹⁸²Woods, p. 6.

¹⁸³Rachel L. Carson, The Sea Around Us (New York: Oxford University Press, 1951), p. 37.

¹⁸⁴Ibid.

Although underwater diving, as a popular phenomenon, has emerged only in the last thirty years, the underwater frontier was first penetrated centuries ago.

Archaeological evidence suggests that man began underwater diving as early as 4500 B.C. Passages from classical literature also indicate underwater activities began early in time.

Many motivations prompted man to enter the unknown depths of the awesome sea. The need to obtain food was a basic motive. Diving for fish, mollusks, and crustaceans fulfilled this basic and essential drive. Early underwater divers were motivated also by material reasons. Diving for sponges, oysters, and coral offered a profitable return. Divers, too, were employed to perform such tasks as underwater construction and the recovery of lost valuables and treasures.

In addition to obtaining food and gaining material resources, the first underwater divers were used for naval warfare. Military use of divers included such tasks as sabotage of enemy vessels and enemy harbors. These divers were very skilled in their work and often contributed to the outcome of a particular battle or seige.

The material potential of sunken treasures, minerals, gems, and commercial diving has remained a central motivating factor in man's continued pursuit of underwater diving. In modern times, sunken ships have lured man to

the depths. At the same time, dive prospecting for minerals and gems has proven to be profitable for many divers.

Military warfare has mandated the continual use of underwater diving. Military divers have cut holes in the bottoms of ships, cut anchor chains and cables, and engaged in other works of sabotage. The outbreak of World War II prompted the development of new and improved diving equipment, as well as the training of military divers.

The underwater world has been called the last great frontier. Man continues to explore this frontier of inner space for many reasons. For some, the exploration of the unknown is exciting, challenging, and adventurous. For others, undersea exploration has and will continue to attract divers interested in scientific pursuits. The science of oceanography is considered extremely important and much oceanographic research is performed by divers. Underwater archaeology and ichthyology also make extensive use of divers. New scientific knowledge is being discovered about divers themselves, as well as about the ocean and the ocean floor. Some even envision that one day man will be able to breathe water and work in the oceans' depths for very long periods of time.

The development of efficient and safe diving equipment--primarily the aqua-lung and the regulator--caused underwater diving to emerge as an activity that is easily

pursued. As a sport or source of recreation, underwater diving traces its history for roughly thirty years. There are many attractions and activities which draw people to engage in and pursue underwater diving. Sightseeing, underwater photography, collecting shells or other marine specimens, wreck exploration, and underwater hunting or spearfishing appeal to many of today's divers. Skin diving and scuba diving have become popular as well as safe.

The underwater world attracts many, and it offers intangible qualities and aspects to those who choose to enter. Some seek a state of harmony, some a state of euphoria, and some seek a place to escape. Underwater divers often dive to gain pleasure and inspiration. These pleasures and inspirations have often led to a written expression of feelings and thoughts about underwater diving.

From early times to the present day, man has dived below the seas' surfaces. The motivations to engage in underwater diving are varied, but demonstrate that the sea has been and will continue to be explored, exploited, and observed by underwater divers.

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