

Time Line of Scuba:

A Chronology of the Recreational Diving Industry

By Mark Dorfman - Arlington, Virginia

We humans have been trying to find a way to swim freely under water ever since our species' expulsion from the Garden of Eden. The earliest evidence of scuba diving is an Assyrian frieze dating from about 900 B.C. It shows armed men using a small breathing device while swimming under water.

The word "SCUBA" has somewhat more recent origins. An acronym for "Self Contained Underwater Breathing Apparatus," it started as military jargon coined by the U. S. Navy underwater demolition team (UDT). As used today, the term "scuba" distinguishes self-contained devices from surface-fed "habitat" and "hard hat" types of diving equipment, and from submersible vessels.

Early diving systems proved dangerous and difficult to use, and required lengthy training. Modern scuba equipment, first introduced in 1943, comes close to realizing the ancient dream of allowing humans free access to the underwater world. Here are some of the milestones on the path to fulfilling that fantasy.

332 BC: The Greek philosopher Aristotle's *Problemata* describes a diving bell used by Alexander the Great at the siege of Tyre (a Phoenician town on the Mediterranean coast of what is now Lebanon).

1500s: Leonardo da Vinci designs the first known scuba. His drawings of a self-contained underwater breathing apparatus appear in his *Codex Atlanticus*. Da Vinci's design combines air supply and buoyancy control in a single system, and foreshadows later diving suits. There is no evidence that he ever built his device. He seems, instead, to have abandoned scuba in favour of refining the diving bell.

1622: A Spanish treasure fleet on its way home is scattered and largely destroyed by a hurricane near the Florida Keys. The Spaniards will salvage a small part of the treasure with a custom-built diving bell, but most of it stays on the bottom. Storms will also sink treasure transports in 1715 and 1733. Hundreds of people drown in the shipwrecks and the economic losses intensify Spain's national deficit, accelerating its decline as a world power.

That's the bad news. The good news is that, for the next 350 years, people will dream about the treasure and fantasize about finding a way....

1680: Italian physician Giovanni Borelli imagines a closed circuit "rebreather."

His drawings show a giant bag using chemical components to regenerate exhaled air. This, he suggests, should allow the air to be breathed again by a submerged diver. Borelli also draws rather bizarre, claw-like feet on his diver. This leads one historian to stretch things a bit and credit Borelli as the inventor of swim fins. Others recognize Borelli as the first to envision the scuba diver as a free-swimming "frogman."

1808: Friedrich von Driberg develops his "Triton" apparatus. The system uses an air reservoir worn by the diver but requires that the tank be supplied by surface hoses. The diver obtains air from the backpack reservoir through a valve operated by nodding his head.

1819-1830s: A German-born inventor and machinist living and working in England, Augustus Siebe, designs a surface fed helmet for "open dress" diving. (In "open dress," an open-bottomed helmet rests on the diver's shoulders.) He introduces his "closed dress" (with the helmet sealed to the suit) diving outfit in 1836. In 1839, Siebe's hard hat system, along with four other designs, is used to salvage the Royal George from the harbour at Spithead, England. Siebe wins endorsement by Her Majesty's Royal Navy and his firm, Siebe, Gorman & Co., becomes the leading manufacturer of diving equipment.

1819-1830s: Charles Anthony Deane and his brother, John, develop, manufacture, and market a succession of fire-fighters' smoke helmets, diving outfits, and related equipment. The Deanes compete with Siebe for market share, government contracts, and eventually, a place in diving history. They lose the first two battles, but are now winning recognition as the actual inventors of open dress diving equipment.

1825: An Englishman, William James, develops a system that several historians consider to be the first true scuba. It employs tanks of compressed air and a full diving dress with a helmet. Limits on useful depth and duration keep it from widespread adoption by commercial divers.

1825: Charles Condert, an American, develops a compressed air reservoir consisting of copper tubing bent into a horseshoe and worn around the diver's body. The system includes a valve to inflate the diver's suit.

1828: Lemaire d'Augerville patents a "swimming belt" designed to enable divers to swim in mid-water and ascend or descend as needed for their work. We now call such devices "buoyancy compensators." But nineteenth-century salvage divers found little use for the buoyancy device, so d'Augerville netted little compensation.

1836: Charles Deane publishes the first "how to" diving manual.

1864: Two Frenchmen, Benoit Rouquayrol and Auguste Denayrouze, develop a diving system that feeds air to a diver carried tank from a pump on the surface, and to the diver through a membrane-controlled "demand" valve. The valve automatically compensates for the pressure of the surrounding water. That makes it possible for the diver to breathe with minimum effort. Their system of surface pump, pressurized air cylinders, and demand regulators goes into commercial production in 1867. The principle behind the Rouquayrol/ Denayrouze system is essentially the same as that of demand valves used in modern scuba.

1869: Jules Verne popularizes the concept of scuba in *20,000 Leagues Under the Sea*. His central character, Captain Nemo, specifically cites the Rouquayrol/Denayrouze system and theorizes about the inevitable next step - severing the diver's reliance on surface-supplied air.

1869-1883: New York's Brooklyn Bridge is built, but many of the workmen pay a high price. Emerging after extended hours in high-pressure caissons (dry construction compartments sunk into the riverbed) they become crippled by "caisson disease." Because of the cramped and frozen joints caused by the affliction, reporters dub it "the bends."

1876: Henry Fleuss, an English merchant seaman, revives the idea of the closed-circuit rebreather. His self-contained system is useful for working in smoke and noxious air, and, for short periods, underwater. Fleuss goes to work as an engineer for Siebe, Gorman, and the company puts his design into commercial production.

1880: Dr. Paul Bert, a French physiologist, completes his pioneering work on breathing under hyperbaric (high pressure) conditions. He recognizes that "caisson disease" is identical to problems experienced by deep sea divers, and suggests that it is caused by the release of dissolved nitrogen from the bloodstream. He also shows that oxygen, even the oxygen in compressed air, can become toxic when breathed under pressure. (The oxygen in compressed air becomes toxic only at depths far beyond the 130-foot limit of recreational diving.)

1892: Frenchman Louis Boutan develops a variant of the closed-circuit system. The Boutan scuba can be used for up to three hours at shallow depths.

1909: The Draeger company of Lübeck, Germany - a manufacturer of gas valves, fire fighting equipment, and mine safety devices - plunges into making dive gear. The company creates a self-contained dive system combining a "hard hat" style helmet with a backpack containing compressed oxygen. Over the next few years, Draeger will win numerous patents for diving equipment.

1910: Dr. John Scott Haldane, a British physiologist, confirms that caisson disease is caused by the release of dissolved nitrogen when surfacing. To enable divers to avoid "the bends," Haldane develops a procedure that calls for gradually staged "decompression." His pioneering research culminates in publication of the first dive tables.

1911: Sir Robert Davis, a director of Siebe, Gorman, refines the Fleuss system and comes up with the Davis False Lung. His reliable, compact, easily stored, and fully self-contained rebreather is adopted (or copied) throughout the world for use as an emergency escape device for submarine crews.

1912: Germany's Westfalia Maschinenfabrik markets a hybrid dive system that blends scuba and surface-fed components with mixed gas technology.

1915: An early film of *20,000 Leagues Under the Sea* marks the first commercial use of underwater cinematography. Cast and crew use modified Fleuss/Davis rebreathers and "Oxylite," a compound that generates oxygen through a chemical reaction. (Oxylite explodes if it gets wet, a trait that tends to limit its popularity as a scuba component.)

1917: Draeger produces a true scuba system that combines tanks containing a mixture of compressed air and oxygen (oxygen-enriched air) with rebreathing technology. It is sold for use at depths to 40 meters (130 feet).

1918: The Ogushi Peerless Respirator passes field tests at 324 feet. The Japanese device combines modified false-lung style closed-circuit rebreather technology with a compressed air reserve. It supplies air to the diver through a manually controlled on/off valve.

1919: C. J. Cooke develops a mixture of helium and oxygen (heliox) for use as a breathing gas by divers. The mixture enables divers to avoid nitrogen narcosis while diluting oxygen to non-toxic concentrations. It allows commercial divers to extend their useful working depth well beyond previous limits.

1926: An officer in the French Navy, Yves le Prieur, patents the Fernex/Le Prieur diving system based on compressed air carried in tanks. Le Prieur's device feeds air to a full-face mask worn by the diver. Early models provide a continuous flow of air. Later models use a manual on/off valve to preserve the air supply.

Early 1930s: Guy Gilpatrick, an expatriate American writer living in France, waterproofs a pair of pilot's goggles by lining the edges with glazer's putty. Commercial versions of his window to the underwater world soon follow.

1933: Jack Prodanovich, Ben Stone, and Glen Orr (later joined by Jack Corbley, Bill Batzloff and Wally Potts) start a skin diving club in San Diego - the Bottom Scratchers. This pioneering group, the first of its kind, helps define the sport and creates its own folk legends. (In an era preceding the availability of swim fins, would-be members are required to dive to 30 feet. They have to capture three abalone on one dive, grab a five-foot horned shark by its tail, and bring up a "good-sized" lobster) Those who pass the test include underwater filmmaker Lamar Boren and Jim Stewart, a diving officer at Scripps Institute.

1935: Louis de Corlieu patents a broadbladed fin to be worn on the feet by swimmers. The fins make a big splash among free-swimming "goggle" divers. With their help, skin divers and their sport really start going places!

1937: The American Diving Equipment and Salvage Company (now known as DESCO) develops a self-contained mixed-gas rebreather. It uses a compressed mixture of helium and oxygen in combination with a fully sealed diving suit. Using the new system, DESCO diver Max Nohl sets a new world depth record of 420 feet.

1937: Georges Comheines creates a scuba system by combining the Rouquayrol/Denayrouze valve with le Prieur's system of compressed air tanks. This breakthrough finally brings to reality the scuba device anticipated by Jules Verne in 1869. Comheines and a group of friends demonstrate the device in a "human aquarium" exhibit at the Paris International Exposition.

1939-1940s: Owen Churchill helps popularize skin diving, making it a hot sporting craze among cool cats living in coastal areas of the United States.

1942: The Duke Goes Diving. John Wayne stars as a hard-hatted salvage diver in Cecil B. de Mille's *Reap the Wild Wind*. Co-stars include Rita Hayworth, Paulette Goddard, Raymond Massey, Charles Bickford, Ray Milland, and the giant squid that does in *The Duke* at the end. Cinematographer Victor Milner is nominated for an Academy Award, but only the squid wins an Oscar (special effects).

1942: Jacques-Yves Cousteau meets Emile Gagnan, an industrial gas control systems engineer with L'Air Liquide et Cie. They combine their talents and insights. Cousteau, an experienced diver, understands the diver's requirements. Gagnan is an expert on the mechanics of gas valves. Working together, they will soon produce significant advances over Comheines' pre-War scuba system.

1943: The first Cousteau/Gagnan scuba device fails January testing in the Marne River outside Paris and goes back to Gagnan's drawing board for modifications. Subsequent innovations include a novel device that provides inhalation and exhaust valves at the same level. Several months later, the modified device passes tests in a water tank in Paris.

During the summer, Cousteau and two close friends, Philippe Tailliez and Frédéric Dumas, test production prototypes of the Cousteau/Gagnan scuba system in the Mediterranean Sea. The device proves to be safe, reliable, and remarkably easy to use. During July and August, the friends make hundreds of dives, thoroughly testing the system and seeking to determine its limits. (Cousteau's wife, Simone, and sons, Philippe and Jean-Michel, also try out the prototype Aqua-Lung® units. That makes the Cousteau family the first to discover that a dive trip makes a great family vacation.) In October, Dumas demonstrates the amazing reliability of the Aqua-Lung® with a dive to 210 feet.

That same year, Cousteau and Dumas complete *Au DixHuit Mètres du Fond* ("Sixty Feet Down"), their first underwater film. To overcome wartime shortages of movie film stock, Jacques and Simone Cousteau splice rolls of still film together. Lacking a darkroom, they work under blankets at night. Cousteau photographs some underwater scenes using a small camera housed in a modified fruit jar.

1946: Pat Madison and Everett Edmund incorporate M & E Marine in Camden, New Jersey, and create Mar-Vel Underwater Equipment as a division of M & E. Mar-Vel will import and retail diving equipment - primarily commercial hardhat rigs, but also early skin diving and scuba gear. M & E will also manufacture specialized diving and underwater gear, and become a specialty supplier and contractor with major American corporations, the U. S. Navy, NASA, and other government agencies.

1947: Jordan Klein starts a small company, Marine Enterprises, Inc., to manufacture spear guns and housings for underwater cameras. His company evolves into a retail store. When he has difficulty finding a good air source, he goes into the business of repairing and modifying war surplus air compressors. In 1956, Klein will start importing parts from Germany's Bauer organization and packaging his own compressors under the MAKO name.

1948-1949: Rene Bussoz imports the Cousteau/Gagnan AquaLung® (manufactured by L'Air Liquide through a subsidiary, Le Spirotechnique) for sale in his Southern California store, Rene's Sporting Goods. When the Hollywood film community discovers his new gadget, interest in scuba skyrockets. Bussoz returns to France in 1953. The store's new management, an executive team from Le Spirotechnique, transforms Rene's Sporting Goods into U. S. Divers which becomes a leading manufacturer of diving equipment.

1949: Arnold Post starts selling the Aqua-Lung® and related scuba gear at "Richards Sporting Goods" (now "Richards Aqualung Center" and still operating at the same location) in New York. At the same time, Charlie Marshall offers the Aqua-Lung® for sale at the exclusive New York outfitter "Abercrombie & Fitch." In Chicago, Vem Pederson stocks the Aqua-Lung® at his medical gas supply business, "Chicago Oxygen."

1950: The International Underwater Spear Fishing Association holds the first national skin diving competition at Laguna Beach, California. Organized by Ralph Davis, the competition pulls together many underwater activities. It is won by the Dolphin Club of Compton, California.

Early 1950s: Gustav dalla Valle, the émigré scion of an aristocratic Italian family, begins importing scuba and skin diving equipment made in Italy by Eduardo Cressi to the United States. Dalla Valle later sells the Cressi distribution contract to Dick Kline at Healthways.

Early 1950s: Entrepreneurs in coastal cities all around America launch dive retail operations. In California, Bob Lorenz opens "Water Gill," presumably the first specialty retail store for scuba divers, in Venice; Mel Fisher opens "Mel's Aqua Shop" in a Torrance feed store; and Bill Hardy and Bill Johnston open "San Diego Divers Supply." In Florida, Paul Arnold opens "Aqua-Lung, Inc." and Jordan Klein opens "Underwater Sports" (originally named "Marineland") in 1951. They soon face competition from Lou Maxwell's "Florida Frogman." Back on the West Coast, Bob and Bill Meistrell start "Dive 'N' Surf" in Hermosa Beach, California, in 1953. That makes "Dive 'N' Surf" the West Coast's oldest diving specialty retailer in continuous operation. In Boston, James Bliss starts retailing scuba gear at his marine products wholesale distributor in 1954. In 1955, Bernie Freedman starts selling dive gear at "Tommy's Hardware" (now "Tommy's Hardware and Dive Store") of Portland, Maine. And things are just getting started!

1951: Richard Widmark and Dana Andrews star in *The Frogmen*, a critically acclaimed film about the exploits of the Navy's underwater demolition teams. Industry experts credit this film and other publicity given the exploits of military divers with helping to accelerate the growth of scuba diving. Cinematographer Norbert Brodine earns an Academy Award nomination.

1951: E. R. Cross invents the "Sport Diver," one of the first American-made single-hose regulators. Cross' version is based on the oxygen system used by pilots. Other early single-hose regulators developed during the 1950s include Rose Aviation's "Little Rose Pro," the "Nemrod Snark" (from Spain), and the Sportsways "Waterlung," designed by diving pioneer Sam LeCocq in 1958. The "Waterlung" will become the first single-hose regulator to be widely adopted by the diving public. (While some double-hose regulators remain in use, they are no longer manufactured in the United States.)

1951: Chuck Blakeslee and Jim Auxier create *Skin Diver* magazine. (Many early skin divers refuse to use the new "bubble machines" and look on scuba as "sissy diving.") *Skin Diver* instantly becomes the leading journal of spearfishing and underwater hunting. In later years, the magazine shifts its attention to scuba. *Skin Diver* will continue to play an important role, nurturing industry growth by promoting underwater photography and travel.

1951: A European manufacturer, possibly Le Spirotechnique, produces a new tank valve that can be set to reserve part of the air supply. The "reserve" can be used by the diver after the main supply is depleted. The first U. S. Divers catalogue, published in 1953, designates the reserve valve with the letter "J," and it becomes known throughout the industry as the "J-valve." Its catalogue companion, the "non-reserve" device, is still known as the "K-valve."

1951: Rachel Carson publishes *The Sea Around Us*. Her scholarly yet poetic book about the oceans wins several prestigious awards and tops bestseller lists for almost seven months. Today, more than 40 years later, *The Sea Around Us* continues to win new friends for the marine environment.

1951: John Steinbeck publishes *The Log from the Sea of Cortez*. His book chronicles a 1940 research and collecting expedition undertaken by Steinbeck and Ed Ricketts. It introduces a wide audience to the Sea of Cortez, then more commonly called the Gulf of California. It also attracts many adventurous scuba divers to La Paz and nearby islands. (The original, full report of the journey appeared in 1941 as Steinbeck and Ricketts, *The Sea of Cortez: A Leisurely Journal of Travel and Research*.)

1951: Hans Hass publishes *Diving to Adventure*. With its descriptions of diving with sharks, whales, manta rays, and other animals, the bestseller enhances diving's image as grand adventure. It also makes Hass a role model for the diving public.

1952: Jacques-Yves Cousteau, Frédéric Dumas, and James Dugan publish *Silent World*, a book about the early days of Aqua-Lung® diving. It, too, becomes a bestseller.

1953: Dr. Eugenie Clark publishes *Lady With a Spear*. It becomes a Book-of-the-Month Club selection and will be translated into eight languages, plus Braille. The popular book gives women divers a role model of their own.

1953: Robert Wagner, Gilbert Roland, Peter Graves and an antagonistic rubber octopus star in *Beneath the 12 Mile Reef*, a film about diving for sponges off the Florida coast. The critics say it's a sinker. But crowds flood the theatres, and the underwater cinematography of Edward Cronjager receives an Academy Award nomination.

1953: The July issue of *Popular Science* publishes directions for modifying surplus Air Force oxygen systems for use as scuba regulators. (There is no indication of who was supposed to pay for the product liability insurance. It was, indeed, a simpler, albeit more hazardous, era!)

1953: E. R. Cross publishes *Underwater Safety*, the first modern diving manual in the U. S. Later distributed by Healthways, well over 100,000 copies of this 86-page book will eventually be sold. Cross also publishes *Underwater Photography and Television*. Since there are only a few hundred underwater cameras in the country at the time, this one proves to be a book whose time has not yet come.

1954: Al Tillman, director of sports for the Los Angeles County Department of Parks and Recreation, and L. A. County lifeguard Bev Morgan develop the first formal skin and scuba diver training programs. In 1955, the L. A. County program will begin certifying diving instructors.

1954: The first full textbook of recreational diving, *The Science of Skin and Scuba Diving*, is published by the Council for National Cooperation in Aquatics. An expanded edition appears in 1959. The third edition appears, under the title *The New Science of Skin and Scuba Diving*, in 1962. By 1974, when the fourth edition is published, more than a million copies have been sold.

1954: Kirk Douglas, James Mason, Paul Lukas, and Peter Lorre star in Walt Disney's popular remake of *20,000 Leagues Under the Sea*. It wins Academy Awards for art direction and special effects.

1954: Television's first underwater documentary series, *Kingdom of the Sea*, makes its debut. The program includes live broadcasts of a "diver education" segment starring research diver Zale Parry. The same year, Parry makes a recordsetting dive to 209 feet near Catalina Island. National publicity accompanies her exploit, and diving will never again be perceived as "for men only."

1955: Jane Russell, Richard Egan, and Gilbert Roland star in a Howard Hughes film, *Underwater!* Promotional posters feature scantily-clad Hollywood newcomer Jayne Mansfield. The film premieres at a Florida spring. Some of the guests wear scuba gear to watch divers search for sunken treasure. Or maybe they just watch Jane and Jayne.

1955: Sam Davison, Jr., introduces the "Dial-A-Breath," a double-hose, double-diaphragm regulator, complete with a built-in low-pressure reserve and variable breathing resistance. It helps touch off a competitive frenzy, as other manufacturers seek special features to distinguish their own lines of equipment. Davison goes on to build his own equipment manufacturing company, Dacor.

Late 1950s: Dive retailing shifts into high gear. Jim Cahill and Bob Gurette open "New England Divers" in Beverley, Massachusetts. Mike Kevorkian opens "Tarpoon Skin Diving Center" in Miami. In Vermont, Harold Simperts transforms his auto dealership into "Victory Auto and Dive." In Connecticut, Navy diver Bob Barth starts "Aqua Sports" and Lenny Green offers diving gear at his "Surplus Trading Post." In Rhode Island, John McAniff adds dive equipment to the photography equipment sold at the "Bellevue Camera" chain. Out on New York's Long Island, Archie Orenstein opens "Central Skin Divers." In Schenectady, New York, Howard Goldstock opens "Goldstock Sporting Goods." Joe Dorsey opens the "Divers Den" in Baltimore and Smokey Roberts opens "Smokey's Divers Den" in Pennsylvania.

In the Midwest, Vern Pederson changes the name of his business from "Chicago Oxygen" to "Verne's Scuba Center"; Ed Thorne's "Hardware" in Rockford, Illinois, adds a line of scuba gear; Jack Blocker opens "Jack the Frogman" in Minneapolis; and Ralph West opens "Sport Diver" in Milwaukee. In the Northwest, the man to see is Gary Keffler at Seattle's "Underwater Sports." Down South, Bill Tant opens "Southern Skin Diver Supply" in Alabama and Roland Riviere opens "Roland's" in New Orleans. Texas checks in with Jack Rich's "Village Sporting Goods" and "Copeland's," owned by Jim Copeland. The Sooner State makes its entry a little later when Phil Bayouth opens "Phil's" in Oklahoma City. Even the arid Southwest discovers diving when Boris Innocenti opens "Aqua Sports" in Phoenix. And many other pioneering retailers also take the plunge.

1956: A group of scientists at the University of California are researching thermodynamic principles as applied to the protective properties of Arctic long johns. Instead of perfecting polar underwear, they invent a new type of outerwear for divers. The fabric: a neoprene foam manufactured by Rubatex as automobile insulation. The concept: replace a physical barrier (the supposedly watertight diving suit) with a more user-friendly thermal barrier. That means that the wearer gets wet but stays warm anyway. The product becomes known, logically enough, as the wetsuit. Early production models are 1/8-inch thick, made by EDCO, and marketed by the Beaver company of La Jolla, California.

1956: Jacques Cousteau and co-director Louis Malle win the Golden Palm at the Cannes Film Festival for *Le Monde Du Silente* ("Silent World"). The documentary introduces worldwide audiences to Cousteau's research ship and floating film studio, *Calypso*.

1956: Commander Lionel Philip K. Crabb of the British Navy disappears while diving in Portsmouth Harbour, near a visiting state-of-the-art Soviet cruiser, *Ordzhonikidze*. The British admiralty cries "foul," claims that Crabb was innocently testing new scuba gear, and demands an explanation from the Soviets. The USSR strenuously denies knowing anything at all about whatever could possibly have happened to the British frogman. Media coverage stresses Crabb's extraordinary career as a military diver and creates widespread interest in scuba diving. The event remains diving's greatest unsolved mystery.

1956: Ted Nixon introduces a distinctive red and white "diver down" flag to warn boaters to stay clear or slow down to avoid injuring nearby divers. (There is no record of who becomes the first boater to respond by cruising over at high speed "to see what those guys are up to.")

1957: Zale Parry and Al Tillman organize the first international underwater film festival in Los Angeles. The popular event gives diving a new artistic and cultural dimension. Similar popular events soon follow in Mexico, Canada, New York, Miami, Chicago, the Virgin Islands, and other locations.

1957: Bob Soto opens "Bob Soto's Diving, Ltd.," the first successful full-service, full-time dive operation on Grand Cayman Island.

1958: A small hotel, *Sunset House*, opens for business on Grand Cayman. Its beachfront location makes it an immediate success. It becomes especially popular with scuba divers. Over the next decade, *Sunset House* (now "Sunset Divers") will become a popular dive resort.

1958: Sherwood Manufacturing purchases the patent for the piston regulator. (The price asked and received by the inventor is that he be taken to lunch once a year.) Sherwood engineers modify the regulator for use in scuba equipment, as a replacement for the diaphragm regulator originally created by Rouquayrol and Denayrouze in 1864. Sherwood will manufacture pistonvalved regulators in various configurations for sale by U. S. Divers, Voit, Healthways, Swimaster, Scubapro, Dacor, Nemrod-Seamless Rubber, and others, for many years. Various versions of the device are still widely used throughout the industry.

1958: Executives from several diving equipment manufacturers exhibiting at the National Sporting Goods Association (NSGA) - Voit, U. S. Divers, Healthways, Dacor, and Swimaster - decide to form the "Organization of Underwater Manufacturers." They hope it will become a vehicle for the gathering and exchange of valuable commercial information, and will help professionalize recreational diving. The group continues to meet at NSGA shows for a few years, but it fails to become much more than a social club.

1958: Ivan Tors' *Underwater Warrior* (1958) starring Ross Martin and Dan Daily spotlights the career of Doug Fane and his U. S. Navy UDT divers. One critic calls it "a semidocumentary drama, unlikely to win any recruits," but enlistment of UDT volunteers soars anyway.

1958-1961: *Sea Hunt*, produced by Ivan Tors and photographed by Lamar Boren, becomes one of America's most popular television series. The exploits of Mike Nelson (played by Lloyd Bridges) make the character a role model for a generation of wanna-be and someday-will-be scuba divers.

1959: Hollywood's love affair with the underwater world bottoms out with Jerry Lewis on scuba gear, some wayward Weeki Wachee mermaids, and a wimpy, wacky octopus in *Don't Give Up the Ship*).

1959: The YMCA's National Aquatic Council offers the first nationwide diver training and certification program.

1959: The Boston-based Northeast Council of Dive Clubs hosts the First National Convention of Skin Divers. The group forms an umbrella organization representing many diving clubs, councils, and constituencies - the Underwater Society of America. Organizers include John McAniff, who serves as director of competitive skin diving. The Society will become an industry advocate and an active forum for skin diving activities, including a variety of national and international competitions.

1960: Diving pioneer Connie Limbaugh drowns while diving in a cave in France. Limbaugh, the first chief diving officer at Scripps Institute, is among the most admired divers in the world and a leading marine scientist. His death saddens everyone in the industry - and makes divers everywhere feel vulnerable.

1960: Neal Hess and Al Tillman organize the National Association of Underwater Instructors (NAUI) in cooperation with the Underwater Society of America. Its first instructor certifying course, held in Houston, draws participants from all over the United States.

1960: Dick Birch opens the four-room Small Hope Bay on Andros Cay in The Bahamas - the earliest known dedicated dive resort. Small Hope Bay offers a remote location sheltered by the Andros Barrier Reef, less than 200 miles from Miami. Now with 20 rooms, it is still in business.

1960s: Mel Fisher, Burt Webber, Kip Wagner, Fay Feild, and others find scattered treasure from wrecks of Spain's 1715 fleet and create new technology for the hunt. By the end of the decade, they recover much of the salvageable treasure from the 1715 and 1733 fleets. But new finds will continue to be uncovered in the 1990s, and, perhaps, beyond.

1961: Maurice Fenzy patents a device invented by the underwater research group of the French navy. The device includes an inflatable bag with a small attached cylinder of compressed air. It rapidly becomes the first commercially successful buoyancy compensator. Within a few years, divers throughout Europe, and a few well-travelled Americans, are wearing "Fenzys."

1961: Ed Replogle invents a "sonic alarm" that automatically warns its user (and everyone else in the vicinity) of low air pressure. The device, manufactured by Sherwood and sold by Healthways, signals that safety remains a major concern in the recreational diving industry.

1962: Two highly publicized experiments give the world a glimpse of underwater experimentation and research. E. A. Link becomes the "Man in the Sea" with an experimental 24hour dive(on heliox) to 200 feet. And Jacques Cousteau conducts "Conshelf One," with a habitat housing six men breathing oxygen enriched air (nitrox) at 35 feet for seven days.

1963: Equipment importer and distributor Gustav dalla Valle and his partner, former Navy diver and dive equipment retailer Dick Bonin, start their own diving equipment manufacturing company, Scubapro.

1963: Art Stanfield and Charlie Jehle (Voit), Dick Bonin (Scubapro), Sam Davison, Sr. (Dacor), John Culley (U. S. Divers), and Randy Stone (Healthways) revive the idea of a national trade association. They form the Diving Equipment Manufacturers Association (DEMA) "to promote, foster and advance the common business interests of the members as manufacturers of diving equipment."

1963: Flipper, a movie featuring Chuck Connors and Luke Halpin, but starring a tail walking, playfully squeaking bottlenosed dolphin, wins modest box office success. The film, its sequels, and the popular television series that follows will change popular attitudes toward marine mammals - and toward the oceans.

1964: Richard Adcock launches Marisla, possibly the first dedicated live-aboard dive boat, in La Paz, Mexico. Adcock has been teaching diving and guiding dive tours of the Sea of Cortez since 1956.

1964: The U. S. Navy launches Sealab I for a different kind of live-aboard diving experience. In the first experiment, four divers stay underwater for 11 days at an average depth of 193 feet.

1965: Al Tillman develops the UNEXSO Diving Resort at Freeport in The Bahamas. Created with the dawn of the jet age, it soon becomes a major attraction for teaching diving and a magnet for travelling divers. Programmed to protect the environment, the resort promotes hunting with cameras instead of spear guns. UNEXSO becomes the prototype of a complete dedicated dive travel destination.

1965: U. S. Navy Sealab II team leader Scott Carpenter, living and working in the habitat at a depth of 205 feet, speaks with astronaut Gordon Cooper in a Gemini spacecraft orbiting 200 miles above the surface. No longer will humanity be able to view space, sea, and land as separate entities. Instead, we are learning to view Spaceship Earth as a single system. This is the real dawning of the Age of Aquarius.

1965: Thunderball, starring Sean Connery, glamorizes and updates the image of scuba with waves of diving extras and starlets galore. Agent 007 saves the world but gives diving retailers fits as customers demand to buy scuba gear "just like James Bond's." The special visual effects win an Academy Award.

1966: The Professional Association of Diving Instructors (PADI) is formed by John Cronin and Ralph Ericson.

1967: The Undersea Medical Society (now the Undersea and Hyperbaric Medical Society, UHMS) is founded in Maryland. UHMS and its members will significantly advance knowledge of the medical aspects of diving.

1969: Travel agent Dewey Bergmans starts Sea and Sea Travel based in San Francisco. The new agency offers tour packages designed for scuba divers travelling to such off-the-beaten-path destinations as Bonaire, Grand Cayman, and Cozumel.

1970: John McAniff and the University of Rhode Island create the National Underwater Accident Data Center (NUADC). The statistics and accident information gathered, analyzed, and reported by McAniff will advance industry awareness of many aspects of diving safety. Originally funded by the U. S. Department of Health, NUADC will later attract support from the National Oceanic and Atmospheric Administration (NOAA), DEMA, PADI, and other groups within the dive industry.

1970: The macho image of underwater exploration has its chest hairs tweaked when marine biologist Dr. Sylvia Earle leads a highly publicized mission in the Tektite habitat. Earle's all-female team of aquanauts successfully completes a two-week saturation stay at 42 feet, providing researchers with much valuable data.

1970s: Mel Fisher and his group find scattered traces of Nuestra Señora de Atocha, a treasure ship lost in 1622. Treasure fever fires the imagination of the nation. Burt Webber's group later finds the remains of Nuestra Señora de la Concepcion, another rich treasure ship, and the world has a relapse of treasure fever. As research, technology, and search skills improve, more finds will follow.

1971: Peter Hughes opens the first full-service dive business on Roatan at "Anthony's Key Resort," then a 17-room resort hotel catering to the sailing crowd. Hughes' remarkable and rapid success demonstrates to beach resort operators throughout the Caribbean that "underwater treasure" can take many forms.

1971: Scubapro introduces the Stabilization Jacket, a combination backpack and jacket style buoyancy control device (BCD). The "stab jacket" and its imitators increase diver acceptance of BCDs. Jacket-style BCDs become the industry standard for most uses. ("Horse-collar" BCDs will continue to be popular with cave divers and others who use multi-tank dive rigs.)

1972: The U. S. Congress passes the Marine Protection, Research and Sanctuaries Act. The Act seeks to extend the kind of protection afforded by national park status to estuaries and coastal waters. It recognizes that marine sanctuaries are "part of our collective riches as a nation" and charges NOAA with managing the program. The first National Marine Sanctuary, designated in 1975, protects the remains of the Civil War ironclad Monitor. Today, the system embraces 13 sites including the three newest: Monterey Bay, California; Stellwagen Banks off the New England coast; and the Hawaiian Islands Humpback Whale National Marine Sanctuary.

1972: "Captain Don" Stewart of Bonaire starts setting concrete "sea tethers" (now known as mooring buoys) at popular dive sites. The buoys successfully prevent damage to fragile reefs caused by failing and dragging boat anchors. In 1979, to further protect the reefs for and from divers, Bonaire designates its surrounding waters as a marine park. Tom van't Hof, head of the Caribbean Marine Biological Institute (Curaçao), formalizes the mooring buoy program. The reef protection idea gradually (actually, far too gradually) takes hold at other popular dive destinations.

1972: Carl Roessler joins Sea & Sea Travel and expands the organization's live-aboard dive boat program. The liveaboard idea popularizes dive travel to the Cayman Islands (aboard Paul Humann's pioneering Cayman Diver), the Great Barrier Reef and Coral Sea (aboard Wally Muller's Coralita), and other distant seas.

1974: Baja Expeditions expands dive opportunities the Sea of Cortez aboard Poseidon, then the Baja Explorador and the Don Jose. Dive guides working for Baja Expeditions include neophyte underwater photographers Marty Snyderman and Howard Hall.

1975: Hollywood rediscovers the underwater world in a fearsome way with the box office blockbuster, Jaws. Stephen Spielberg's bodacious beast makes a bunch of bucks for novelist Peter Benchley but takes a big bite out of the diving business. Shark-o-phobia chases people out of the water in droves, ending 15 consecutive years of industry growth. Aftershocks echo in 1977 with The Deep and in 1978 and 1983 with Jaws 2 and Jaws 3.

1977: The first DEMA trade show convenes in Miami. The show establishes itself as "neutral ground" where the entire industry can meet. The trade show becomes remarkably successful, and within a few years, DEMA makes itself a potent force for professionalism and unity within the recreational diving industry.

1981: DEMA designs and tests its GEM program of streamlined diver training in cooperation with NAUI, PADI, and a group of diving retailers. The program suggests a kinder, gentler philosophy of dive instruction - along with courses that require less pool and classroom time. The certification programs that follow in GEM's wake make diving more accessible to busy professionals, entire families, and other new participants.

1982: The Institute of Diving opens the "International Diving Museum" (now the "Museum of Man in the Sea") in Panama City, Florida. The museum's collection will become one of the most comprehensive in the world. It includes the U. S. Navy's Sealab I and the Deep Dive System Mark 1. The museum also houses diving equipment from England, France, Germany, and Japan, as well as a research library of rare books, video tapes, photographs, and films.

1983: DEMA produces I'd Rather Be Diving, a film that promotes recreational diving and is widely used by retailers as a sales aid. In the best Hollywood tradition, it will be followed by three sequels: Treasure Diving (1984) spoofs adventure films; The Seven Wonders of the Diving World (1985) promotes dive travel; and Scuba Diving in America (I 986) promotes local diving at domestic sites throughout the United States.

1983: Co-inventors Craig Barshinger and Carl Huggins, and ORCA Industries founder Jim Fulton, introduce The Edge®, the first commercially successful American electronic dive computer, at the DEMA trade show. The device automatically tracks dives and continuously calculates remaining "no decompression" time and depth limits. It helps spark a new era in dive instrumentation.

1984: Dive travel via live-aboard boats surges with the arrival of a new group of charter boats custom-designed for scuba divers. They include the Cayman Aggressor serving the Cayman Islands; the Tri-Star in the Philippines; and the Fantasea in the Red Sea. Larger, more stable, and more luxurious than their predecessors, they will attract and satisfy diving's increasingly upscale market. The new market, in turn, will attract new players to dive travel.

1984, 1985: American popular culture shows a revived affection for the underwater world. Two movies - Splash and Cocoon - portray the ocean as a revitalizing, nurturing environment and feature lovingly photographed underwater scenes. Rising sales throughout the recreational diving industry reflect the appeal of the new image.

1985: Mel Fisher's team finds the main body of the 1622 wreck Atocha, along with its fabled \$400 million in gold, silver, emeralds, and priceless historic artefacts. The event marks the ultimate fulfilment of the treasure hunter's fantasy. Publicity given Fisher's find (not to mention the lawsuits that follow) helps fuel America's reviving fascination with recreational diving.

Late 1980s: The recreational diving industry continues to evolve, with a growing emphasis on underwater photography and video. Domestic and international dive travel attract a rapidly growing following. With increasing popularity comes a new emphasis on the style, colour, fashion, and visual excitement of diving equipment. Books about the ocean, especially lush "coffee table" presentations of underwater photography, become bestsellers. These years also witness continuous improvements in the comfort, durability, and efficiency of equipment, and in diver education, training, safety, and environmental awareness.

1991: Recreational divers form Ocean Futures, an environmental organization "Dedicated to the Sea Around Us." The new group recognizes that the dive industry has a responsibility to the oceans and marine life throughout the world. The 1992 DEMA trade show in Houston features an "Environmental Pavilion" with displays and information provided by many of America's leading marine environmental organizations. As part of the show's "Industry Convocation," NOAA Administrator Dr. John A. Knauss and Chief Scientist Dr. Sylvia Earle designate the Flower Gardens reef system as a National Marine Sanctuary.

1993: Dive travel continues to grow rapidly, and takes another giant step with the addition of numerous new boats to the charter fleet. They include luxurious live-aboards serving Borneo, Papua/New Guinea, the Solomon Islands, Fiji, the Sea of Cortez, the Coral Sea, and many other new destinations around Planet Ocean.

1993-2001 and beyond: We can only fantasize about accomplishments yet to come. Revolutionary new technologies such as rebreathers for recreational divers are already in prototype. Remarkable new live-aboard dive boats and luxurious resorts are under construction at this moment. Whatever form your diving dreams may take, you can be sure that diving educators, inventors, scientists, explorers, and other visionaries are already working to fulfill those fantasies.