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DIVING RECORDS ALMANAC WHO'S

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DIVING

FALL 2016

ALMANAC • BOOK OF RECORDS • WHO'S WHO

EDITOR-IN-CHIEF JEFFREY J. GALLANT



"An Underwater Nirvana" ~ Jacques Cousteau

"A fantastic and unique location with some of the best dive sites we've ever experienced. The sites are great at 25 metres, 15 metres and 5 metres, so perfect for any kind of preference. The service and support was downright luxurious. All in all 5 stars!" ~ T. Marshall Manson

An experience without equal

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wakatobi

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Anthony's Key Resort

Roatan • Bay Islands
Honduras

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THE DIVING ALMANAC & BOOK OF RECORDS

Edition 5.4 - Fall 2016 - FREE Publication

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Porbeagle Press Inc.
Drummondville, QC, Canada

ABOUT

First published in 2007, the Diving Almanac & Book of Records is the only compilation of such diverse and far-ranging information on the world diving community. It is meant to showcase the accomplishments of underwater explorers, scientists, engineers, freedivers and adventurers since Man first plunged into the sea more than six millennia ago. Although it is the most complete source of diving records, diving history, as well as the only repertoire of the international diving community available today, the Diving Almanac & Book of Records will forever remain a work in progress. Even in 2016, language and cultural barriers, and the absence of a central body of historical and current information, make it difficult to shed light on all of the events that have shaped the course of humanity's underwater experiences and achievements. Future editions will thus continue to add to the shared history of divers worldwide. All of the information in this book was obtained directly from the source or from verified references. However, we are regularly confronted with conflicting dates and claims of world firsts. The Diving Almanac & Book of Records may thus contain factual errors and omissions, none of which are deliberate or meant to ignore the accomplishments of any individual or group.

LATEST EDITION

A new edition of the Diving Almanac & Book of Records is posted online every three months. If the edition number in this document does not match the edition number on our website, your copy is out of date:

ED. 5.4 2016

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TITLE IMAGES

Exosuit by **Nuytco Research**; green moray at Roatan by Jeffrey Gallant I Diving Almanac I **Anthony's Key Resort**

SAFETY NOTE

Individuals attempting to dive without proper training do so at their own risk. Like the millions of certified divers around the world, ensure your diving experiences are safe and pleasurable by completing a recognized training program before your first dive. Your life depends on it.

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ON THE COVER

Mass Communication Specialist 2nd Class Sean Furey, assigned to Expeditionary Combat Camera, conducts underwater photo training off the coast of Guantanamo Bay, Cuba, Nov. 16, 2015. Expeditionary Combat Cameras' Underwater Photo Team conducts annual training to hone its divers specialized skill set and ensure valuable support of Department of Defense activities worldwide. (U.S. Navy photo by Mass Communication Specialist 1st Class Blake Midnight/Released)

READER CONTRIBUTIONS

Help us improve the Diving Almanac & Book of Records by contributing your knowledge and suggestions. If you know of any individuals, records, firsts or historical events that should be included in the next edition, or if you have found a factual mistake or a typo, contact the editor:
editor@divingalmanac.com

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Jeffrey Gallant in Disko Bay, Greenland, during the Sedna Epic Expedition
Photo by Françoise Gervais

ABOUT THE EDITOR

Jeffrey Gallant, M.Sc., started diving in 1982. He has since led research and training missions around the world, including in Canada where he is a scientist with the **Greenland Shark and Elasmobranch Education and Research Group**.

Among other accomplishments, Jeffrey was trained as an aquanaut in Romania in 1995 (*L.S.-1 Habitat*), he dove with *Équipe Cousteau* aboard the windship *Alcyone* in 1999, he is a Fellow of the Explorers Club (FI, 2010), and he was awarded the Queen Elizabeth II Diamond Jubilee Medal in recognition of his contributions to underwater science and exploration in 2012.

As a prize-winning photographer, author and researcher, Jeffrey has contributed to many dive publications, science journals, as well as television and film documentaries on sharks and diving, including Discovery Channel, National Geographic, and the BBC. He has been a contributing editor of Vancouver-based DIVER Magazine since 1997. He currently resides in Drummondville, Québec, where he is a college teacher.

HOW TO USE THIS DIGITAL BOOK

The digital edition of the Diving Almanac & Book of Records does not include a traditional index because it is fully searchable on any device, including PCs, tablets and mobile phones.

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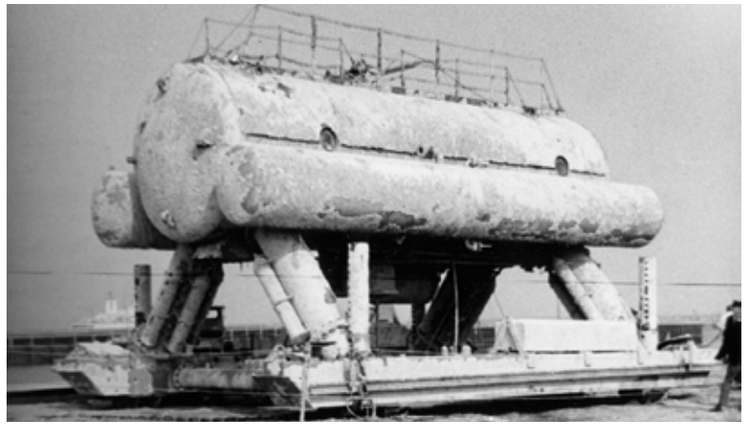
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CHAPTER 1

DIVING RECORDS
and Aquatic Superlatives

RECORD

233. Deepest submersible dive [Ocean]

10,916 m (35,814 ft) - Bathyscaphe *Trieste* (Project Nekton) - 23 January 1960, Challenger Deep (Mariana Trench), Guam (Deepest known point on earth). Hydrostatic pressure: 16,000 PSI (1,089 ATM). Occupants: Dr. Jacques Piccard (Switzerland), Lt. Donald Walsh, USN.

DIVING RECORDS

and Aquatic Superlatives

RECORD VERIFICATION: Although every attempt is made to verify the following records and world firsts, some information may be incorrect. If you can demonstrate that any of the following information is false or outdated, please contact us.

NEW OR UNLISTED RECORD: If you have claim to a diving or underwater record or first, or if you know of a record not listed here, write to us to get your record published in the next edition of the Diving Almanac and Book of Records.

EDITOR'S NOTE: We realise that some of the records listed on the following pages may have been broken, and that we have not received the new information. If you have verified information that contradicts any of the records in this book, please contact us so that we may make corrections or updates. Thank you.

records@divingalmanac.com

☞ SCUBA DIVING

1. Deepest altitude dive [Men]
2. Deepest altitude dive [Women]
3. Deepest cave dive [Men]
4. Deepest cave dive [Women]
5. Deepest cave dive [USA]
6. Deepest cave dive on air
7. Deepest dive in shark observation cage
8. Deepest dive in spring connected tunnel [USA]
9. Deepest dive in the Great Lakes [Open-circuit]
10. Deepest dive on air [Men]
11. Deepest dive on air [Women]
12. Deepest dive on scuba [Freshwater | Europe]
13. Deepest dive on scuba [Freshwater | Men]
14. Deepest dive on scuba [Freshwater | Women]
15. Deepest dive on scuba [Mixed team | OC & CCR]
16. Deepest dive on scuba [Ocean | Men]
17. Deepest dive on scuba [Ocean | Men | Disability]
18. Deepest dive on scuba [Ocean | Women]
19. Deepest dive under ice [Freshwater]
20. Deepest dive under ice [Ocean | CCR]
21. Deepest dive under ice [Ocean | Open-circuit]
22. Deepest rebreather dive [CCR | Freshwater | Men]
23. Deepest rebreather dive [CCR | Freshwater | Women]
24. Deepest rebreather dive [CCR | Ocean | Men]
25. Deepest rebreather dive [CCR | Ocean | Women]
26. Deepest rebreather dive [CCR | Ocean | Women | UK]
27. Deepest rebreather dive [CCR | Wreck | Women]
28. Deepest rebreather dive by blind diver [CCR | Freshwater]
29. Deepest rebreather dive by blind diver [CCR | Ocean]
30. Deepest wreck dive [Freshwater]
31. Deepest wreck dive [Men]
32. Deepest wreck dive [Women]
33. Fastest drift dive

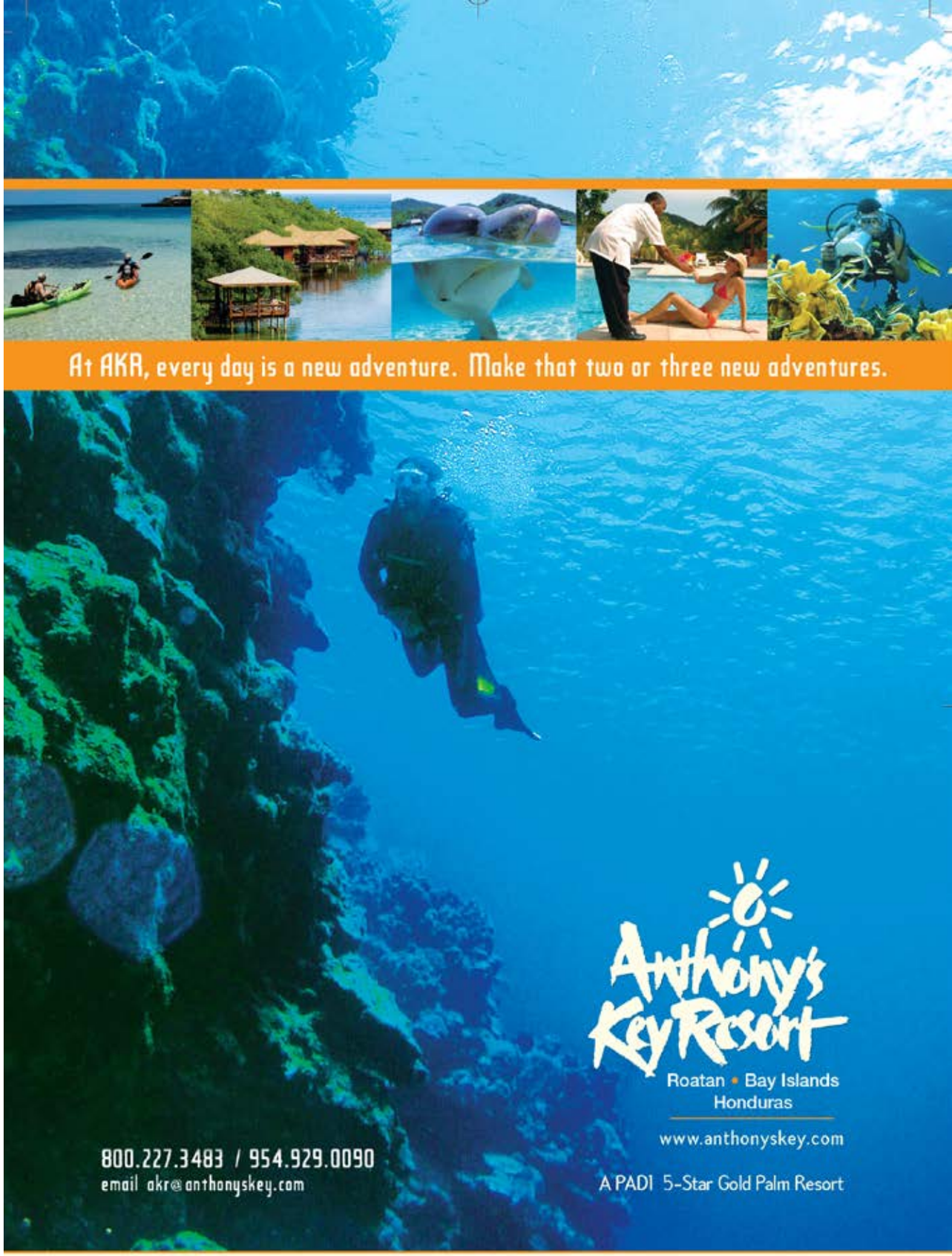
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34. First diver to reach 1000 feet (310 m)
35. High-altitude dive [Highest]
36. High-altitude dive [No decompression | Deepest]
37. High-altitude dive [Staged decompression | Deepest]
38. Largest underwater press conference
39. Longest cave penetration dive [Solo]
40. Longest cave penetration dive [Solo | DPV]
41. Longest cave penetration dive [DPV]
42. Longest cave traverse [DPV]
43. Longest continuous immersion [Controlled environment | Hooka]
44. Longest continuous immersion [Openwater | Hooka]
45. Longest continuous immersion on scuba [Controlled | Solo]
46. Longest continuous immersion on scuba [Controlled | Group]
47. Longest continuous immersion on scuba [Freshwater]
48. Longest continuous immersion on scuba [Ocean | Closed-circuit]
49. Longest continuous immersion on scuba [Ocean | Coldwater]
50. Longest cont. imm. on scuba [Ocean | Men | Open-circuit] **[NEW]**
51. Longest cont. imm. on scuba [Ocean | Women | Open-circuit]
52. Longest deep cave penetration [Women]
53. Longest dive into an iceberg
54. Longest underwater distance without surfacing
55. Longest underwater distance without surfacing [Europe]
56. Oldest active diver
57. Oldest decompression divers
58. Oldest scuba diving club
59. Oldest scuba diving club [USA]
60. Oldest scuba diving show [USA]
61. Youngest cave diver [Female]
62. Youngest cave diver [Male]
63. Youngest diver to dive south of the Antarctic Circle
64. Youngest diving author
65. Youngest scuba instructor

FREEDIVING & SWIMMING

66. Constant weight AIDA [CWT | Men]
67. Constant weight AIDA [CWT | Women]

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68. Constant weight without fins AIDA [CNF I Men] **[NEW]**
69. Constant weight without fins AIDA [CNF I Women]
70. Dynamic apnea without fins AIDA [DNF I Men] **[NEW]**
71. Dynamic apnea without fins AIDA [DNF I Women] **[NEW]**
72. Dynamic apnea with fins AIDA [DYN I Men] **[NEW]**
73. Dynamic apnea with fins AIDA [DYN I Women]
74. Fastest ice water swim
75. First freediving club
76. First long-distance swim at North Pole
77. First to complete long-distance swims in five oceans
78. First to swim the Arch at Dahab's Blue Hole
79. First to swim the Arch at Dahab's Blue Hole [No equipment]
80. First person to swim from Cuba to USA [No Cage]
81. First to snorkel across the Arctic Circle
82. Free immersion AIDA [FIM I Men]
83. Free immersion AIDA [FIM I Women] **[NEW]**
84. Highest altitude freedive
85. Longest ice water swim
86. Longest ocean swim
87. Longest snorkel relay [DPV I Arctic]
88. Longest underwater relay swim [24hr]
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105. Variable weight AIDA [VWT I Men]
106. Variable weight AIDA [VWT I Women]



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107. First Aqua-Lung dive
108. First archaeological excavation on scuba
109. First cageless dive with the white shark
110. First cageless dive with the white shark [Intentional]
111. First commercial shark-feeding dive
112. First dive across the English Channel
113. First dive across the English Channel [Relay]
114. First dive across the English Channel [Untethered]
115. First dive at the the North Pole
116. First dive in Antarctica
117. First dive on the HMHS *Britannic*
118. First dive under sea ice [Arctic | Women]
119. First dive with a coelacanth
120. First diver propulsion vehicle (DPV)
121. First diver to reach the bottom of Dean's Blue Hole
122. First diver to tag a Greenland shark underwater
123. First diver to tag a torpedo ray underwater
124. First diver to tag a whale shark underwater [Women]
125. First diving program [USA]
126. First female scuba diver
127. First female scuba diving instructor
128. First female scuba diving instructor [Pakistan]
129. First Internet-enabled scuba diving device
130. First mixed gas dives under polar ice
131. First online college course taught from underwater
132. First quadriplegic open water dive
133. First quadruple amputee dive to 100 ft
134. First saturation dive under polar ice
135. First scientific dives at the North Pole
136. First scuba diving club
137. First scuba diving family
138. First shark observation cage
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140. First shark observation cage [Variable depth]
141. First shark observation cage [White shark]
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144. First shark observation suit
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146. First to dive 50 U.S. states [Men]
147. First to dive 50 U.S. states [Women]
148. First training agency

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149. Deepest fish video
150. Deepest hologram
151. Deepest video camera
152. First amphibious camera
153. First consumer underwater 35 mm camera
154. First diver to film cookiecutter shark
155. First diver to film frilled shark
156. First diver to film giant squid
157. First diver to film Greenland shark
158. First diver to film walrus underwater
159. First diver to film white shark
160. First live television broadcast from under the sea
161. First photograph of an entire giant squid
162. First to film a frilled shark
163. First to film a live coelacanth
164. First to photograph a giant squid underwater
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168. First underwater flash (Electronic)
169. First underwater IMAX film
170. First underwater live monitor broadcast
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172. First underwater movie [Filmed on scuba]
173. First underwater movie
174. First underwater photo

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175. First underwater photo [Colour]
176. First underwater photo [Half & half]
177. First underwater selfie
178. First underwater spherical panorama [Cave]
179. First underwater spherical panorama [Lagoon]
180. First underwater video chat [Live]
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182. First underwater webcam [Megapixel]
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184. Largest underwater camera system
185. Largest white shark filmed underwater
186. Most powerful underwater lighting
187. Oldest underwater cinematographer
188. Youngest diver to photograph a white shark underwater

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189. Deepest underwater live broadcast **[NEW]**
190. First all underwater photographer band
191. First book about women and diving
192. First book for children with underwater photos
193. First dive magazine
194. First diving show for children
195. First online scuba HD TV
196. First online scuba magazine
197. First underwater animated TV show [Colour]
198. First underwater radio show
199. First use of the Shark Repellent Bat Spray
200. First virtual scuba dive [Online]
201. Largest dive show [Consumer]
202. Largest dive show [Industry]
203. Longest-established independant diving publication [NPO]
204. Longest-established scuba diving magazine [North America]
205. Longest underwater radio broadcast on scuba
206. Longest underwater radio broadcast on scuba [Unassisted]
207. Longest underwater radio broadcast on scuba [Aquarium]

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209. Deepest underwater artist
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211. First underwater band and visual performance
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213. First underwater painter
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☞ SUBMARINES

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256. Fastest human-propelled submarine [2 crew | w/propellor]
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258. Fastest torpedo
259. First aluminum submarine
260. First submarine to sink another submarine [Both submerged]
261. Largest submarine
262. Largest submarine salvage
263. Largest warship ever sunk by a submarine
264. Longest submerged patrol

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320. Most valuable shipwreck recovery
321. Oldest human artefact ever found underwater
322. Oldest intact war wreck in North America
323. Oldest shipwreck ever found
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342. Deepest frog
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344. Deepest octopus
345. Deepest plant
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SCUBA DIVING

1. Deepest altitude dive [Men]
282.6 m (927 ft) - Nuno Gomez (South Africa), Boesmansgat, South Africa, August, 1996. Altitude: 1,500 m (4,921 ft) (Corrected depth: 337 m / 1,106 ft). Total dive time: 12 hours.

2. Deepest altitude dive [Women]
221 m (725 ft) - Verna van Schaik (South Africa), Boesmansgat, South Africa, October 25, 2004. Altitude: 1,500 m (4,921 ft) (Corrected depth: 261 m / 856 ft). Time to descend: 12 min. Total decompression time: 5 hours, 27 min. The record dive required 40 decompression stops.

3. Deepest cave dive [Men]
282.6 m (927 ft) - Nuno Gomez (South Africa), Boesmansgat, South Africa, August, 1996. Altitude: 1,500 m (4,921 ft) (Corrected depth: 337 m / 1,106 ft). Total dive time: 12 hours.

4. Deepest cave dive [Women]
221 m (725 ft) - Verna van Schaik (South Africa), Boesmansgat, South Africa, October 25, 2004. Altitude: 1,500 m (4,921 ft) (Corrected depth: 261 m / 856 ft). Time to descend: 12 min. Total decompression time: 5 hours, 27 min. The record dive required 40 decompression stops.

5. Deepest cave dive [USA]
157 m (515 ft) - Chuck Noe (USA), Goodenough Springs cave system (Del Rio, Texas), July 20, 2008. The dive required the use of sidemount configuration (open circuit) in order to pass an extremely tight high-flow restriction at a depth of 58 m (190 ft).

6. Deepest cave dive on air
127 m (415 ft) - Hal Watts, January 2001.

7. Deepest dive in shark observation cage
30 m (100 ft) - Lawrence Groth (Shark Diving International) and Erick Higuera made the record dive off Guadeloupe Island, Mexico, on August 27, 2007. Several large white sharks were observed during the dive.

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During this special week at the resort there will be a series of image clinics for underwater photographers hosted by Walt Stearns and Peter Symes (publisher of X-Ray Magazine), along with a photo contest for the best wide-angle & macro subjects taken during the week.

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Lawrence Groth and Erick Higuera observe multiple white sharks in a shark observation cage at 30 m (100 ft). Video still: **www.seesharks.com**

8. Deepest dive in spring-connected tunnel [USA]

In July 2007, a dive expedition led by Jeff Petersen (Karst Underwater Research) used underwater scooters to reach the base of an underwater mountain known as Mount Doom at a depth of 124 m (407 ft) in Weeki Wachee Springs, Florida. The team explored more than 2,042 m (6,700 ft) of underwater tunnels at an average depth of 81 m (265 ft) beyond the source of the river.

9. Deepest dive in the Great Lakes [Open-circuit]

161.54 m (530 ft) - Terrence Tysall and Mike Zee, Wreck of the *Edmund Fitzgerald*, Sept 1, 1995. Tysall and Zee carried nearly 14.16 sq m (500 sq ft) of tri-mix. Bottom time: 12 min.

10. Deepest dive on air [Men]

158 m (519 ft) - Mark Andrews (UK), July 1999.

11. Deepest dive on air [Women]

129 m (425 ft) - Scarlett Watts (UK), 1999.

12. Deepest dive on scuba [Freshwater | Europe]

264 m (866 ft) - Dariusz Wilamowski (Poland), Lake Garda (Italy), 2010.

13. Deepest dive on scuba [Freshwater | Men]

271 m (889 ft) - David Shaw (Australia) on CCR, Boesmansgat, South Africa, October 25, 2004.

14. Deepest dive on scuba [Freshwater | Women]

221 m (725 ft) - Verna van Schaik (South Africa), Boesmansgat, South Africa, October 25, 2004. Altitude: 1,500 m (4,921 ft) (Corrected depth: 261 m / 856 ft). Time to descend: 12 min. Total decompression time: 5 hours, 27 min. The record dive required 40 decompression stops.

15. Deepest dive on scuba [Mixed team | OC & CCR]

166.4 m (546 ft) - Johan de With (Netherlands) on OC and Markku Diedrich (Germany) on CCR, Lake Thun (Thunersee), Switzerland, September 26, 2015. Time to descend: 13 min. Total dive time: 3 hours, 9 min. **[WATCH VIDEO]**

16. Deepest dive on scuba [Ocean | Men]

332.35 m (1,090 ft) - Ahmed Gabr (Egypt), Dahab, Egypt, September 18, 2014. Time to descend was 12 minutes. Total ascent time including decompression was just under 15 hours.



Ahmed Gabr and support team during his record dive to 332.35 m (1,090 ft). Photo courtesy **Ahmed Gabr**

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17. **Deepest dive on scuba [Ocean | Men | Disability]**
120 m (400 ft) - Leo Morales (Mexico), Cozumel, Quintana Roo (Palancar Reef), Mexico, December 9, 2012. Morales is a cancer survivor and amputee (right leg). Time to descend was 13 minutes.

18. **Deepest dive on scuba [Ocean | Women]**
201.2 m (660 ft) - Christina Dimitrova (Bulgaria), Dahab, Egypt, July 14, 2015. Total dive time including decompression: 282 min. The record required seven breathing mixes.

19. **Deepest dive under ice [Freshwater]**
72 m (236 ft) - Mario Cyr (Canada) and Éric Levan (France) dove to the record depth under landfast ice during a freediving event in Lake Témiscouata (Québec) in March 1997.

20. **Deepest dive under ice [Ocean | CCR]**
111 m (364 ft) - Ghislain Bardout and Martin Mellet (France) dove to the record depth under sea ice near the Greenlandic town of Ikerasak during **Under the Pole II** on April 25, 2015.

21. **Deepest dive under ice [Ocean | Open-circuit]**
102 m (335 ft) - Maxim Astakhov and Alexander Gubin of the Russian Geographical Society dove to the record depth near Arkhangelsk in the White Sea on March 5, 2016.

22. **Deepest rebreather dive [CCR | Freshwater | MEN]**
271 m (889 ft) - David Shaw (Australia), Boesmansgat, South Africa, October 28, 2004. Total decompression time: 7 hours, 30 min. At 271 m (889 ft), Shaw found the body of Deon Dreyer who died on December 17, 1994.

23. **Deepest rebreather dive [CCR | Freshwater | Women]**
154 m (505.2 ft) - Brigitte Lenoir (Switzerland), April 10, 2010. Mrs Lenoir used a Megalodon rebreather. In addition to the rebreather, she was equipped with four tanks for use in the event of an emergency and to inflate her suit. The equipment had a combined weight of 100 kg (220 lbs). Her record objective was 160 m (525 ft) but she had to end the descent when her suit bottle regulator started to freeflow. The rebreather record was part of her preparations to attempt the deepest dive ever made by a woman (230 m / 755 ft). The record attempt was scheduled for August 2010 but Mrs Lenoir died on May 14 during a training dive.



Ghislain Bardout and Martin Mellet decompress after their record dive to 111 m (364 ft) under ice near Ikerasak, Greenland. Photo by Benoît Poyelle | **Under the Pole II**

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RECORD

20. Deepest dive under ice [Ocean]

111 m (364 ft) | Ghislain Bardout and Martin Mellet | Ikerasak, Greenland | 2015. The dive team readies for a deep dive in Uummannaq Bay during Under the Pole II. Photo by Franck Gazzola | **Under the Pole II**

24. **Deepest rebreather dive [CCR | Ocean | Men]**
283 m (928 ft) - Krzysztof Starnawski (Poland), Dahab Blue Hole, Egypt, December 2, 2011. Total dive time including decompression: 533 min. Rebreather: Hammerhead.

25. **Deepest rebreather dive [CCR | Ocean | Women]**
198.73 m (652 ft) - Kimberly Inge (USA), Lighthouse Point, Grand Cayman, May 30, 2012. Total dive time including decompression: 362 min. Rebreather: rEvo. **[WATCH VIDEO]**

26. **Deepest rebreather dive [CCR | Ocean | Women | UK]**
155 m (509 ft) - Gemma Smith (UK), Grand Cayman, Cayman Islands, August 28, 2014. Total dive time including decompression: 268 min.

27. **Deepest rebreather dive [CCR | Wreck | Women]**
146 m (479 ft) - Frances Jewson (BSAC 434 - Bracknell UK) using an Inspiration CCR in 2008 on the wreck of HMS *Victoria* off the coast of Lebanon.

28. **Deepest rebreather dive by blind diver [CCR | Fresh]**
106 m (347 ft) - Graham Owen (UK), September 9, 2009, in Dorothea Quarry (Gwynedd, North Wales).

29. **Deepest rebreather dive by blind diver [CCR | Ocean]**
105 m (344 ft) - Graham Owen (UK), March 12, 2016, on the wreck of the *Gulf Fleet*, Hurghada, Egypt.

30. **Deepest wreck dive [Freshwater]**
236 m (774 ft) - Alessandro Scuotto (Italy), Mario Marconi (Italy) and Pim van der Horst (The Netherlands), Wreck of the *Milano*, Lake Maggiore, Italy, May 10, 2008. Altitude compensated depth was 241 m (790 ft). Divers used Ouroboros rebreathers. Total dive time was almost 8 hours, including 4.5 hours decompression.

31. **Deepest wreck dive [Men]**
236 m (774 ft) - Alessandro Scuotto (Italy), Mario Marconi (Italy) and Pim van der Horst (The Netherlands). Wreck of the *Milano*, Lake Maggiore, Italy, May 10, 2008. Altitude compensated depth was 241 m (790 ft). Divers used Ouroboros rebreathers. Total dive time was almost 8 hours, including 4.5 hours decompression.



Gemma Smith at 155 m (509 ft) off Grand Cayman. Photo: Phil Short

32. **Deepest wreck dive [Women]**
160 m (525 ft) - Nina Preisner, Sharm El Sheikh, Egypt, May 1, 2007. Wreck: *The Jolanda* (Cargo ship sunk in 1985). Time to descend: 4 min. Decompression: 3 hours.

33. **Fastest drift dive**
16.1 knots (29.6 km/h / 18.4 mph): Sechelt Rapids (Skookumchuck Narrows), British Columbia, Canada. It is estimated that for a 3.6 m (12 ft) tide, 757 billion liters (200 billion gallons) of seawater flow through the Sechelt Rapids in 6 hours. Several charter operators offer dives at the site during slack tide.

34. **First diver to reach 1000 feet (310 m)**
Hannes Keller (Switzerland) and Peter Small (UK) reached the depth of 310 m (1,020 ft) off the coast of California in 1962. Small and support diver Chris Whittaker died during the dive.

35. **High-altitude dive [Highest]**
5,913 m (19,400 ft) - Crater Lake, Licancabur Volcano (Chile / Bolivia). Team led by Johan Reinhard (1982) made 11 dives. Max depth: 6.10 m (20 ft).

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36. High-altitude dive [No deco. | Deepest]

18 m (60 ft) (Corrected depth) | Altitude: 4,877 m (16,000 ft) - George K. Watson (USA) and Preston Sowell (USA), Laguna Sibinacocha, Peru, August 13, 2013. Total dive time was 30 minutes. The dive took place during an archeological expedition for the Sibinacocha Watershed Project.

37. High-altitude dive [Staged deco. | Deepest]

50 m (165 ft) (Corrected depth) | Altitude: 4,877 m (16,000 ft) - George K. Watson (USA) and Geoff Belter (USA), Laguna Sibinacocha, Peru, August 20, 2014. The dive which took place during an archeological expedition ended in a fatality for Geoff Belter.

38. Largest underwater press conference

12 Spanish journalists - El Hierro, Canary Islands, June 20, 1997. Depth 16 m (53 ft). Time: 20 min. Event: Book launch of Champion's Secrets (underwater photo manual) by Carlos Virgili Ribé. Participants communicated via two-way radios.

39. Longest cave penetration dive [Solo]

3,183 m (10,444 ft) - Sheck Exley (USA), 1989. Chips Hole cave system, Florida. No DPV (Diver Propulsion Vehicle) was used.

40. Longest cave penetration dive [Solo | DPV]

6,400 m (21,000 ft) - Gilberto Menezes (Brasil), September 20, 2004. Bananeira Cave, Brazil. Max. depth: 50 m (164 ft). The dive lasted 11 h 23 min.

41. Longest cave penetration dive [DPV]

8,800 m (28,871 ft) - British-led team of divers (Jason Mallinson, Rick Stanton, John Volanthen, and Dutch caver Rene Houben), September 2010, Pozo Azul cave system (Spain). It took the team 50 hours to complete the dive including two nights camped deep underground.

42. Longest cave traverse [DPV]

11,265 m (36,960 ft) - Gainesville underwater explorers Casey McKinlay and Jarrod Jablonski, Dec. 15, 2007. Turner Sink cave entrance to Wakulla Springs cave entrance, Florida. Max depth: 91 m (300 ft).

43. Longest continuous immersion [Controlled environment | Hooka]

7.375 days (177 hours) - David Blaine remained submerged in an acrylic sphere in front of the Lincoln Center (New York City) starting on May 1, 2006. The sphere had a diameter of 2.4 m (8 ft) and was filled with water containing 0.9% salt. He breathed, ate and drank through tubes. He suffered from skin breakdown and liver failure.

44. Longest continuous immersion [Openwater | Hooka]

10 days (240 hours) - Progetto Abissi 2005 (The House at the Bottom of the Sea) - Stefano Barbaresi, Stefania Mensa (Italy), Ponza, Italy, September 17, 2005. Maximum depth: 8 m (26.4 ft). Total decompression time: 6 hours and 40. The two divers spent 240 hours on a platform anchored to the sea floor equipped with beds, exercise machines, a television, and a table and chairs. Every 5 to 6 hours, the divers were allowed to enter a dive bell where they could change, eat or use the toilet.

45. Longest continuous immersion on scuba [Controlled environment | Solo]

220 hours (9.17 days) - Khoo Swee Chiow (Singapore), December 16 to 26, 2005. Khoo dove in a special mineral water tank for the entire duration, enduring dehydration, nausea and hunger. Khoo was on a 100% liquid diet. Toilet breaks had to be taken underwater in a private cubicle out of sight of the shoppers at a Singapore mall. The previous record was 212 hours and 30 min. set by British diver Michael Steven in a Royal Navy tank in Birmingham, England in 1986.

46. Longest continuous immersion on scuba [Controlled environment | Group]

168 hours (7 days) - On April 9, 2013, a relay team of 25 divers from the University of Toledo dive club completed a seven-day immersion in a 330-gallon (1,250 l) container.

47. Longest continuous immersion on scuba [Fresh]

120 hours 14 minutes 11 seconds (5 days) - Allen Sherrod (USA), Lake David, Florida, September 16, 2011. Sherrod sustained himself with Ensure and Gatorade. He passed the time by watching online movies on a waterproof computer.

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WORLD 52 RECORDS

RECORD

52. Longest deep cave penetration [Women]

Jill Heinerth | Distance: 3,050 m (10,000 ft) | Depth: 91 m (300 ft) | 1999. **Jill Heinerth** at the helm of the “Mapper” at Wakulla Springs, Florida. Photo by Wes Skiles courtesy **U.S. Deep Caving Team**

48. Longest continuous immersion on scuba [Ocean | Closed-circuit]

48 hours 9 minutes 17 seconds - Will Goodman (UK), Gili Trawangan, Indonesia. The dive started at 08:11:33 on January 7, 2010, and ended at 08:20:16 on January 9, 2010. The record was set using a combination of closed-circuit rebreathers and open-circuit SCUBA. The dive took place at depths varying from 6 m to 20 m and the diver had no contact with the surface at any time. Air and liquid nutrition were supplied by a support crew.

49. Longest continuous immersion on scuba [Ocean | Cold-water]

13 hours and 4 minutes - Paul Devane completed the dive in the North Atlantic Ocean off Killary in County Galway on October 9, 2012.

50. Longest continuous immersion on scuba [Ocean | Open-circuit | Men] [NEW]

142 hours 42 minutes 42 seconds - Cem Karabay (Turkey), Yavuz Çıkarma Beach (Cyprus), July 20, 2016.

51. Longest continuous immersion on scuba [Ocean | Open-circuit | Women]

51 hours 25 minutes - Christi Quill (USA), July 12, 2015. The dive in San Diego (CA), raised funds for the American Cancer Society.

52. Longest deep cave penetration [Women]

Jill Heinerth (Canada) made a 3,050 m (10,000 ft) cave penetration at a depth of 91 m (300 ft) during a science and mapping dive at Wakulla Springs in 1999. The dive included 5 hours at 91 m (300 ft) followed by 16 hours of decompression. The dive took place during the Wakulla2 expedition (US Deep Caving Team).

53. Longest dive into an iceberg

Wes Skiles (USA) and Jill Heinerth (Canada) dove inside a grounded iceberg in Antarctica for over 3 hours using Cis Lunar MK-5P rebreathers in 2001. Water temperature was -1.9°C (28.6°F).

54. Longest underwater distance without surfacing

106 km (66 miles) - Neil Watson (United States), 1977; swam from Islamorada (Florida Keys) to Miami in 19.5 hours.

55. Longest underwater distance without surfacing [Europe]

55 km (34.2 miles) - Jens Hilbert (Germany), October 15-16, 1994; total kicking time: 19.36 hours; resting periods (in water): 4 hours and 24 min.

56. Oldest active diver

Leni Riefenstahl, Germany (1902-2003) became a diver at age 71 and was awarded the SSI Platinum Pro 5000 Diver Award in 1995 (requires a minimum of 2,500 dives). She released her first underwater documentary *Impressionen unter Wasser* (Underwater Impressions) on her 100th birthday in 2002. The underwater footage was directed by Riefenstahl between the 1970s and 2000.

57. Oldest decompression divers

Gregg Bemis, 76, made a 62-minute dive on the wreck of the RMS *Lusitania* (Ireland) in July 2004. The *Lusitania* lies at a depth of 92 m (300 ft). Jacques-Yves Cousteau was 66 when he explored the wreck of the HMHS *Britannic* at depths beyond 92 m (300 ft) in 1976.

58. Oldest scuba diving club

The Cave Diving Group was formed in 1946 by the late Graham Balcombe.

59. Oldest scuba diving club [USA]

The Sea Sabres Scuba Club was formed in 1953 by a group of engineers working for Rockwell International on the Sabre jet fighter.

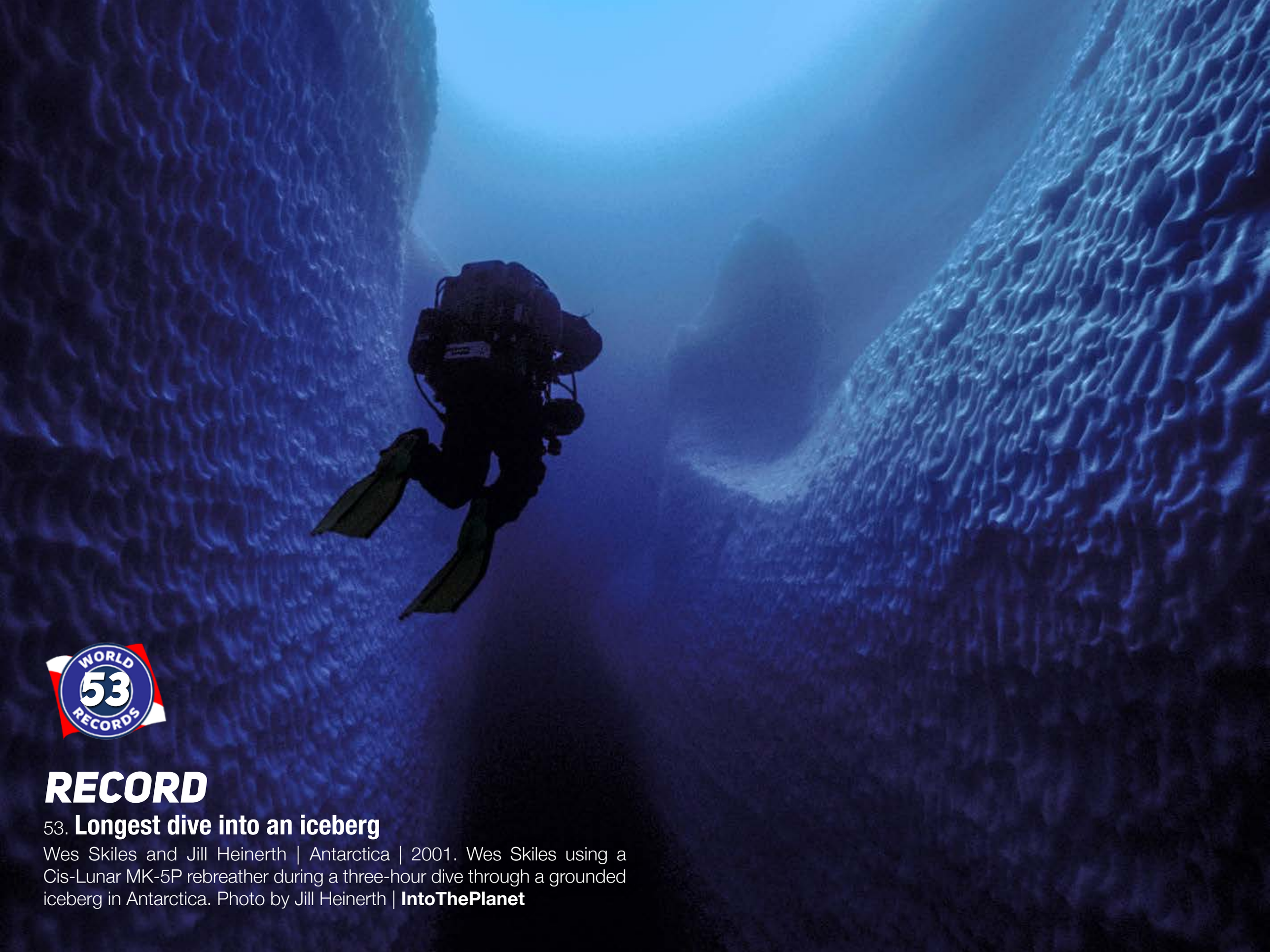
60. Oldest scuba diving show [USA]

The Boston Sea Rovers International Clinic was first held in 1954.

61. Youngest cave diver [Female]

Mary Kate Jennings (USA) made two dives at the Dos Ojos cenote (Mexico) at the age of 12. The dives were organised by Dressel Dive shop in Playa del Carmen on August 12, 2005.

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RECORD

53. Longest dive into an iceberg

Wes Skiles and Jill Heinerth | Antarctica | 2001. Wes Skiles using a Cis-Lunar MK-5P rebreather during a three-hour dive through a grounded iceberg in Antarctica. Photo by Jill Heinerth | **IntoThePlanet**

62. Youngest cave diver [Male]

Tony DeRosa Jr. (Mexico) dove the Carwash Cenote (Mexico) when he was only 14 years old. Tony started diving at the age of 8 and became a certified cave diver at the age of 14. He made his first cave dive on August 3, 1997 under the guidance of instructor Steve Gerrard.

63. Youngest diver to dive south of the Antarctic Circle

Evan Bozanic (USA) - On March 13, 2009, at the age of 11, Evan became the youngest person to dive in Antarctica, and the youngest to dive south of the Antarctic Circle. His record dive was near Detaille Island, on the Antarctic Peninsula.

64. Youngest diving author

Cody Brown, a Jr. Master Scuba Diver from Idaho, wrote his first book, *Scuba for Kids*, when he was only 12 years old.

65. Youngest scuba instructor

Dennis H. Hocker (USA) became the youngest scuba instructor at age 17 in 1963 when he became a Head Instructor for the Aqua Tutus Diving Club in San Lorenzo, California.



Evan Bozanic, 11, and Jeff Bozanic diving in Antarctica. Photo courtesy Jeff Bozanic



FREEDIVING & SWIMMING

66. **Constant weight AIDA [CWT | Men]**
128 m (420 ft) - Alexey Molchanov (Russia), Kalamata, Greece, September 19, 2013.

67. **Constant weight AIDA [CWT | Women]**
101 m (331 ft) - Natalia Molchanova (Russia), Kalamata, Greece, September 23, 2011.

68. **Constant weight without fins AIDA [CNF | Men] [NEW]**
102 m (335 ft) - William Trubridge (New Zealand), Dean's Blue Hole, Bahamas, July 20, 2016. Total time: 4 min 13 sec.

69. **Constant weight without fins AIDA [CNF | Women]**
72 m (236 ft) - Sayuri Kinoshita (Japan), Dean's Blue Hole, Bahamas, April 26, 2016.

70. **Dynamic apnea without fins AIDA [DNF | Men] [NEW]**
244 m (801 ft) - Mateusz Malina (Poland), Turku, Finland, July 3, 2016.

71. **Dynamic apnea without fins AIDA [DNF | Women] [NEW]**
185 m (607 ft) - Magdalena Solich (Poland), Turku, Finland, July 2, 2016.

72. **Dynamic apnea with fins AIDA [DYN | Men] [NEW]**
- 300 m (984 ft) - Giorgos Panagiotakis (Greece), Turku, Finland, July 2, 2016.

- 300 m (984 ft) - Mateusz Malina (Poland), Turku, Finland, July 2, 2016.

73. **Dynamic apnea with fins AIDA [DYN | Women]**
237 m (778 ft) - Natalia Molchanova (Russia), Sardinia, Italy, September 26, 2014.



William Trubridge descends to 101 m and a new world record [AIDA CNF] in the Bahamas. Photo by Paolo Valenti | **Vertical Blue**

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RECORD

68. Constant weight without fins AIDA [CNF | Men]

101 m (331.36 ft) | William Trubridge | December 16, 2010. William Trubridge celebrates his world-record freedive to 101 m (331.36 ft) at Dean's Blue Hole in the Bahamas. Photo by Paolo Valenti | **Vertical Blue**

74. Fastest ice water swim

Lewis Gordon Pugh (UK) swam 500 m (1,640 ft) in 7 min 2 sec at the World Winter Swimming Championships in Finland in March, 2006. Organizers of the event had to cut 8 swimming lanes in the frozen Oulu River. Ice thickness was 1 m (3 ft).

75. First freediving club

The Bottom Scratchers of San Diego dive club was founded by Ben Stone, Jack Prodanovich, and Glen Orr in 1933.

76. First long-distance swim at North Pole

Lewis Gordon Pugh (UK) swam for 18 min 50 sec at the Geographic North Pole in water ranging between -1.8ºC and 0ºC (29F and 32F) in July 2007.

77. First person to complete long-distance swims in five oceans

Lewis Gordon Pugh (UK) became the first person to complete long-distance swims in the Atlantic, Arctic, Southern, Indian and Pacific oceans after enduring a six-hour, 9-mile (15 km) swim from Manly north of Sydney to the Sydney Opera House in January 2006. Pugh (36) began his quest in 1992 by swimming across the English Channel in the Atlantic Ocean. He swam in the Arctic Ocean in 2003, the Southern Ocean in 2005, followed by the Indian and Pacific oceans in 2006.

78. First person to freedive the Arch at Dahab's Blue Hole

William Winram (Canada) became the first person to swim through the Arch at Dahab's Blue Hole without scuba gear on June 1, 2007. The roof of the Arch lies at a depth of 52 m (170 ft) and the tunnel is 30 m (100 ft) long.

79. First person to freedive the Arch at Dahab's Blue Hole [No equipment]

William Trubridge (New Zealand) became the first person to swim through the Arch at Dahab's Blue Hole without the use of fins, a wetsuit or weights, in July 2007.



Members of the **Sedna Epic Expedition** form a raft prior to crossing the Arctic Circle 20 km (12.5 miles) off the coast of Greenland. Photo by Jeffrey Gallant | **Arctic Kingdom**

80. First person to swim from Cuba to the USA [No cage]

Diana Nyad swam from Havana to Key West without the aid of a shark cage. Nyad took 53 hours to swim the distance of 180 km (110 miles) in September 2013. She wore a mask, a full bodysuit with gloves and dive booties to protect her skin from jellyfish.

81. First to snorkel across the Arctic Circle

The 10 female members of the **Sedna Epic Expedition** crossed the Arctic Circle on snorkel 20 km (12.5 miles) off the coast of Greenland on July 23, 2014.

82. Free immersion AIDA [FIM | Men]

124 m (407 ft) - William Trubridge (New Zealand), Dean's Blue Hole, Bahamas, May 2, 2016.

83. Free Immersion AIDA [FIM | Women] [NEW]

92 m (302 ft) - Jeanine Grasmeijer (Netherlands), Kralendijk, Netherlands Antilles, September 6, 2016.

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84. Highest altitude freedive

5,791 m (19,000 ft) - Crater Lake, Licancabur Volcano (Chile / Bolivia). NASA geologist Dr. Natalie Cabrol (2002).

85. Longest ice water swim

Lewis Gordon Pugh (UK) swam 1.2 km (0.75 miles) in a Norwegian fjord on May 12, 2006. The waters beneath the Jostedalsbreen glacier were still mostly covered with ice. It took him 23 min 50 sec to complete the distance wearing only swim trunks, a cap and goggles. After 15 min Pugh had lost sensation in his hands and feet.

86. Longest ocean swim

Veljko Rogosic (Croatia) swam 225 km (140 miles) from Grado to Riccione (Italy) without fins. The long-distance swim (50 hours 10 min.) across the Adriatic Sea took place from August 29-31, 2006.

87. Longest snorkel relay [DPV | Arctic Ocean]

The ten-woman team of the **Sedna Epic Expedition** snorkeled a combined, uninterrupted distance of 35.12 km (21.82 miles), achieving an average in-water speed of 6.2 kph (3.8 mph) off the coast of Western Greenland on July 24, 2014. The all-female Team Sedna conducted similar relays including a sortie of near-equal duration in the middle of Davis Strait as part of the July 2014 Proof-of-Concept Expedition. The group, led by Canadian Susan R. Eaton, celebrated the feat by snorkeling across the Arctic Circle.

88. Longest underwater relay swim [24 hours]

In October 1987, 6 Czech swimmers swam a combined distance of 151.99 km (94.44 miles) in an Olomouc swimming pool.

89. Most southerly swim

Lewis Gordon Pugh (UK) swam 350 m (1,150 ft) wearing only a Speedo, bathing cap, and goggles in Antarctica's Bay of Whales (78.5 degrees south latitude) on March 2, 2015. Water temperature was -1°C (30°F) and air temperature was -37°C (-35°F).

90. No limits [Women]

166 m (545 ft) - Audrey Mestre (France), Bayahibe, Dominican Republic, October 4, 2002.

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Members of the all-female **Sedna Epic Expedition** test their DPVs near Nain, Labrador, in July 2014. Photo by Jeffrey Gallant | Diving Almanac | **Arctic Kingdom**



RECORD

87. Longest snorkel relay [DPV | Arctic]

35.12 km (21.82 miles) | July 2014 | Sedna Epic Expedition | Greenland
The leader of the all-woman **Sedna Epic Expedition**, Susan R. Eaton, makes her way through the ice-choked water of Saglek Bay, Labrador, before the group's crossing of the Davis Strait to Greenland. Photo by Jeffrey Gallant | Diving Almanac | **Arctic Kingdom**



Ama pearl diver in Japan (PD)

91. No limits AIDA [NLT | Men]

214 m (702 ft) - Herbert Nitsch (Austria), Spetses, Greece, June 14, 2007.

92. No limits AIDA [NLT | Women]

160 m (525 ft) - Tanya Streeter (USA), Providenciales, Turks & Caicos, August 17, 2002.

93. Oldest freediving club

The Bottom Scratchers of San Diego dive club was founded by Ben Stone, Jack Prodanovich, and Glen Orr in 1933. The club held its last meeting in 2005 after operating for 72 years.

94. Oldest order of female divers

• The Ama divers (Sea People) of Japan have been diving for food and pearls for 2,000 years. Traditional Ama divers wear only a loincloth (isogi) and no diving equipment. The isogi is white to ward off sharks and bad luck. Today, it is worn mostly for tourists while others dive with masks, fins, and even a wetsuit. Ama divers are also known as Uminchu (Okinawa), and Kaito (Izu Peninsula).

• In South Korea, the Haenyo (Sea Women) of Jeju Island took over diving from men in the 18th century because they were exempt from a new tax. Many became the biggest earners in their families while the men stayed at home to take care of the children. Some have made small fortunes diving for high-priced abalone and conch. In 1950, the number of Haenyo was about 30,000 on Jeju. In 2003, there were only 5,650 and 85% were over 50 years old.

95. Static apnea [STA | Men]

11 min 54 sec - Branko Petrovic (Serbia), October 7, 2014. Petrovic set the record in a swimming pool in Dubai without inhaling pure (100%) oxygen before submerging.

96. Static apnea [STA O2 | Men] [NEW]

24 min 03 sec - Aleix Segura (Spain), Barcelona, Spain, February 28, 2016. Segura inhaled 100% oxygen for several minutes before submerging.

97. Static apnea [STA O2 | Women]

11 min 07 sec - Diana Gaiciunas (Lithuania), Vilnius, Lithuania, June 16, 2007. Gaiciunas and her brother Arvydas, both illusionists, were chained to a metal frame at the bottom of a pool before a live audience and several television cameras. They inhaled pure 100% oxygen for 40 seconds before submerging.

98. Static apnea AIDA [STA | Men]

11 min 35 sec - Stéphane Mifsud (France), Hyères, France, June 8, 2009.

99. Static apnea AIDA [STA | Women]

9 min 02 sec - Natalia Molchanova (Russia), Belgrade, Serbia, June 29, 2013.

100. Under ice [Constant weight]

65 m (213 ft) - Konstantin Novikov (Russia), geographic North Pole, April 13, 2015 (**North Pole Freediving Challenge 2015**). Total dive time: 2 min 12 sec.

101. **Under ice [Variable weight]**
70 m (230 ft) - Éric Charrier (France), Lake Témiscouata, Québec, Canada, March 28, 1997. Charrier used a ballast weight and a balloon on a weighted cable. Total dive time: 1 min 59 sec. The event also produced the deepest scuba dive under ice at 72 m (236 ft).

102. **Under ice [Distance | Men]**
152.4 m (500 ft) - Stig Severinsen (Denmark) swam the distance in April 2013 under one metre (3 feet) of ice in Qorlortoq Lake (Greenland) wearing a full-body wetsuit and monofin. The dive lasted 2 min 11 sec.

103. **Under ice [Distance | Swimming | Men]**
76.2 m (250 ft) - Stig Severinsen (Denmark) swam the distance in April 2013 under one metre (3 feet) of ice in Qorlortoq Lake (Greenland) wearing only a Speedo swimsuit. The dive lasted 1 min 26 sec.

104. **Under ice [Distance | Swimming | Women]**
50 m (164 ft) - Johanna Nordblad (Finland) swam the distance in Lake Päijänne on March 14, 2015, wearing a swimsuit and mask. The dive lasted 2 min 11 sec.

105. **Variable weight AIDA [VWT | Men]**
146 m (479 ft) - Stavros Kastrinakis (Greece), Kalamata, Greece, November 1, 2015.

106. **Variable weight AIDA [VWT | Women]**
130 m (426.5 ft) - Nanja Van Den Broek (Netherlands), Sharm el Sheik, Egypt, October 18, 2015.



Konstantin Novikov during his record freedive at the North Pole in April 2015
Photo by Андрей Сидоров, **North Pole Freediving Challenge 2015**

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DIVING & UNDERWATER FIRSTS

107. First Aqua-Lung dive

January 1943 - Cousteau tests the first Cousteau / Gagnan single-stage open-circuit SCUBA unit in the cold Marne River near Paris. The regulator works fine when Cousteau swims horizontally but it free flows when he stands vertically underwater. Air flow stops entirely when he positions himself vertically with his head down. Mechanical modifications solve the problem and further testing is done off the French coast of the Mediterranean in the summer of 1943.

108. First archaeological excavation on scuba

1948 - Cousteau, Dumas, Tailliez, Alinat and five other divers excavate a Roman galley off Mahdia, Tunisia.

109. First cageless dive with the white shark

1948 - Cousteau, Dumas observe a 7 m (23 ft) white shark off the Cape Verde Islands in the Atlantic Ocean.

110. First cageless dive with the white shark [Intentional]

1987 - Jeremiah Sullivan (USA), South Australia.

111. First commercial shark-feeding dive

1972, Marion Reef (Australia) - Dewey Bergman charters a vessel for a baited dive at a site called Action Point.

112. First dive across the English Channel

1962 - Fred Baldasare (USA). Baldasare covered the total distance of 67.59 km (42 miles) in 19 hours and one minute using scuba equipment. He swam inside a wire cage that was towed by a trawler at a depth of 4.5 m (15 ft).

113. First dive across the English Channel [Relay]

In August 2006, six men and one woman became the first people to swim across the English Channel from Britain to France in an underwater scuba relay. They covered the distance of 34 km (21 miles) from



Jean-Yves “Tag” Forest is ready to tag another Greenland shark in Québec.
Photo by Jeffrey Gallant | **GEERG**

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Dover to Cap Gris Nez in just over 12 hours. The team was composed of Colin Osbourne, Lieutenant John Bainbridge and Lieutenant Commander Mike Leaney from the Royal Navy, and sport divers Warren Brown, Paul Cushing, Mark Evans and Rosemary Lunn.

114. First dive across the English Channel [Untethered]
2012 - Achim Schloeffel (Germany). On June 29, Schloeffel used a DPV to cover the distance of 55 km between Dover (UK) and Calais (France) in strong currents and with shipping overhead. The dive required a decompression stop of 160 minutes.

115. First dive at the North Pole
Dr. Joseph MacInnis (Canada) - Although several recent expeditions have laid claim to being the first to dive at the North Pole, the first dives at the top of the world were conducted during the Arctic IV Expedition led by Dr. Joseph MacInnis in 1974. Ice thickness was over 2 m (6.5 ft).

116. First dive in Antarctica
Willy Heinrich (Germany), 1902 - German National Antarctic Expedition 1901-03. Using a surface-supplied Siebe diving helmet, Heinrich conducted repairs on the ship and also dove under ice.

117. First dive on the HMHS *Britannic*
1976 - Team led by Jacques-Yves Cousteau.

118. First dive under sea ice [Arctic | Women]
1994 - Christine Dennison (USA), Resolute Bay (Canada).

119. First dive with a coelacanth
2000, Sodwana Bay (South Africa) - Pieter Venter, Peter Timm, and Etienne le Roux, encounter a coelacanth at a depth of 104 m (340 ft).

120. First diver propulsion vehicle (DPV)
1952 - The *Torpille* (Torpedo) by Dimitri Rebikoff (France). It later becomes the world's first ROV, the *Poodle*. In 1953, Rebikoff launches the *Pegasus* which is equipped with gyro instruments.

121. First diver to reach the bottom of Dean's Blue Hole
Jim King (USA) - 1992. King took 11 min to descend to the bottom (202 m / 663 ft) on TRIMIX. After spending 3 min on the bottom, his ascent back to the surface required nearly five hours of decompression.



Dr. Fred Whoriskey after tagging an Atlantic torpedo ray near Halifax, Nova Scotia.
Video still by Dr. Chris Harvey-Clark

122. First diver to tag a Greenland shark underwater
2004 - Jean-Yves "Tag" Forest tagged a freeswimming Greenland shark off Baie-Comeau, Québec, during a science mission led by **GEERG** in July 2004.

123. First diver to tag a torpedo ray underwater
On October 11, 2015, Dr Fred Whoriskey (**Ocean Tracking Network**) and Dr. Chris Harvey-Clark (Dalhousie University) implanted the first satellite tag into an Atlantic torpedo ray (*Torpedo nobiliana*) at a depth of 20 m near Ketch Harbour, Nova Scotia. **[WATCH VIDEO]**

124. First diver to tag a whale shark underwater [Women]
Susan Kim Smith (Shark Research Institute), was the first woman to tag a whale shark (*Rhincodon typus*). She tagged the shark, a 6 m (20 ft) male named Khalid, on January 16, 1994, 10 km (6.2 miles) south of Durban, South Africa.

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Susan Kim Smith was the first woman to ever tag a whale shark.
Photo by **Shark Research Institute**

125. First diving program [USA]

1951 - The research diving program at the Scripps Institution of Oceanography, University of California (San Diego), was the first non-military scuba training program in the U.S.

126. First female scuba diver

1943 - Simone Melchior Cousteau (1919-1990), first wife of Jacques-Yves Cousteau. Her first dives were in the Mediterranean Sea in the summer of 1943. Her sons Jean-Michel and Philippe also dove the prototype making the Cousteaus the first scuba diving family.

127. First female scuba diving instructor

1955 - Dottie Frazier (USA)

128. First female scuba diving instructor [Pakistan]

2009 - Rosheen Khan became the first female scuba diving instructor in Pakistan after undergoing training in Thailand. Ms. Khan, a PADI Master Scuba Diver Trainer (MSDT), is originally from the province of Balochistan where women are often not allowed to complete their education. Scuba diving is still an uncommon activity in conservative Pakistan, where tight fitting wetsuits are considered improper by many. Ms. Khan is now the Director of Training at the Karachi Scuba Diving Center.



Shark observation cage stuck in the ice of the Saguenay Fjord (2002)
Photo by Jeffrey Gallant | **GEERG**

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129. First Internet-enabled scuba diving device

In 2008, Foster's Brewery (Australia) created Ride the Scuba, the World's first internet controlled scuba device, at the National Marine Aquarium. Users could pilot a little sub through a tank at the aquarium to destroy big bubbles in real time from their PC. The campaign was to promote the introduction of the in-can Scuba, a revolutionary lager widget, to Foster's cans. The Scuba destroys big bubbles in the can, to create a lager that 'slips down like a dream'.

130. First mixed gas dives under polar ice

Dr. Joseph MacInnis (Canada) and Dr. Phil Nuytten (Canada) - Arctic IV Expedition, 1974. Dr. Nuytten descended to 67 m (220 ft) breathing oxy-helium. Ice thickness was over 2 m (6.5 ft).

131. First online college course taught from underwater

2014 - Bruce Cantrell (USA) and Jessica Fain (USA) hosted the first online college credit biology course taught from underwater while spending a record 73 days in Jules Undersea Lodge.

132. First quadriplegic open water dive

2006 - On November 14, Matthew Johnson (USA) became the first ventilator dependent quadriplegic to scuba dive in open water off Tavernier Key, Florida. Johnston's first dive to four feet for 15 minutes, then made a second dive to four feet for 10 minutes.

133. First quadruple amputee dive to 100 ft

2013 - Philippe Croizon (France) became the first quadruple amputee to reach the depth of 33 m (108 ft) in the NEMO 33 pool in Brussels.

134. First saturation dive under polar ice

Dr. Joseph MacInnis (Canada) and Dr. Phil Nuytten (Canada) - Arctic IV Expedition, 1974. Dr. Nuytten descended to 67 m (220 ft) breathing oxy-helium. Ice thickness was over 2 m (6.5 ft).

135. First scientific dives at the North Pole

Dr. Joseph MacInnis (Canada) - Arctic IV Expedition, 1974. Ice thickness was over 2 m (6.5 ft).

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136. **First scuba diving club**
1936 - The club was founded by Yves Le Prieur.

137. **First scuba diving family**
1940s - Jacques-Yves, Simone, Jean-Michel and Philippe Cousteau did their first dives as a family in the mid-1940s.

138. **First shark observation cage**
1948 - Jacques-Yves Cousteau uses a cage built by the GRS (Groupe de recherches sous-marines) during an expedition off northwest Africa.

139. **First shark observation cage [Under ice]**
2002 - The cage was deployed in the frozen Saguenay Fjord by Jeffrey Gallant and John Batt **(GEERG)** during Operation Skalugsuak II.

140. **First shark observation cage [Variable depth]**
1971 - The cage was used to film *Blue Water, White Death*.

141. **First shark observation cage [White shark]**
1965 - Rodney Fox

142. **First shark observation cage dives [Canada]**
2000 - Jeffrey Gallant and Chris Harvey-Clark (**GEERG**), Halifax, Nova Scotia.

143. **First shark observation cage dives [UK]**
August 5, 2006 - Group lead by conservationist David Peirce off Cornwall, UK.

144. **First shark observation suit**
1980 - Neptunic Sharksuit by marine biologist Jeremiah Sullivan (a.k.a. Chain Mail Anti-Shark Suit); the suit was developed in 1978-1979; **Shark-Armor**.

145. **First tablet (iPad) dive computer**
2015 - DiveNav develops the Smart Dive Buddy sensor and the Smart Dive Computer app for use with the iDive Housing for iPad.

146. **First to dive 50 U.S. states [Men]**
On October 8, 2000, Charles Ballinger (USA) became the first man - and person - to scuba dive in all 50 U.S. states.

147. **First to dive 50 U.S. states [Women]**
On August 21, 2015, Jennifer Idol (USA) became the first woman to scuba dive in all 50 U.S. states. The record series of dives took 4 years 6 months and 2 days to complete.

148. **First training agency**
1953 - The British Sub-Aqua Club or BSAC was founded by Oscar Gugen, Peter Small, Mary Small, and Trevor Hampton on October 15, 1953.



Jennifer Idol diving her 50th state in Lake Huron, Michigan. Photo by Jennifer Idol and John Mills.

UNDERWATER IMAGING

149. **Deepest fish video**
8,145 m (26,722 ft) - 2014. Marine scientists from the University of Aberdeen's Oceanlab recorded **video footage** of an unknown species of snailfish in the Mariana Trench. The researchers obtained the images using the UK's deepest diving vehicle, the *Hadal-Lander*.

150. **Deepest hologram**
450 m (1,476 ft) - The eHoloCam 3D holographic camera recorded an image of a marine organism in the North Sea while deployed by the RV *Scotia* of the Fisheries Research Services Marine Laboratory in Aberdeen in March 2007. The eHoloCam is designed to operate as deep as 2,000 m (6,562 ft).

151. **Deepest video camera**
7,703 m (25,272 ft) - September 24-29, 2008. Marine scientists from the University of Aberdeen's Oceanlab, on board the Japanese research ship *Hakuho Maru*, film swarms of snail fish (Limparidae) in the Japan Trench. The camera mounted on the *Hadeep* submersible platform took 5 hours to reach the record depth where the surrounding pressure is equivalent to the weight of 1,600 elephants standing on the roof of a car.

152. **First amphibious camera**
1954 - The Mako Shark camera was the world's first amphibious camera (no housing). It was designed by Jordan Klein.

153. **First consumer 35 mm underwater camera**
1960 - The Calypsophot was the first waterproof 35 mm camera. It was developed by Belgian Jean de Wouters and Jacques-Yves Cousteau in 1957-58). Nikon further developed the camera and produced the Nikonos I in 1963. Spirotechnique began distribution in 1960.

154. **First diver to film cookiecutter shark**
On November 28, 2008 (10 pm), Frank Hendriks of Big Island Divers filmed the first known live images of a cookiecutter shark - filmed by a diver - off Kona, Hawaii. This was the fourth cookiecutter seen on night dives during a six-month period.



A frilled shark at the Awashima Marine Park in Numazu, south of Tokyo on Jan. 21, 2007. Photo handout by Awashima Marine Park

155. **First diver to film frilled shark**
January 21, 2007 - Divers from the Awashima Marine Park, filmed a frilled shark near the surface in Numazu, south of Tokyo, after it was captured in nearby waters. The 1.6-m (5.2 ft) fish, believed to be a pregnant female, was later placed in a saltwater tank where more images were taken. The shark died a few hours later.

156. **First diver to film giant squid**
January 24, 2015 - Akinobu Kimura (Japan), Toyama Bay, Japan. Kimura dove alongside the 3.7-m (12.1 ft) squid near the surface for several minutes before it swam into deeper water.

157. **First diver to film Greenland shark**
1995 - Nick Caloyianis (USA), Baffin Island (Canada).

158. **First diver to film walrus underwater**
1991 - Mario Cyr (Canada), Igloolik, Nunavut (Canada).

159. **First diver to film white shark**
1966 - Ron Taylor and Rodney Fox (Australia).

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160. **First live television broadcast from under the sea**
Dr. Joseph MacInnis (Canada) - First live television images are broadcast during Arctic IV Expedition (Canadian Arctic) in 1974. Ice thickness at the dive site is over 2 m (6.5 ft).

161. **First photograph of an entire giant squid**
1873 - Rev. Dr. Moses Harvey (1820-1901) took a photo of an entire giant squid in his bathtub in St. John's, Newfoundland. Rev. Dr. Moses Harvey was a prolific author of articles on Newfoundland and Labrador. He was particularly well known for his writings on the giant squid (a.k.a. devilfish).

162. **First to film a frilled shark**
2004, Blake Plateau (Georgia, USA) - H. Scott Meister at a depth of 873 m (2,866 ft) aboard the deep submersible vehicle, the *Johnson-Sea-Link II*.

163. **First to film a live coelacanth**
1988 - Prof. Hans Fricke (Max Planck Institute) filmed a coelacanth (*Latimeria chalumnae*) in its natural habitat using a two-man submersible, the *Geo*, during a night dive at a depth of 180 m (590 ft) off Grand Comore (Comoros). The coelacanth was thought to have been extinct since the end of the Cretaceous period until a specimen was captured off South Africa in 1938.

164. **First to photograph a giant squid underwater**
January 15, 2002 - The first image ever recorded of a live mature giant squid was taken on Goshiki Beach, Amino Cho, Kyoto Prefecture, Japan. The reddish colour of the skin in the photo is indicative that the animal is still alive. The squid's mantle measured approximately 2 m (6.6 ft) in length. Total length including tentacles was 4 m (13 ft). The animal was roped to a dock where it soon died. It was later identified by a scientist from the Tokyo University of Fisheries and it is now on display at the National Science Museum of Japan.

165. **First to photograph giant squid u/w [Deep water]**
2005 - Japanese researchers led by Dr. Tsunemi Kubodera of the National Science Museum produced the first images ever recorded of a live giant squid in its natural habitat.



26-foot (8 m) giant squid brought to the surface after attacking prey hung on rope at a depth of 2,950 ft (900 m) off Japan's Bonin Islands. Photo handout by Dr. Tsunemi Kubodera | National Science Museum

166. **First underwater film**
Kodak Ektachrome Underwater film appeared on the market in 1993. Production lasted only two years terminating in September, 1995.

167. **First underwater flash (Bulb)**
1893 - The first ever flash bulb was designed by Frenchman Chauffour for underwater photographer Louis Boutan. The glass bulb contained pressurized oxygen and magnesium which was ignited by a wire carrying an electrical discharge.

168. **First underwater flash (Electronic)**
1950 - Dimtri Rebikoff (France). He also invented the portable electronic flash in 1947.

169. **First underwater IMAX film**
1979 - John Stoneman directs the first underwater IMAX documentary film, Nomads of the Deep with underwater scenes by Chuck Nicklin.

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170. **First underwater live monitor broadcast**
1953 - Jacques-Yves Cousteau using u/w television equipment developed with André Laban in 1952.

171. **First underwater movie [Colour]**
1939 - Hans Hass produced the first underwater colour movie in the Netherlands Antilles.

172. **First underwater movie [Filmed on scuba]**
1939 - Hans Hass produced the first underwater movie filmed on scuba in the Netherlands Antilles.

173. **First underwater movie**
1914 - John Ernest Williamson and his brother George use the *Williamson Photosphere* to produce the first underwater movie in which he kills a shark with a knife in the Bahamas.

174. **First underwater photo**
1856 - Photo taken by Englishman William Thompson. Total exposure time was 10 min. during which the camera flooded. The plate was removed and rinsed in freshwater. The plate still produced a weak underwater photo of the Bay of Weymouth. No other attempts were made until Frenchman Louis Boutan in 1893.

175. **First underwater photo [Colour]**
1926 - The first colour photographs (Autochromes) taken underwater by W. H. Longley and Charles Martin appeared in the January 1927 issue of National Geographic.

176. **First underwater photo [Half & half]**
1856 - The world's first underwater photo was also the first half & half image (split shot, over-under), i.e. part of of the image is underwater and the other is in air.

177. **First underwater selfie**
1893 - Louis Boutan made an underwater autoportrait with a camera known as the *Detective* inserted into a wooden housing of his design.

178. **First underwater spherical panorama [Cave]**
In 2015, Viktor Lyagushkin (Russia) photographed a spherical* pan-



Boutan's method for using a magnesium flashlight under water. (PD)



The world's first underwater photo taken by William Thompson in 1856 was also the first half & half (split shot, over-under) image. (PD)



Louis Boutan autoportrait (selfie) in 1893 (PD).

orama in Orda Cave, Russia. Lyagushkin had the additional challenge of photographing in an overhead environment without natural light. *Without a tripod or panoramic head.

179. First underwater spherical panorama [Lagoon]
In 2011, Marcio Cabral (Brazil) photographed a spherical* panorama in Mysterious Lagoon, Brazil. *Without a tripod or panoramic head.

180. First underwater video chat [Live]
On Earth Day (April 22) 1997, Jean-Michel Cousteau led the first undersea live video chat on Microsoft Internet, from the coral reefs of Fiji, celebrating the International Year of the Reef and answering questions from participants around the world.

181. First underwater webcam
2000 (August 24) - Caribbean WebCams, successfully installed the world's first permanent underwater Reef WebCam (or ReefCam) off the southern Caribbean island of Bonaire.

182. First underwater webcam [Megapixel]
2007 - The first public-accessible underwater megapixel camera was located at a depth of 15 m (50 ft) on the west coast of Bonaire (Netherlands Antilles) at a dive site known as Something Special. It started broadcasting on June 1, 2007 (breathebonaire.com).

183. First underwater webcam [Realtime video]
2008 - WildCam Belize Reef operated by the National Geographic Society. The OceanCam® was first designed by Ocean Presence Technologies for continuous monitoring of manta rays in the open ocean.

184. Largest underwater camera system
Howard Hall Productions designed and built an underwater housing for the Mark II IMAX® camera (2D), and consulted on the housing design for the Imax 3D Soledo camera. These camera systems have been used in the production of several large format films, including *Island of the Sharks* (2D), *Coral Reef Adventure* (2D), *Into the Deep* (3D), and *Deep Sea 3D* (3D). While both systems are neutrally buoyant in the water, on the surface the Mark II system weighs 114 kg (250 lbs) and the Solido 3D system weighs around 590 kg (1,300 lbs). During the filming of *Coral Reef Adventure*, divers took the Mark II system to 114 m (373 ft): the deepest a diver has ever taken an IMAX camera.

185. Largest white shark filmed underwater
6 m (20 ft) - In August 2015, biologist Mauricio Hoyos Padilla posted a Facebook video of what he claimed was the largest white shark ever filmed. The female shark known as Deep Blue may have been pregnant when filmed off the island of Guadaloupe Island, Mexico. **[VIDEO]**

186. Most powerful underwater lighting
The 6,000 m (20,000 ft) depth capable Medusa, built by Phoenix International, Inc., is a Remotely Operated Vehicle (ROV) that carries 10 high-powered, independently movable and controllable, HMI lights. Medusa can produce a total of 12,000 watts of illumination. It was suspended over the wreck of the RMS *Titanic* for the making of James Cameron's Ghosts of the Abyss in 2001.

187. Oldest underwater cinematographer
Leni Riefenstahl, Germany (1902-2003); Riefenstahl became a diver at the age of 71. She released her first underwater documentary *Impressionen unter Wasser* (Underwater Impressions) on her 100th birthday in 2002.

188. Youngest diver to photograph white shark underwater
John-Aaron Bozanic (USA) - On Sept 9, 2008, at the age of 7, John-Aaron became the youngest person to photograph white sharks underwater in the wild at Guadelupe Island, Mexico.

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MEDIA & ENTERTAINMENT

189. Deepest underwater live broadcast [NEW]

1,002 ft | SiriusXM Deep Dive Radio - John Fugelsang (USA) hosted a live radio show off the coast of Bermuda with the assistance of Nekton Mission on August 8, 2016. A pair of two-person submersibles took part in the broadcast. Interviewees included David Crosby, Céline Cousteau, Dr. Joe MacInnis, Rod Roddenberry and Mark Hamill.

190. First all underwater photographer band

The Wetsuits (2009) - The Wetsuits played their first gig at the "Fish and Famous" party at BTS in March 2009 with Michel Gilbert on drums, Jonathan Bird on electric guitar/vocals, Leandro Blanco on acoustic guitar/vocals, and Peter Riekstins on bass. The Wetsuits' second gig was before a live audience of several hundred people following the Saturday evening film festival at Our World-Underwater (Chicago) in February 2010. The next stop on the Wetsuits World Tour was Beneath the Sea 2010 (Meadowlands, NJ), where they rocked the house at the "Meet the Fish and Famous" fundraiser. The Wetsuits are: Jonathan Bird (Electric guitar and vocals), Leandro Blanco (Acoustic guitar and vocals), Paul Cater Deaton (Vocals), Michel Gilbert (Drums), Chris Kohl (Keyboards), Michael Lawrence (Bass), Peter Riekstins (Bass).

191. First book about women and diving

Women Underwater by Dr. Susan Bangasser and Jeannie Bear in 1979.

192. First book for children with u/w photos

What's in the Deep: An Underwater Adventure for Children by Alese and Morton Pechter in 1989.

193. First dive magazine

The Skin Diver (later known as Skin Diver Magazine) was published by Chuck Blakeslee and Jim Auxier in 1951. The magazine initially catered to spearfishers but soon switched over to scuba diving. The magazine ceased publication in 2002.

194. First diving show for children

Diver Dan debuted in 1960. 104 episodes were produced, each lasting seven minutes. Characters included Diver Dan, who wore an old-fashioned diving suit, Miss Minerva, and the Captain. The puppet cast in-



DIVER Magazine is North America's longest-established scuba diving publication. Image courtesy **DIVER Magazine**

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cluded Baron Barracuda and Trigger, Finley Haddock, Doc Sturgeon, and many others.

195. First online scuba HD TV

• Dive Zero TV (Canada) became the first online HD TV network dedicated to scuba diving in 2008.
• Plongeurs.tv (France) became the first French-language online HD TV network dedicated to scuba diving in 2011. An English version is available at YouDive.tv

196. First online scuba magazine

Aqualog Magazine was the first dive magazine published exclusively online in 1997. Based in Montréal, Québec, and offered in English and in French, the magazine was operated by Jeffrey Gallant and Marc-André Saint-Laurent.

197. First underwater animated TV show [Colour]

Stingray (1964-65) - *Stingray* was the first Supermarionation show filmed in colour. It was produced by AP Films for ITC Entertainment. It was also the first British television programme filmed entirely in colour. *Stingray* was a combat submarine capable of reaching speeds of 600 knots and the depth of 36,000 feet. It was piloted by Capt. Troy Tempest. Titan's slave girl Marina was modeled on French actress Brigitte Bardot.

198. First underwater radio show

Feb. 23, 1940 - Marineland (St. Augustine, Florida). Robert Ripley of Ripley's Believe it or Not! fame, hosted a radio show while diving with sharks and dolphins using a microphone-equipped hardhat. The show was broadcast coast to coast to an audience of one million listeners.

199. First use of the Shark Repellent Bat Spray

July 20, 1966 - Robin hands Batman a can of Shark Repellent Bat Spray while they are both dangling on a ladder under the Batcopter. Batman uses the spray to fight off a shark that has latched onto his leg after he was accidentally lowered into the ocean. The shark explodes when it falls back into the water.

200. First virtual scuba dive [Online]

The eDiving SCUBA diving simulator was released by DiveNav Inc. on June 21, 2008. eDiving integrates a custom designed next generation 3D engine, optimized for rendering underwater scenery, with high resolution bathymetry models, satellite and terrain maps, existing habitat, and interactive 3D models (**www.ediving.us**).

201. Largest dive show [Consumer]

Beneath the Sea is the largest consumer scuba and dive travel show in the U.S.

202. Largest dive show [Industry]

The **DEMA Show** is the largest trade-only event in the world for companies doing business in the scuba diving, ocean water sports and adventure/dive travel industries.

203. Longest-established independant diving publication [Non-profit]

Undercurrent is a consumer newsletter that was founded by Ben Davison in 1975. Originally a print publication, its impartial articles on travel and scuba equipment are now available online.

204. Longest-established scuba magazine [North America]

DIVER Magazine (Vancouver, British Columbia, Canada) was founded by Peter Vassilopoulos in 1974. DIVER was purchased by Dr. Phil Nuytten in 2004.

205. Longest underwater radio broadcast on scuba

5 hours 6 min - Simon Clarke (UK). The show to raise funds for charity (Cash 4 Kids) was broadcast live on Wave 105.2 FM with the support of Andark Diving and a poolside host on November 15, 2011.

206. Longest u/w radio broadcast on scuba [Unassisted]

4 hours 43 min 54 sec - Richard Hatch (UK). The show was broadcast live on BFBS Radio at The Underwater Studios (Essex) to an audience of British troops around the world on 24 November 2011. Mr. Hatch was not aided during the record broadcast.

207. Longest u/w radio broadcast on scuba [Aquarium]

3 hours - Brendan "Jonesy" Jones and Amanda Keller (Australia) broadcast their entire morning radio show (WSFM Radio) from a depth of 3.8 m (12.5 ft) in the Great Barrier Reef Habitat at the Sydney Aquarium. The exhibit also contained eight sharks at the time of the event.

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UNDERWATER ART

EDITOR'S NOTE
Depth records in the art section are limited to the recreational diving range of 1-40 m (1-130 ft) since deeper depths on air do not allow enough time to complete most art forms without entering into decompression. Also, the narcotic effects of depth on the artist's creative faculties are eliminated with the use of deep breathing gases.

208. Coldest underwater artist

≤-1°C (30°F) - On July 5, 2013, Jean-Louis Courteau (Canada), made an artistic drawing of a wreck and its surrounding environment at a depth of 21 m (70 ft) off the town of Godbout, Québec. In 1978, Parks Canada archaeologists wearing heated drysuits drew outlines and artefacts of Basque shipwrecks in Red Bay, Labrador. Water temperatures during the excavations reached as low as -1.8°C (28.7°F).



Jean-Louis Courteau drawing underwater off the town of Godbout, Québec, Canada. Photo by Jeffrey Gallant | Diving Almanac

209. Deepest underwater artist

40 m (130 ft) - André Laban (France) painted (oil on canvas) at the depth of 40 m off the island of Corsica in 1971.

210. First underwater art gallery [Canada]

The first edition of Aquart International was held in Thetford-Mines, Québec (Canada) in August 2006. The gallery now houses a permanent underwater exhibit.

211. First underwater band and visual performance

AquaSonic (2013) is a visual performance, art installation, and concert for liquid space produced by Between Music (Denmark). The five musicians submerge themselves in individual water tanks where they sing or play custom made underwater instruments. **[WATCH VIDEO]**

212. First underwater dance-visual performance

Drops of Breath was created by choreographers Sophie Bulbulyan (France) and Apostolia Papadamaki (Greece). It was first presented at Cape Sounio (Greece) on September 25, 2015. Fifteen performers, including three disabled persons and three children, took part in an underwater dance-visual performance (underwater scenography, costumes and sound) near the ancient temple of Poseidon. The audience could watch the performance in three different ways: scuba diving, snorkeling, or via live broadcast on shore: **[WATCH VIDEO]**

213. First underwater painter

André Laban (France), a chemical engineer, cellist, cinematographer, and pioneer diver of Équipe Cousteau, started painting underwater in 1966. Laban was part of the crew which spent 3 weeks in an underwater habitat at a depth of 100 m (328 ft) during (Conshelf III, October 1965). His film *Iris et Oniris* won the Palme d'or at the Festival mondial de l'image sous-marine d'Antibes in 1996. **[WATCH VIDEO]**

214. First underwater sculpture park

Jason de Caires Taylor (UK) Grenada, West-Indies. The Moilinere Underwater Sculpture Park (2006) is now home to more than 65 sculptures. It is located near the capital St. Georges within an area designated a National Marine Park. The sculptures are sited in clear shallow waters

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to afford easy access by divers, snorkelers and those in glass-bottomed boats. Viewers are invited to discover the beauty of our underwater planet and to appreciate the processes of reef evolution.

215. Largest underwater painting

6 m² (64.58 ft²) - The painting was created by Colette Haddad (Lebanon), at La Marina Dbayeh pool, Beirut (Lebanon) on October 30, 2015.

216. Largest underwater sculpture

Jason deCaires Taylor submerged the “Ocean Atlas” sculpture in the Bahamas in 2014. It is the largest single underwater sculpture in the world with a height of 5 m (16 ft) and a weight of 60 tons.

217. Longest underwater painting

44 diving artists on Tioman Island (Malaysia) painted the world’s longest underwater painting on a 56.4 m (185 ft) canvas to commemorate World Earth Day. The divers from Malaysia and Singapore all made three dives on April 26, 2008, to complete the work of art.

218. Longest underwater painting [Children]

10.7 m (35 ft) - Mabul Island, Sabah, June 28 to July 2, 2008. Fifty (50) children aged 9 to 12 years created a masterpiece themed *Underwater Lives in Mabul Island*. The painting was made while the children were snorkeling. The event was part of the National Art Gallery’s (NAG) Golden Jubilee Celebration.

219. Most underwater paintings

André Laban (France) has made over 800 paintings while scuba diving. He painted his 801st underwater work of art at the age of 86 in September 2014. The painting took 50 minutes to complete at the depth of 15 m (50 ft). **[WATCH VIDEO]**



André Laban painting at 40 m (130 ft) in 1971. Photo by Ron Church courtesy of André Laban.

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RECORD

214. First underwater sculpture park

Jason de Caires Taylor (UK) Grenada, West-Indies. The Moilinere Underwater Sculpture Park (2006) is now home to more than 65 sculptures. It is located near the capital St. Georges within an area designated a National Marine Park. The sculptures are sited in clear shallow waters to afford easy access by divers and snorkelers. Photo courtesy Jason de Caires Taylor

COMMERCIAL DIVING

220. **Deepest salvage operation [Diver-assisted]**
245 m (803 ft) - Wreck of HMS *Edinburgh* (sunk during World War II) off Bear Island (Bjørnøya) in the Barents Sea (Norway), in 1981. A British dive team recovered 431 gold ingots.

221. **Deepest saturation dive [Experimental]**
701 m (2,300 ft) - Comex Hydra 10, Hyperbaric Experimental Centre, Marseille, France, 1992. Gas mixture of hydrogen, helium and oxygen.

222. **Deepest saturation dive [Open sea]**
534 m (1,752 ft) - Comex Hydra 8, Hyperbaric Experimental Centre, Marseille, France, 1988. Gas mixture of hydrogen, helium and oxygen.

223. **Most hours underwater in a diving helmet**
Noel McCully (USA) has logged over 20,000 in a diving helmet.

MILITARY DIVING

224. **Largest ship sunk by divers [WWI]**
The dreadnought SMS *Viribus Unitis*: 20,000 t (19,684 long tons) - With the fall of the Austro-Hungarian Empire, the Austro-Hungarian SMS *Viribus Unitis* (with United Forces) was taken over on October 31, 1918, by the fledgling state of Yugoslavia which had just joined the Allies. Unaware of the new alliance, Italy attacked the naval installations at Pula on November 1. Relaxed security allowed two Italian frogmen, Maj. of Naval Engineers Raffaele Rossetti and Doctor Lt. Raffaele Paolucci, to attach “Mignatta” limpet mines to the *Viribus Unitis*. The divers were captured and taken aboard the doomed ship but did not reveal the position of the mines. The ship was evacuated but when the mines failed to explode on time, the captain and much of the crew returned aboard thinking the Italians had lied. The mines exploded 14 minutes later killing the captain and several hundred of the crew.



Atmospheric Diving System (ADS) a.k.a. *Hardsuit 2000*. Photo: U.S. Navy

225. **Deepest dive in one-atmosphere suit [Military]**
610 m (2,000 ft) - U.S. Navy Chief Diver Daniel P. Jackson using the *Atmospheric Diving System* (ADS), off the coast of La Jolla, Calif., on Aug. 1, 2006.

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SUBMERSIBLES & ROVs

226. **Deepest dive in one-atmosphere suit [Men]**
655 m (2,150 ft) - A WASP and an ROV conduct the deepest on-bottom repair on an underwater pipeline in the Gulf of Mexico (Mariner Energy Pluto field) in October 2000.

227. **Deepest dive in one-atmosphere suit [Women]**
381 m (1,250 ft) - Dr. Sylvia Earle using the *JIM* Suit off Oahu, Hawaii in 1979.



Dr. Sylvia Earle prepares to dive in a *JIM* suit. Photo: OAR/NURP

228. **Deepest diving submersible [In service]**
The *Deepsea Challenger* (DCV 1) is capable of reaching the bottom of the Challenger Deep 10,994 m (36,070 ft). The 7.3-m (24 ft) submersible piloted by James Cameron was the second manned vehicle to touch the deepest known point on the planet in 2012. The Japanese research submersible *Shinkai 6500* has reached a depth of 6,526 m (21,411 ft) in the Japan Trench. Russia's *Mir I* and *Mir II* submersibles have a maximum operating depth of 6,000 m (20,000 ft). France's *Nautile* also has a maximum operating depth of 6,000 m (20,000 ft). Both of the Mir submersibles have made several dives to the wreck of the RMS *Titanic*.

229. **Deepest diving submersible [Touring]**
610 m (2000 ft) - *Idabel* submersible, Roatan Institute of Deep-sea Exploration (RIDE). The *Idabel* is a three-sphered submersible designed by Karl Stanley, which is designed to dive to 914 m (3000 ft). Passengers are taken to depths up to 610 m (2,000 ft) to observe deep-dwelling sea life including six gill sharks and Lophelia reefs.

230. **Deepest diving vehicle**
Nereus - A new type of deep-sea robotic vehicle. *Nereus* successfully reached the deepest part of the world's ocean by diving to 10,902 m (6.8 miles) on May 31, 2009, at the Challenger Deep in the Mariana Trench in the western Pacific Ocean.

231. **Deepest salvage operation [ROV]**
5,273 m (17,300 ft) - Recovery of a U.S. Navy Helicopter (CH-46 Sea Knight), Wake Island, 1992. ROV: *CURV III* (U.S. Navy). Weight of ROV: 5,715 kg (12,600 lbs). Max. operating depth: 6,096 m (20,000 ft).

232. **Deepest submersible dive [Lake]**
1,637 m (5,371 ft) - Russian scientist Dr. Anatoly Sagalevitch in Lake Baikal (Siberia) aboard a *Pisces* submersible in 1990.

233. **Deepest submersible dive [Ocean]**
10,916 m (35,814 ft) - Bathyscaphe *Trieste* (Project Nekton) - 23 January 1960, Challenger Deep (Mariana Trench), Guam. Hydrostatic pressure: 16,000 PSI (1,089 ATM). Occupants: Dr Jacques Piccard (Switzerland), Lt. Donald Walsh, USN. The deepest known point on earth is 10,994 meters (36,070 feet) (Also in the Challenger Deep).

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Trieste's pressure sphere where the two passengers spent the entire dive. Photo: U.S. Navy



Lt. Donald Walsh and Dr Jacques Piccard aboard the Bathyscaphe *Trieste*. Photo: U.S. Navy

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SUBMERSIBLES & ROVs INDEX

234. Deepest submersible dive [Solo | Men]

10,898.4 m (35,756 ft) - On March 26, 2012, Canadian film director James Cameron made the first solo descent to the bottom of the Challenger Deep, the deepest known point in the Earth's ocean seafloor. Cameron reached the record solo depth aboard the *Deepsea Challenger*, a 7.3-m (24 ft) deep-diving submersible. The *Deepsea Challenger* is only one-tenth the weight of the Bathyscaphe *Trieste*, the first and only other manned submersible ever to reach the bottom of the Challenger Deep in 1960.

235. Deepest submersible dive [Solo | Women]

1,000 m (3,280 ft) - Dr. Sylvia Earle (United States). Achieved aboard the *Deep Rover* submersible off the coast of California in 1985.

236. Deepest submersible recovery

1,585 m (5,200 ft) - *Alvin* is recovered by the submersible *Aluminaut* in September, 1969, after spending 10 months on the sea floor with its hatch open.

237. Deepest submersible rescue

3,200 m (10,500 ft) - Bathyscaphe *Archimède* (France) cuts free the submersible *Cyana* which is stuck at the bottom of the Mediterranean off Sicily in September 1971.

238. First commercially built submersible in the USA

The *Asherah*, capable of reaching a depth of 183 m (600 ft) and a speed of 4 knots, was launched about one month before *Alvin* in May 1964. It was designed and built by Electric Boat for then graduate student and underwater acheologist George Bass.

239. First dive on the Titanic

Robert Ballard made the first dive on the RMS *Titanic* aboard the *Alvin* submersible (Woods Hole Oceanographic Institution) on July 13, 1986. The wreck was discovered the previous year (Sept. 1, 1985) by an American-French expedition led by Jean-Louis Michel (IFREMER) and Dr. Ballard. The first images were taken by the ROV *Argo* at the time of the discovery. Depth: 3,840 m (12,600 ft).



James Cameron's *Deepsea Challenger* during a trial dive.
Photo courtesy DEEPSEA CHALLENGE | National Geographic

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240. **First dive on the Titanic [Women]**
Jennifer Carter was the first woman to dive on the wreck of the RMS Titanic in 1987.

241. **First dive to the North Pole seafloor**
Arctic explorer Artur Chilingarov, parliamentarian Vladimir Gruzdev, and a *MIR 1* pilot, placed a titanium Russian flag on the North Pole seafloor on August 7, 2007 - Depth: 4,261 m (13,980 ft). *MIR 1* spent eight hours and 40 minutes submerged. It took 2.5 hours to reach the seafloor and the last 40 minutes were spent hunting for a break in the ice. *MIR 1* was followed by *MIR 2* to the bottom.

242. **First exosuit pilot [Female]**
Nancy McGee (USA), 2015. **[VIDEO]**

243. **First full ocean depth maneuverable submersible**
Graham Hawkes' *Deep Flight Challenger* is capable of reaching the deepest point in the ocean or 10,994 m (36,070 ft). The submersible was built for late adventurer Steve Fossett in 2008.

244. **First link-up between submersible and the International Space Station (ISS)**
January 26, 2007 - WHOI marine biologist Tim Shank - diving in *Alvin* on the East Pacific Rise - compared notes on science in extreme environments and on the value of firsthand human exploration with astronaut Sunita Williams as she orbited on the International Space Station. The call was broadcast (tape-delayed) on NASA TV immediately following the conclusion of a space station status briefing.

245. **First live broadcast from deep submersible [Manned]**
June 23, 2013 - The world's first live broadcast from the *Shinkai 6500* submersible (Japan) takes place by a hydrothermal vent on the Cayman Rise at a depth 5,000 metres. The live Internet program is presented by JAMSTEC and Nico Live.

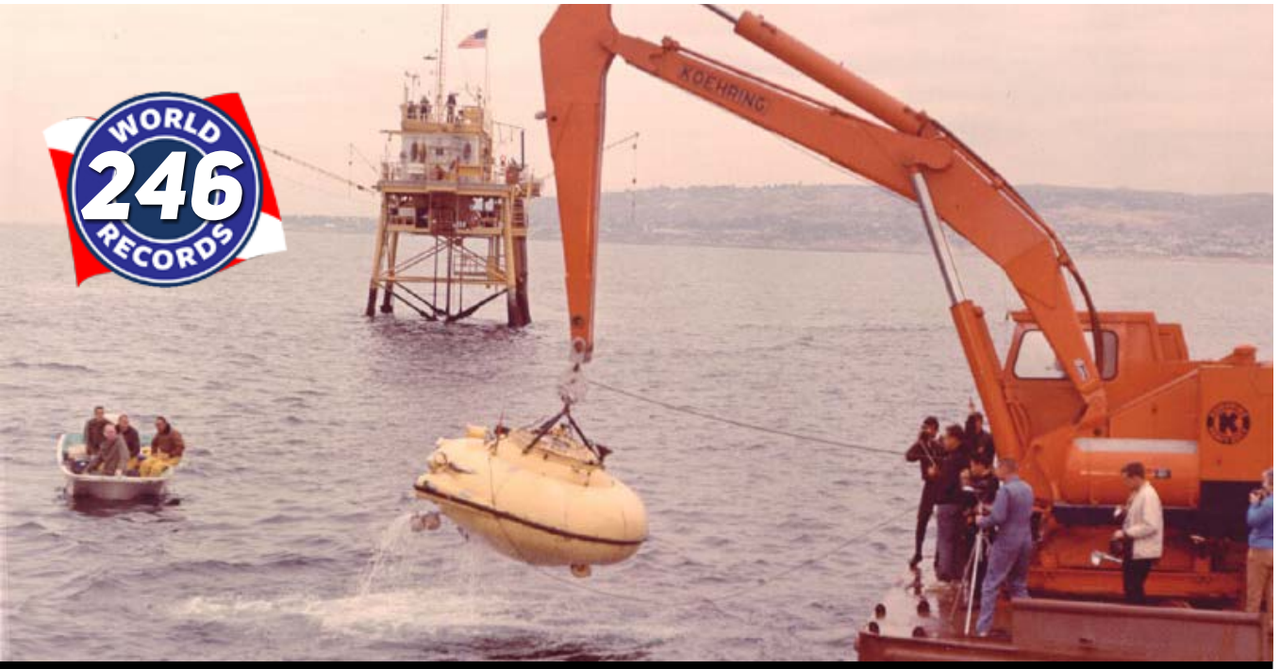
246. **First maneuverable research submersible**
The Diving Saucer *DS-1* (*Soucoupe SP-300*) - Jacques-Yves Cousteau began designing small, maneuverable submersibles capable of being launched from the deck of a ship in the 1950s. His two-man *DS-1* was first tested (unmanned) to a depth of 600 m (1,968 ft) in the Mediterra-



Bow of the RMS *Titanic*. Photo: NOAA

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nean Sea in 1957. It was lost when its tether snapped during ascent. A second saucer *DS-2* (a.k.a. *Denise* in honor of the wife of engineer Jean Mollard), launched in 1959, was used aboard Cousteau's *Calypso*. Unlike current submersible designs, the *DS-2* was propelled by water jets. Its maximum operating depth was 300 m (1,000 ft).



Cousteau's *DS-2* is lifted out of the water after a dive off California. Photo: U.S. Navy

247. **First robotic diver**
OceanOne (2016), a humanoid robotic diver from Stanford University, is powered by artificial intelligence and haptic feedback systems. *OceanOne* was used to explore and to recover artifacts from the wreck of Louis XIV's flagship *La Lune*, which sank to a depth of 100 m off the southern coast of France in 1664. **[WATCH VIDEO]**

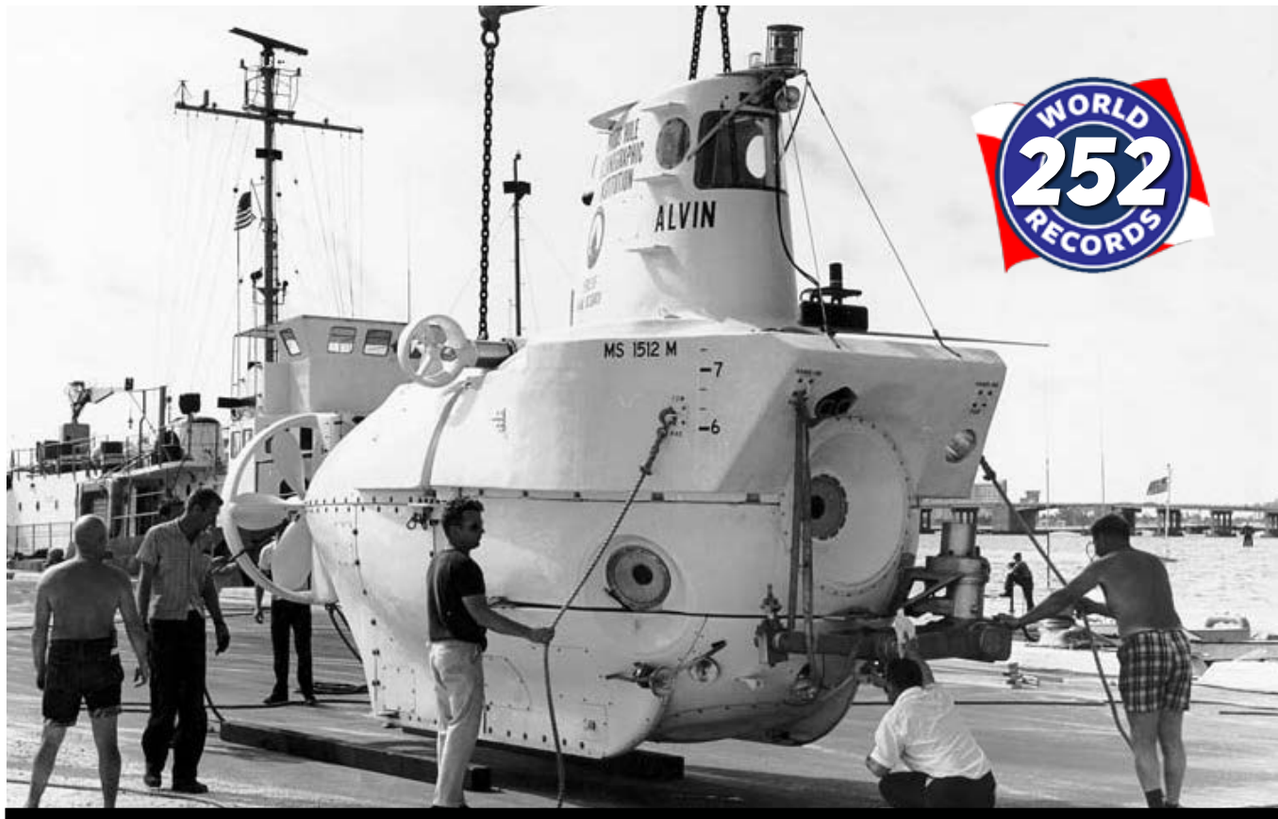
248. **First submersible jamboree**
Catalina Island (California), 1969 - 7 submersibles: Cousteau *Sea Fleas*, *Star II*, *Deep Quest*, *Nekton*, *Beaver* and *Dowb*. During the dive hosted by the Rockwell marine facility, the combined fleet discovered a shipwreck and was surrounded by a mass of squid.

249. **First underwater vessel to operate from an u/w base**
Cousteau Society *DS-2* (1963) - Conshelf II Expedition (France). Eight divers lived in Conshelf II habitat in the Red Sea for one month under the supervision of Jacques-Yves Cousteau. The *DS-2* Diving Saucer operated from an underwater hangar.

250. **First woman on a science dive aboard a submersible**
Dr. Ruth Turner (1971) descended to 1,829 m (6,000 ft) aboard the *Alvin* submersible to conduct research on wood-boring mollusks.

251. **Highest altitude dive in a submersible**
Albert Falco and Raymond Coll explored the depths of Lake Titicaca (Bolivia) aboard two Cousteau *Sea Fleas* (Puce de mer) at an altitude of 3,821 m (12,536 ft) above sea level in 1968. They observed prints made by frogs at a depth of 120 m (394 ft). The *Sea Fleas* could reach deeper depths than Cousteau's *Soucoupe*.

252. **Most active submersible in service [MOD]**
Alvin - Woods Hole Oceanographic Institution (WHOI). Commissioned: June 5, 1964. On January 1, 2016, *Alvin* had completed 4,815 dives. Crew: One pilot and two scientific observers. *Alvin*'s most famous exploits: locating a hydrogen bomb in the Mediterranean Sea (1966); deep-sea hydrothermal vents (1980s); Wreck of the *Titanic* (1986).

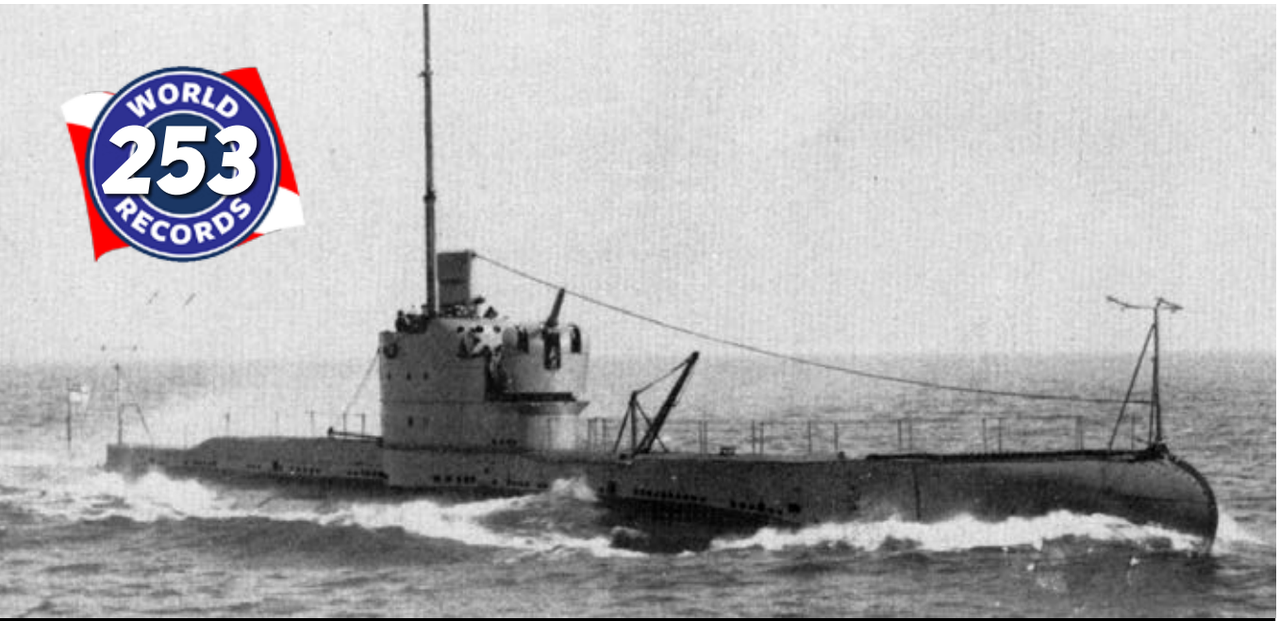


The *Alvin* submersible. Photo: OAR/NURP

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SUBMARINES

253. **Deepest escape w/Davis Submerged Escape Apparatus**
52 m (170 ft) - John Capes (Leading Stoker), 31, was the sole survivor from the wreck of the submarine HMS *Perseus* (crew of 61) after it struck an Italian mine off Cephalonia, Greece, on December 6, 1941. The wreck was discovered with the rear escape hatch still open by Greek diver Kostas Thoctarides in 1997. Capes escaped using the Davis Submerged Escape Apparatus, a closed circuit underwater breathing system.



HMS *Perseus*. Photo: British Archives

254. **Fastest human-propelled submarine [1 crew | w/propellor]**
OMER 8 - 7.282 knots (13.49 kph / 8.38 mph), piloted by David Barry, July 2013. *OMER 8* is a one-person submersible designed and built by the École de technologie supérieure (ETS) Université du Québec à Montréal. Crew: 1

255. **Fastest human-propelled submarine [1 crew | w/o propellor]**
OMER 6 - 4.92 knots (9.11 kph / 5.66 mph), piloted by David Barry, June 2009. *OMER 6* is a one-person submersible designed and built by the École de technologie supérieure (ETS) Université du Québec à Montréal. Crew: 1

256. **Fastest human-propelled submarine [2 crew | w/propellor]**
OMER 5 - 8.035 knots (14.88 kph / 9.25 mph), July 2007. *OMER 5* is a two-person submersible designed and built by the École de technologie supérieure (ETS) Université du Québec à Montréal. Crew: 2

257. **Fastest submarine**
K-222 Papa class nuclear-powered submarine (Russia), commissioned in December 1969. Reported maximum speed: 44.7 knots (82.2 km/h / 52 mph). Maximum operational depth: 400 m (1,312 ft). Only one (*K-222*) was ever built. The Alpha class nuclear-powered submarine (Russia) has a reported maximum speed of 40 knots (74 km/h / 46 mph) Maximum operational depth: 760 m (2,500 ft). The fastest U.S. submarine, the *Seawolf*, is believed to reach up to 35 knots. Electric boat is reportedly working on an underwater craft capable of transporting Navy Seals at speeds up to 100 knots (185 km/h / 115 mph) using supercavitation.



K-222 Papa class submarine. Photo: U.S. Navy

258. Fastest torpedo

260 knots (483 km/h / 300 mph) - *Shkval* (squall) supercavitating rocket-propelled torpedo (Russia). The fastest NATO torpedo is the *Spearfish* (UK) at 75 knots (138 km/h / 86 mph). The *Shkval* produces an envelope of supercavitating bubbles preventing the surface of the torpedo from coming into contact with water thus reducing drag and friction. Maximum launch depth: 100 m (328 ft). In March 2006, the Islamic Republic of Iran reported that it had tested a Shkval-like torpedo called *Hoot* (whale), capable of speeds reaching 360 km/h (225 mph).

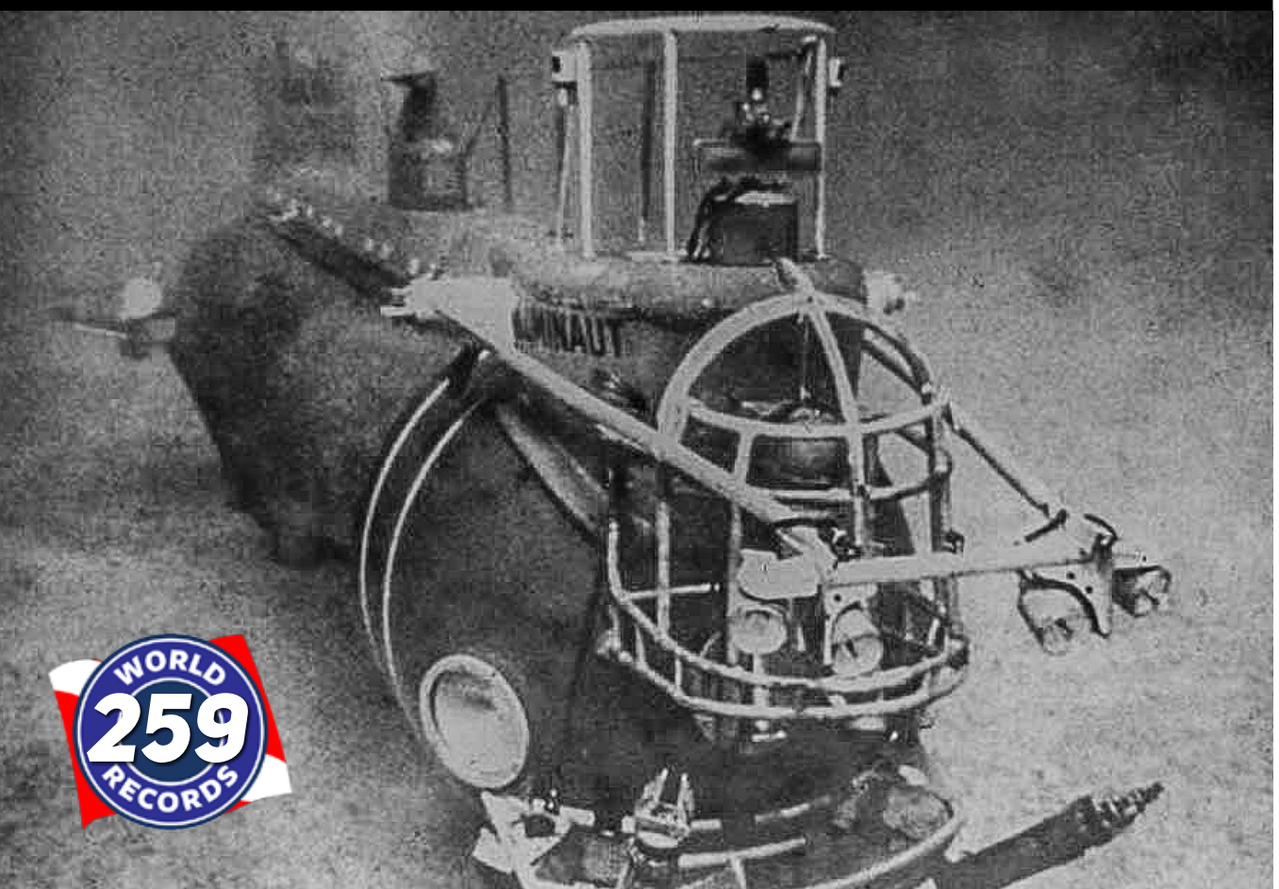
259. First aluminum submarine

1964 - The *Aluminaut* (16 m, 51 ft) was owned by Reynolds Metals and built by the Electric Boat Division of General Dynamics. It is currently preserved as museum ship at the Science Museum of Virginia.

260. First submarine to sink another sub [Both submerged]

The British submarine HMS *Venturer*, under the command of James S. Launders, torpedoed and sank the German submarine *U-864* in the

Aluminaut - The first submarine made of aluminum. Photo: NOAA





Typhoon class submarine. Photo: U.S. Navy

North Sea west of Bergen, Norway, on February 9, 1945. The entire crew of 73 was killed.

261. Largest submarine

Typhoon class (Russia). Length: Approx. 175 m (574 ft); Beam: 23 m (75 ft); Draft: 12 m (38 ft); Displacement: 33,800 tons; Propulsion: 2 pressurized-water nuclear reactors driving 2 propellers; Crew: 150; Armament: 6 torpedo tubes, 20 ballistic missiles; First Sub Commissioned: December 12, 1981; Maximum Speed: 27 knots (50 km/h / 31 mph).

262. Largest submarine salvage

Russian Oscar-class submarine *Kursk* (Length: 155 m / 508 ft). The submarine was sunk by internal explosions in the Barents Sea on August 12, 2000, killing all 118 personnel on board. The submarine was raised to the surface from a depth of 108 m (354 ft) while still loaded with torpedoes, cruise missiles, and its nuclear reactor. The bow was left underwater and subsequently destroyed. Divers employed in the operation spent 28 days underwater or in saturation chambers.

263. Largest warship ever sunk by a submarine

68059-ton Japanese aircraft carrier *Shinano*. *Shinano* was converted from a battleship during construction as a sister ship of the *Yamato*. *Shinano* was the largest aircraft carrier built prior to the late 1950s. *Shinano* was sunk on November 29, 1944, by the U.S. Navy submarine *Archer-fish*.

264. Longest submerged patrol

111 days - The longest known submerged patrol was done by HMS *Warspite* (1982-83) in the South Atlantic. During that time the submarine covered the distance of 30,804 nautical miles (57,085 km).

SHIPS

265. Deepest anchorage

7,600 m (24,928 ft) - In 1956, Jacques-Yves Cousteau's *Calypso* was anchored over the Romanche Gap off the west coast of Africa using a 318 kg (700 lbs) anchor, 30 m (100 ft) of heavy chain, a 250 kg (550 lbs) pig iron, a 61 m (200 ft) steel cable and a quarter-inch braided nylon line 9,997 m (32,800 ft) long.

266. Fastest vessel

Spirit of Australia - 511.11km/h (317.60 mph), Blowering Dam, NSW Australia, October 1978. Pilot: Ken Warby.

267. First dedicated liveaboard for scuba divers

Marisla - In 1964, Richard Adcock launches Marisla, in La Paz, Mexico.

268. First flip ship

The R/P *FLIP* (Floating Instrument Platform) is a research ship (108 m / 355 ft) designed to partially flood and pitch backward thus standing upright and becoming half submerged. Once the ship is vertical, its bulkheads become floors. It was launched by the Scripps Institution of Oceanography in 1962 (modernized in 1995) for use in scientific research. It has no propulsion system and must be towed to sea where it is either anchored or set adrift.

269. First laboratory buoy

Mystery Island was a 60 m (200 ft) tall anchored tube equipped with a lab living quarters which permit researchers to stay at sea indefinitely. It was conceived by Captain Jean Alinat then developed and produced by Jacques Picard and the OFRS (France). *Mystery Island* was launched in 1964. It caught fire while at sea in 1965, was rebuilt, and then served for a further 8 years.

270. First underwater observation chamber

The *Calypso* was the first ship equipped with an underwater observation chamber with 6 portholes where a person could view sea life from a depth of 3 m (10 ft) in 1950. The chamber was replaced by a larger but lighter design including 8 portholes in 1966.



R/P *FLIP* (Floating Instrument Platform). Photo: ONR

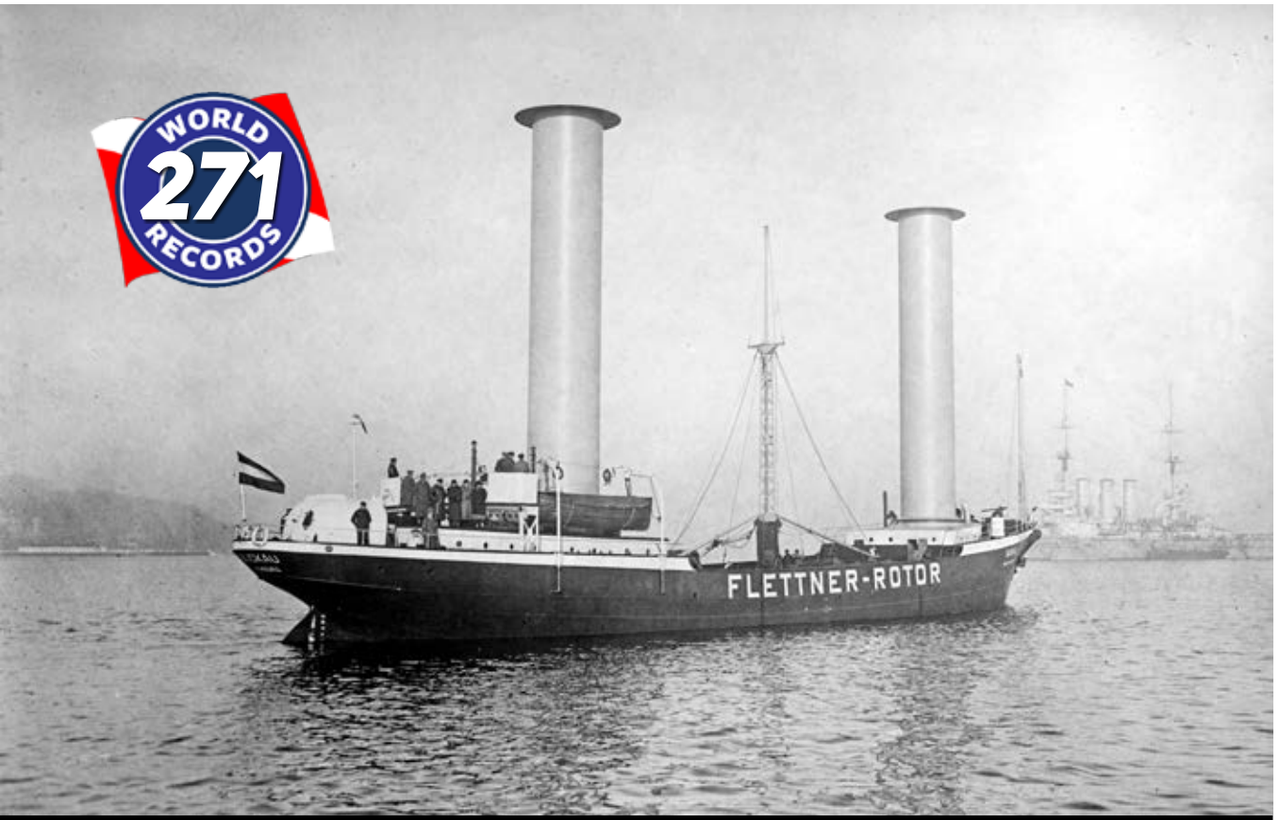


Calypso's rusted underwater observation chamber during refit in Concarneau (France) in 2007. Photo by Massecot (CC)

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271. First rotor ship

• The *Buckau* (later renamed *Baden Baden*) was a ship designed by German engineer Anton Flettner in 1922. The vessel was propelled using the Magnus effect in which hollow rotating cylinders use a controled airstream for propulsion. On May 9, 1926, the *Baden Baden* sailed into New York after crossing the Atlantic via South America. Flettner abandoned the rotor system when he discovered that it was less efficient than the steam engine.



The Rotor ship *Buckau* (a.k.a. *Baden Baden*)
Photo: United States Library of Congress

• Jacques-Yves Cousteau, Lucien Malavard, and Bertrand Charrier much improved the design in order to produce a maximum propelling force in relation to required expenditure of energy. Cousteau's Turbosail (TM) conserves energy resources, by providing a propulsion force for a ship in response to wind in order to assist or replace other energy-consuming propulsion means. The new conceot was first tested on the experimental vessel *Moulin à vent* in 1983. The Turbosail (TM) was refined for Cousteau's *Alcyone* (aka the Daughter of the Wind), which was launched in 1985, and which has served as the flagship of the Cousteau Society since *Calypso* sank in 1996. (See Oceanography record: Most famous oceanographic vessel)



Cousteau's windship *Alcyone* (a.k.a. *The Daughter of the Wind*) sails by Percé Rock, Québec. Photo by Jeffrey Gallant | Diving Almanac

272. First stone frigate

HMS *Diamond Rock* - In 1804, the steep basalt island of Diamond Rock off the southern coast of Martinique was designated a sloop-of-war by Commodore Sir Samuel Hood. Its purpose was to watch for and harass French warships sailing for Fort-de-France. The 175-m (574 ft) high island harboured a British garrison and several cannons during the Napoleonic Wars. Perched at the very top, the guns were able to fire far out to sea where strong currents often prevented French vessels from approaching the harbour in Fort-de-France. The island was retaken by the French after 17 months and many unsuccessful attempts. Today, the uninhabited island, which is still considered a commissioned ship by

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the Royal Navy, is a wildlife refuge for several bird species as well as the endemic Couress grass snake. It is also a highly popular dive site where divers swim through a 30-m (100 ft) long volcanic tunnel running across the island at a depth of 45 feet (14m). A stone frigate is a nickname for a naval establishment on land.

273. Largest cruise ship

Harmony of the Seas (2016) (Royal Caribbean) - 226,963 tons / 362.12 m (1,188.1 ft). The vessel can carry up to 6,410 passengers.

274. Largest loss of life from a single ship sinking

9,400 - The German transport ship MV *Wilhelm Gustloff* was sunk by the Soviet submarine S-13 in the Baltic Sea on January 30, 1945. The ship was evacuating German civilians and military personnel from Gdynia (Gotenhafen). 1,252 passengers and crew survived. The wreck now lies on its side at a depth of 44 m (144 ft).

275. Largest merchant ship

Seawise Giant (1979-2010) - The supertanker formerly known as *Mont*, *Knock Nevis*, *Jahre Viking*, and *Happy Giant*, measured 458 m (1504 ft) in length and 69 m (226 ft) in width. *Seawise Giant* had a dead weight of 564,763 t and displaced 647,955 t (24.6 m draft) when fully laden with nearly 4.1 million barrels (650,000 sq m) of crude oil.

276. Largest warship

Gerald R. Ford-class aircraft carrier (2016) - Displacement: 100,000 tons; Length: 337 m (1106 ft) overall; Flight deck width: 78 m (256 ft); Aircraft: 75+; Crew: Officers: 508 - Enlisted: 3,789.

277. Largest warship ever sunk

USS *America* - 319.28 m (1,047.5 ft), 75,800 tons. The aircraft carrier was sunk for target practice off Virginia in 2005. The wreck lies upright in one piece at a depth of 5,140 m (16,860 ft).

278. Oldest floating commissioned naval vessel

USS *Constitution* (a.k.a. Old Ironsides). The three-masted frigate was launched and christened in Boston on October 21, 1797. She is still listed in active service.



TOP: The first stone frigate, HMS *Diamond Rock*, off the island of Martinique.

BOTTOM: A Caribbean octopus stands guard at the entrance to *Diamond Rock*'s underwater passage. Photos by Jeffrey Gallant | Diving Almanac



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UNDERWATER HABITATS

During the 1960s, more than 60 underwater habitats were constructed around the world. The research to gain a permanent human foothold on the seafloor paralleled the American and Soviet efforts to put men on the moon. By the 1970s, interest and funding for habitat research and development had mostly dissipated.

279. Deepest underwater habitat

185 m (610 ft) - *SEALAB III*, February, 1969, San Clemente Island, California (USA). The SEALAB program was terminated after a man was killed while making repairs to a leak during an early test dive. No new habitats were built by the U.S. Navy. In fact, the main purpose of *SEALAB III* was to develop technology that would permit divers to operate at extreme depths after exiting a submarine. Some of the experiments conducted during SEALAB remained classified till 2002 when it was revealed that in 1971, divers using SEALAB techniques successfully retrieved Soviet test missiles. The divers were deployed from a submarine carrying a pressure chamber welded to its deck, the USS *Halibut*, in the Sea of Okhotsk. They also tapped several underwater communications cables (Operation Ivy Bells) that ran from the Soviet submarine base at Petropavlovsk to Fleet headquarters near Vladivostok.

280. Deepest underwater habitat [Europe]

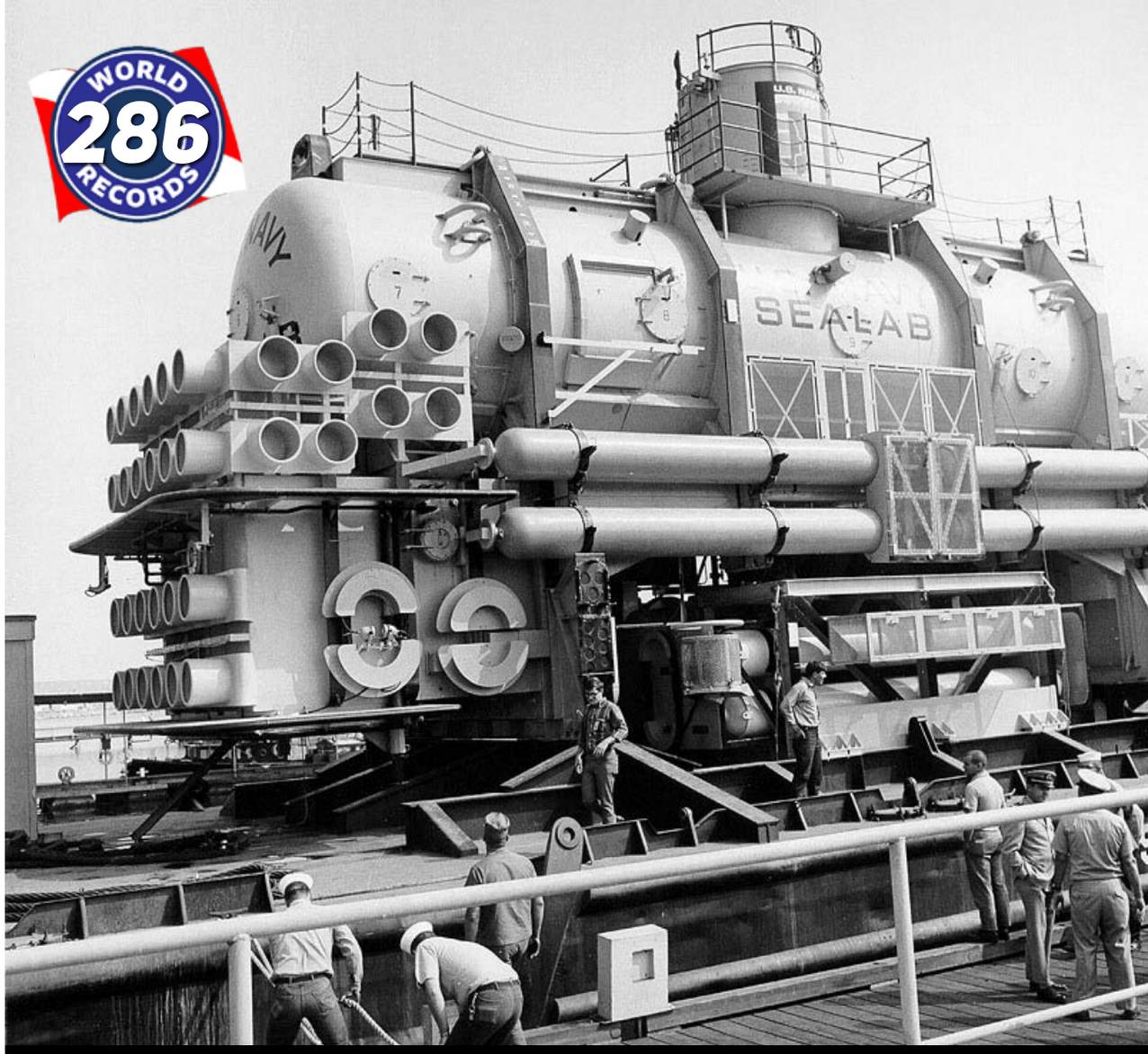
1965 - Conshelf III (France). A team of six Cousteau divers spent one month at 100 m (328 ft) in the Mediterranean Sea off the coast of southern France (Île du Levant). The spherical habitat weighed 140 tons and had a diameter of 6 m (20 ft). The divers breathed a gas mixture of 98% helium and 2% oxygen for the duration.

281. First all-female habitat mission

1970 - Tektite II - The mission led by Dr. Sylvia Earle spent two weeks at a depth of 15 m (50 ft) off the U.S. Vigin Islands.

282. First all-glass underwater restaurant

Hilton Maldives Resort & Spa - The Ithaa Undersea Restaurant is 4.9 m (16 ft) below sea level and offers 270° views of reef and marine life. It opened on April 15, 2005.



TOP RIGHT: *SEALAB II*. Photo: U.S. Navy

283. First aquanaut [Men]

1962 - Albert Falco and Claude Wesly (France) spent seven days inside the *Diogenes* habitat during Conshelf I.

284. First aquanaut [Women]

1963 - Simone Melchior Cousteau spent four days inside the *Starfish House* habitat during Conshelf II.

285. First docking between habitat and sub

1969 - Dry transfer of men from a Perry-built submarine to *Hydrolab*.

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286. **First habitat to habitat communication**
André Laban in Jacques-Yves Cousteau's Conshelf II (Depth of 100 m (328 ft) off Saint-Jean-Cap-Ferrat, France) spoke for several minutes with Scott Carpenter in *SEALAB II* at depth of 62 m (203 ft) off California in September, 1965.

287. **First habitat to head of state communication**
1972 - Dr Joseph MacInnis rang Canadian Prime Minister Pierre Elliott Trudeau from a depth of 11 m (35 ft) in the *Sub-Igloo* habitat. The communication between Resolute Bay in the Northwest Territories (Nunavut since 1999) and the Canadian capital Ottawa, Canada, was bridged by the Canadian Anik I satellite.

288. **First habitat to space communication**
1965 - NASA Astronaut Gordon Cooper, orbiting the Earth with Pete Conrad in *Gemini 5*, spoke by radiotelephone with astronaut and aquanaut Scott Carpenter inside *SEALAB II* at a depth of 62 m (205 ft).

289. **First manned underwater habitat**
1962 - Conshelf I (France) - Albert Falco and Claude Wesly became the world's first aquanauts by spending seven days in the *Diogenes* habitat at a depth of 10 m (33 ft). The experiment was supervised by Jacques Y. Cousteau in the Mediterranean Sea near Marseilles. Falco and Wesly spent an average 19 hours inside the habitat and 5 hours on scuba conducting various experiments. The breathing gas was air.

290. **First manned underwater habitat [Polar]**
1972 - *Sub-Igloo* (Canada) - Mission led by Dr. Joseph MacInnis Resolute Bay in the Northwest Territories (Nunavut since 1999), Canada. Depth: 11 m (35 ft). Location: 966 km (600 miles) north of the Arctic Circle, 200 km (125 miles) from the magnetic pole.

291. **First self-sustaining underwater habitat**
BioSUB (Albury, Australia) 2007 - Australian marine scientist and diver Lloyd Godson survived for 12 days in the world's first self-sufficient, self-sustaining underwater habitat. Lloyd had to generate oxygen, grow food, obtain fresh water and deal with his waste.



Hydrolab - Grand Bahama Island (1966). Photo: OAR/NURP

292. **First underwater colony**
1963 - Conshelf II (France). Seven divers lived underwater off Sha'ab Rumi (Sudan) in the Red Sea for one month under the supervision of

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Jacques-Yves Cousteau. The colony consisted of four manned habitats including a hangar for the *DS-2* Diving Saucer and a tool shed. Eight additional structures including shark cages completed the colony. The main habitat called *Starfish House* was located at 10 m (33 ft) while the smaller *Deep Cabin* was located at 26 m (85 ft).

293. First underwater hotel

Jules' Undersea Lodge, Key Largo Undersea Park - Launched as the research habitat *La Chalupa* off Puerto Rico in 1971, it was moved to Florida and transformed into an underwater hotel in 1986. The habitat can accommodate up to 6 guests at a depth of 6.4 m (21 ft).



La Chalupa research habitat. Photo: NURP

294. First underwater nightclub

Subsix, NIYAMA by Per AQUUM resort in the Maldives. The nightclub launched in 2012 is located six metres below the surface and 500 metres from shore under the resort's overwater restaurant.

295. Largest floating habitat

The *Antarctic Technology Offshore Lagoon Laboratory* (ATOLL). The ATOLL was a floating oceanographic laboratory used to observe animal behaviour underwater in the Baltic Sea and the Southern Ocean off Antarctica from 1982 to 1995. The ATOLL was the largest fiberglass structure in existence during its years in operation.

296. Largest underwater restaurant

Hurawalhi Island Resort, Lhaviyani Atoll (Maldives) - Dimensions: 22.5 m (74 ft) long, 410 tons. Depth: 10 m (33 ft). Capacity: 24 diners.

297. Longest continuous live broadcast from Aquarius

NOAA's National Marine Sanctuary Program streamed 200 hours of live reports over the Internet for nine days from *Aquarius* in September 2007.

298. Longest-running operational habitat

MarineLab Undersea Laboratory (Key Largo) is the longest running continuously operational habitat in the world, having been submerged since 1985. It was originally called the *MEDUSA* (Midshipmen Engineered and Designed Underwater Studies Apparatus). Depth: 8.23 m (27 ft).

299. Longest serving underwater habitat

L.S.-1 Underwater Laboratory (Romania). Launch date: 1967 (still in service). Location: Lake Bicaz, Potoci, Romania. Operated by: Salmo Ecological Diver Association (APES), A.I. Cuza University. Crew: 2. Depth: Variable (mobile platform). Main purpose: Study of fish behaviour in aquaculture.

300. Longest stay in an underwater habitat

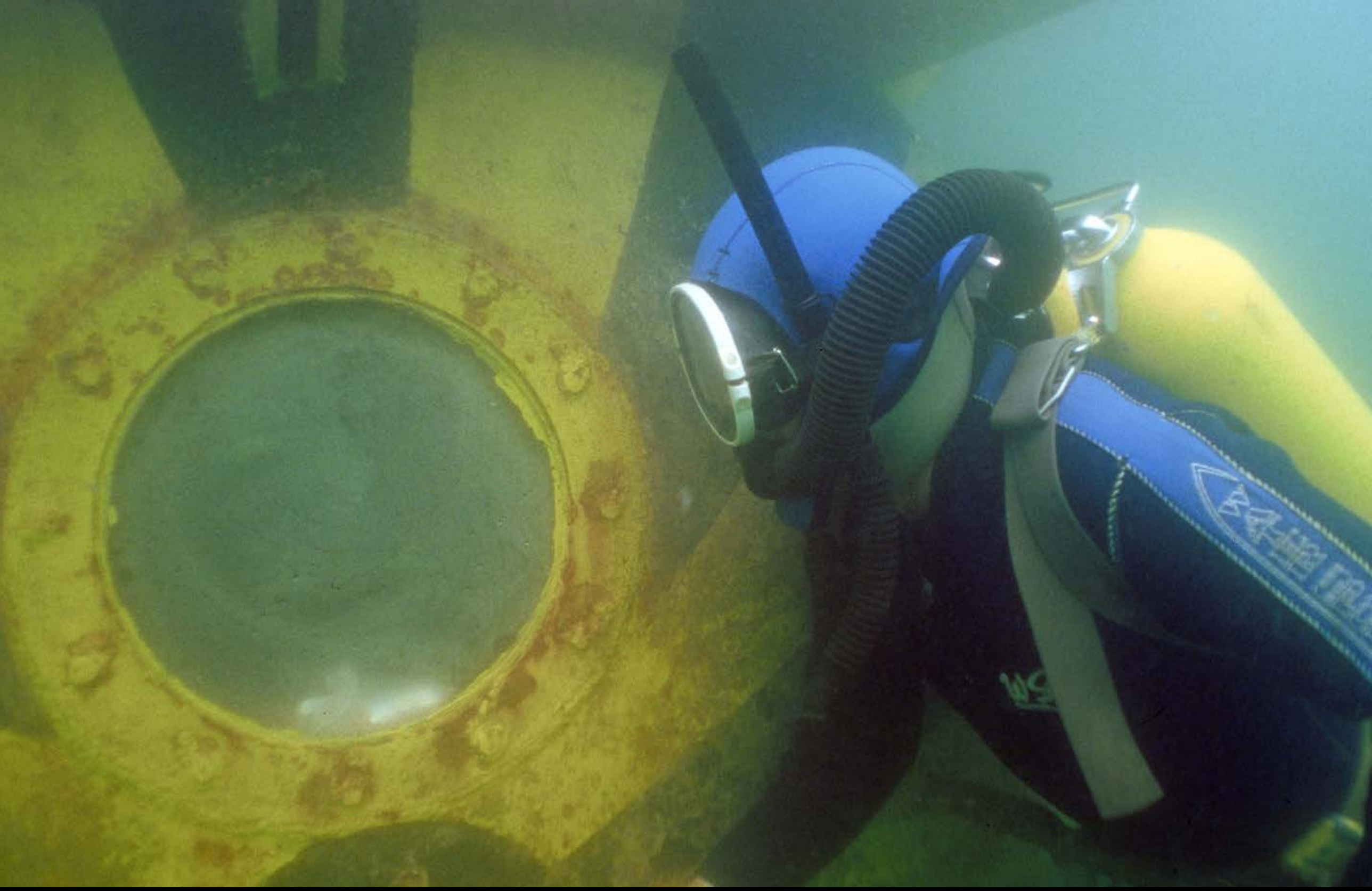
• 2014 - Bruce Cantrell (USA) and Jessica Fain (USA) spent 73 days in *Jules' Undersea Lodge*. During their stay, they hosted the first online college credit biology course taught from below the sea surface.

• 1992 - Richard Presley spent 69 days 19 minutes in *Jules' Undersea Lodge* (former *La Chalupa*) off Key Largo.

301. Longest stay in an underwater habitat [Africa]

1963 - Conshelf II / Précontinent II (France) - Seven divers lived in Conshelf II colony off Sha'ab Rumi (Sudan) in the Red Sea for one month under the supervision of Jacques-Yves Cousteau. The colony consisted of four manned habitats including a hangar for the *DS-2* Diving Saucer and a tool shed. Eight additional structures including shark cages completed the colony. The main habitat called *Starfish House* was located at 10 m (33 ft) while the smaller *Deep Cabin* (manned for one week) was located at 26 m (85 ft). Divers working from *Deep Cabin* dove to depths reaching 110 m (361 ft).

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RECORD

303. **Longest stay in an underwater habitat [Europe]**

36 days | 1994 | *L.S.-1* Underwater Laboratory in Lake Bicaz, Romania. Photo by Jeffrey Gallant | Diving Almanac

302. **Longest stay in an underwater habitat [Aquarium]**
Lloyd Godson (Australia) spent 14 days (336 hours) (March 30 to April 13, 2010) without surfacing in the LEGOLAND® ATLANTIS by SEA LIFE aquarium. He was connected to the outside world by telephone and internet, and a live webcam offered images from inside the habitat. The record event was part of LEGOLAND® Year of Records 2010.

303. **Longest stay in an underwater habitat [Europe]**
1994 - Lacustris Programme (Romania). Aquanauts Liviu Miron & Constantin Mihai set the European record of 36 consecutive days living inside *L.S.-1* Underwater Laboratory at variable depths.

304. **Longest stay in an underwater habitat [Science]**
1969 - *Tektite I* Man-in-the-Sea Project (USA). Four aquanaut-scientists of the U.S. Department of the Interior spent 60 consecutive days at 16 m (52 ft) in Lameshur Bay (U.S. Virgin Islands).

305. **Most electricity generated by human power u/w**
Lloyd Godson (Australia) spent 14 days (March 30 to April 13, 2010) in a house measuring just four square metres in the underwater world of LEGOLAND ATLANTIS by SEA LIFE (LEGOLAND Deutschland®) without surfacing once. Over the course of 336 hours he generated 2,502 watt-hours of electricity by riding a bicycle. This is the largest amount of electricity ever generated in this way underwater.

306. **Most habitat missions [Science]**
180 - Approximately 180 scientific missions were conducted aboard *Hydrolab* in the Bahamas (100) and in St. Croix, USVI (80) from 1977 to 1985. The missions are chronicled in the Hydrolab Journal. More than 120 missions have been conducted aboard *Aquarius* since 1993.

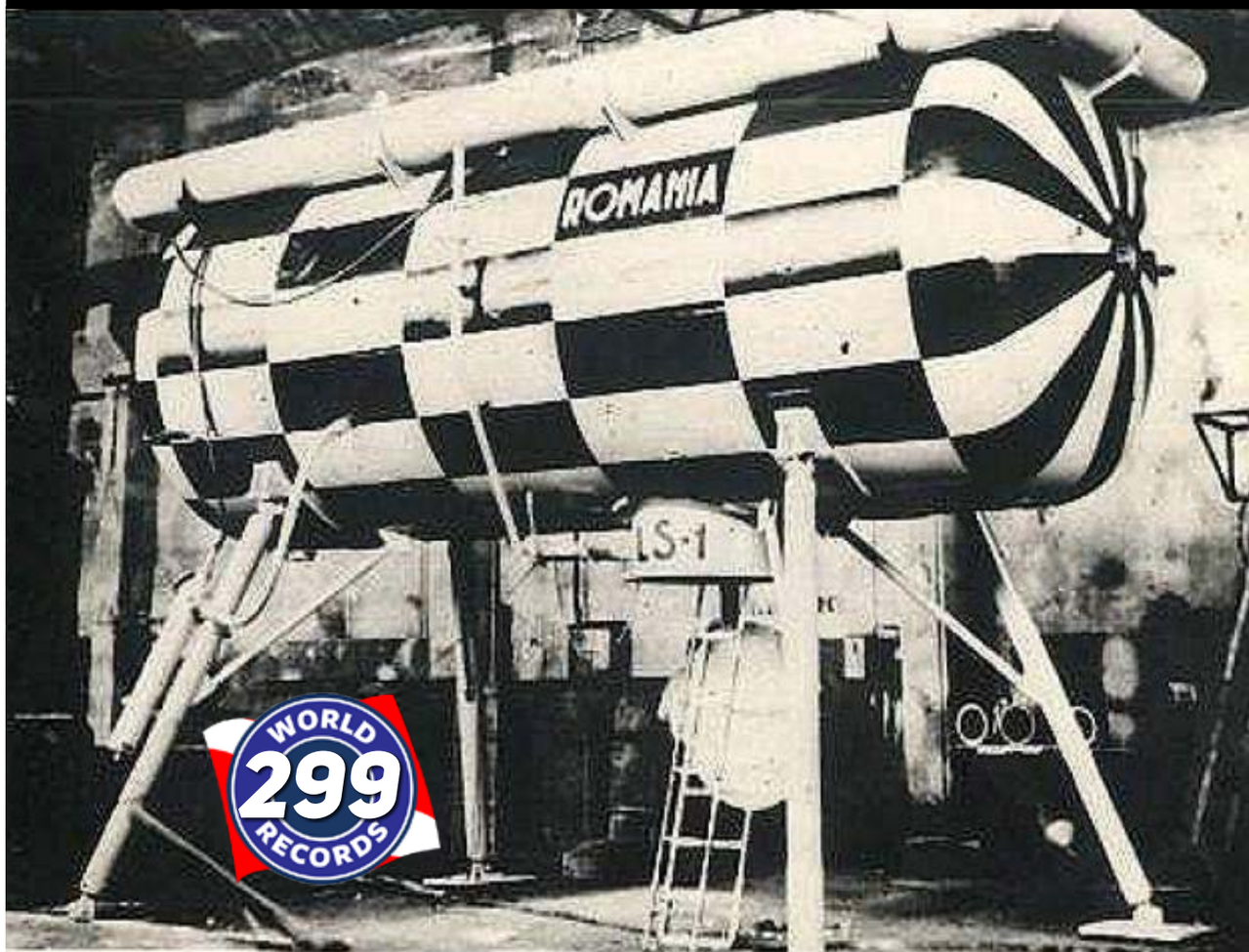
307. **Underwater habitats in service [2016]**
• *Aquarius* (USA)
Launch date: 1986; Operated by: National Undersea Research Center (NURC), National Oceanographic and Atmospheric Administration (NOAA), University of North Carolina at Wilmington (UNCW); Crew: 6; Maximum operating depth: 36.58 m (120 ft); Location: Florida; Average daily operating cost: $10,000 USD per day.

• *L.S.-1* Underwater Laboratory (Romania)
Launch date: 1968; Operated by: SALMO Ecological Divers Association - A.I. Cuza University, Iasi; Location: Lake Bicaz; Depth: Variable (Fixed on mobile platform)

• *MarineLab Undersea Laboratory* (USA)
Launch date: 1984; Operated by: Marine Resources Development Foundation; Location: Key Largo, Florida; Depth: 8.23 m (27 ft).

• *Jules' Undersea Lodge* (USA)
Launch date: 1971 (La Chalupa Habitat); Operated by: Marine Resources Development Foundation; Location: Key Largo Undersea Park; Depth: 6.4 m (21 ft).

L.S.-1 Underwater Laboratory, Romania (1968). Photo courtesy A.P.E.S. | SALMO



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RECORD

307. Underwater habitats in service [2016]

AQUARIUS (USA) - Launch date: 1986; Operated by: National Undersea Research Center (NURC), National Oceanographic and Atmospheric Administration (NOAA), University of North Carolina at Wilmington (UNCW); Crew: 6; Maximum operating depth: 36.58 m (120 ft); Location: Florida. Photo: NASA

ARCHAEOLOGY & WRECKS

308. Deepest ancient wreck ever found

3,048 m (10,000 ft) - Unknown shipwreck, Eastern Mediterranean. In the spring of 1999, Nauticos searched for and found a missing Israeli submarine (INS *Dakar*) that disappeared 31 years ago. Its sonar equipment detected several mysterious objects some 10,000 feet below the surface. A state-of-the-art remotely operated vehicle revealed shipwrecks of tremendous historical and archeological significance. Detailed video and sonar imagery of one of the sites was sent to the Institute of Nautical Archeology at Texas A&M University. The shape of several amphorae - large, oval two-handled vases used for storage - confirmed the vessel dates back to the end of the third century, BC. At 3,048 m (10,000 ft), this makes it the deepest ancient shipwreck ever found. Another striking find is a cauldron that has been collecting sediment for more than 2000 years. A core sample of this sediment could hold secrets about changes in the Mediterranean Sea over the last two millennia. The discovery of this shipwreck between the classical trading centers of Rhodes and Alexandria helps challenge the long-held theory that ancient sailors lacked the skills to sail long distances over the open sea, instead forcing them to closely follow the coastline during their voyages (Nauticos).

309. Deepest dinosaur finding

The uncovering of Norway's first dinosaur happened in the North Sea 7,400 ft (2,256 m) below the seabed. The fossil is just a crushed knucklebone in a drilling core - a long cylinder of rock drilled out from an exploration well at the Snorre Offshore Field. Norway's first dinosaur fossil is a Plateosaurus, a species up to 30 ft (9 m) long and weighing up to four tons. It lived in Europe and on Greenland 210 to 195 million years ago, at the end of the Triassic Period. Source: The Research Council of Norway

310. Deepest shipwreck ever found

18,904 ft (5762 m) - SS *Rio Grande*, South Atlantic. The *Rio Grande* was a German blockade runner sunk by US naval ships 55 miles (89 km) off Northeast Brazil in 1944. It was discovered in 1996 by UK-based Bluewater Recoveries Ltd.

311. Deepest shipwreck salvage [Europe]

2,660 m (8,727 ft) - *General Abbatucci*. The French packet ship was carrying several million French francs destined for the Vatican when it sank off the northern coast of Corsica after colliding with another vessel in 1869. It took marine archaeologist Pascal Kainic many years to research the shipwreck. Blue Water Recoveries, a British salvage company, then searched for 32 days the wreck. Salvage operations using an ROV began on May 19, 1996.

312. Deepest shipwreck salvage [North America]

2,591 m (8,500 ft) - SS *Central America*. The ship carrying an estimated one billion dollars in gold coins and bullion sank off the Carolina coast in 1857. The Columbus America Discovery Group began the search and salvage of the wreck in 1986.



Postcard of the HMHS *Britannic* (PD)

313. **First Internet shipwreck exploration [Live | Scuba]**
DiveLive (2000) - The distance learning program was broadcast from the wreck of the *Queen Anne's Revenge* by Marine Grafics and Nautilus Productions.

314. **First Internet shipwreck exploration [Live | Submersible]**
HMS *Hood* Expedition (2001) - Depth: 9,843 ft (3,000 m). Location: Denmark Strait (Between Greenland and Iceland). The wreck was discovered by undersea explorer David Mearns of UK-based Bluewater Recoveries Ltd using sonar and ROVs. The expedition was funded by Channel Four Television.

315. **First woman to dive the Antikythera Shipwreck**
Gemma Smith (UK) - September 2015. Depth: 45 to 70 m (150-230 ft).

316. **Largest diveable liner**
HMHS *Britannic* - 259.68 m x 28.65 m (852 ft x 94 ft). At 48,158 tons, *Britannic* was also the largest British Merchant Service war loss. On November 21, 1916, the *Britannic* cruised into a German mine field in the Zea Channel off Greece. It sank to a depth of 122 m (400 ft) after hitting a mine with a loss of 30 out of 1,062 crew and medical staff. The wreck was first explored by Jacques-Yves Cousteau in 1975.

317. **Largest diveable liner [Recreational depth]**
The Soviet cruise ship *Mikhail Lermontov* lies on its port side at depths ranging from 25 m (82 ft) to 30 m (100 ft) in the Marlborough Sounds New Zealand. The 155 m (578 ft) ship (20,027 tons) ran aground on February 16, 1986, near Port Gore. The Port bridge wing is only 12 m (40 ft) from the surface. The wreck is still fully intact albeit many of her fittings and contents have been salvaged by recreational divers.

318. **Largest diveable warship [Canada]**
HMS *Raleigh* - Displacement: 12,000 tons / Length: 184 m (605 ft). The Hawkins-class heavy cruiser ran aground at L'Anse Amour, Labrador, on August 8, 1922. The wreck now lies at depths between 6 m and 9 m (20-30 ft).



TOP: Diver explores wreck of HMS *Raleigh*. Photo by Jeffrey Gallant | Diving Almanac
BOTTOM: ROV images during the recovery from the "Black Swan" shipwreck. Photo courtesy Odyssey Marine Exploration

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319. Most northerly shipwreck [MOD]

HMS *Breadalbane* was a British barque crushed by ice south of Beechey Island (Nunavut, Canada) in August 1853. It was explored using the *WASP* manned-diving suit and an ROV during an expedition led by Canadian diver and explorer Dr. Joe MacInnis in 1983. The wreck discovered by Dr. MacInnis at a depth of 100 m (328 ft) in 1980 is now a National Historic Site of Canada.

320. Most valuable shipwreck recovery

In December 2015, the president of Colombia announced the discovery of the *San José*, a galleon sunk by a British warship off Cartagena in 1708. The cargo is believed to be worth over $1bn USD.

OTHER NOTABLE RECOVERIES

• In 2007, Odyssey Marine Exploration excavates a Colonial period shipwreck site codenamed “Black Swan” at an undisclosed location in the Atlantic Ocean. The artifacts recovered from the site include nearly 600,000 silver coins weighing more than 17 tons, hundreds of gold coins, worked gold and other artifacts. It is believed that this recovery constitutes the largest collection of coins ever excavated from a historical shipwreck site.

• HMS *Sussex* sank in a storm off the Straits of Gibraltar in 1694. When the 80-gun warship went down it took all but two of the 500-man crew and the equivalent of nine tons of gold coins, worth $4.54 billion USD (£2.6bn) in 2006. The wreck lies at a depth of almost half a mile in waters hotly contested by the UK and Spain. Salvage operations by Florida-based Odyssey Marine Exploration are currently underway.

• *Nuestra Señora de Atocha* - Key West, Florida. The *Atocha* was discovered by Mel Fisher (USA) in 1985 at a depth of 55 ft (17 m). *Atocha* was carrying 35 tons of silver (901 ingots and 255,000 coins) and 161 pieces of gold and 70 lb (32 kg) of emeralds, when it sank in a hurricane in 1622. A single jewel was valued at $2,000,000. Only five of the 265 people aboard the *Atocha* survived the sinking. The discovery of the shipwreck took 16 years of planning, costing 10 million dollars and the lives of three people. Fisher also had to go through 10 years of litigation with the United States Government and the State of Florida over ownership of the wreck and its contents. Many artifacts from *Atocha* are on display at the Mel Fisher Maritime Museum in Key West, Florida.

321. Oldest human artefact ever found underwater

Dr. Bruno Werz of the South African Institute of Maritime Archaeology discovered a stone hand axe in False Bay in 1995. The age of the axe is estimated at 300,000 to 1.4 million years old.

322. Oldest intact war wreck in North America

The *Land Tortoise* - was sunk in Lake George, New York, during the French and Indian War in October 1758. The floating battery known as a radeau was 52 ft (16 m) long. It was discovered in 1990 using side-scan sonar and has since been made a National Historic Landmark.

323. Oldest shipwreck ever found

14th or 13th century B.C. - Uluburun, Turkey. The wreck was discovered by a Turkish sponge diver Mehmet Cakir at a depth of 150 ft (46 m) in 1982. It is believed to be Levantine or Cypriot in origin. The shipwreck was thoroughly explored by George Bass of the Institute of Nautical Archaeology (Texas, USA) during 11 years. The cargo included gold, ivory, tin, copper, glass, ebony, ostrich eggshells, opercula, tortoise carapaces, and resin for burning incense.

324. Oldest shipwreck ever found [Great Lakes]

1780 - HMS *Ontario* is the oldest shipwreck and the only fully intact British warship ever found in the Great Lakes. It was discovered at a depth of 150 m (500 ft) by Jim Kennard and Dan Scoville using side-scan sonar and an ROV in 2008. The 22-gun ship went down with its entire crew of 130.

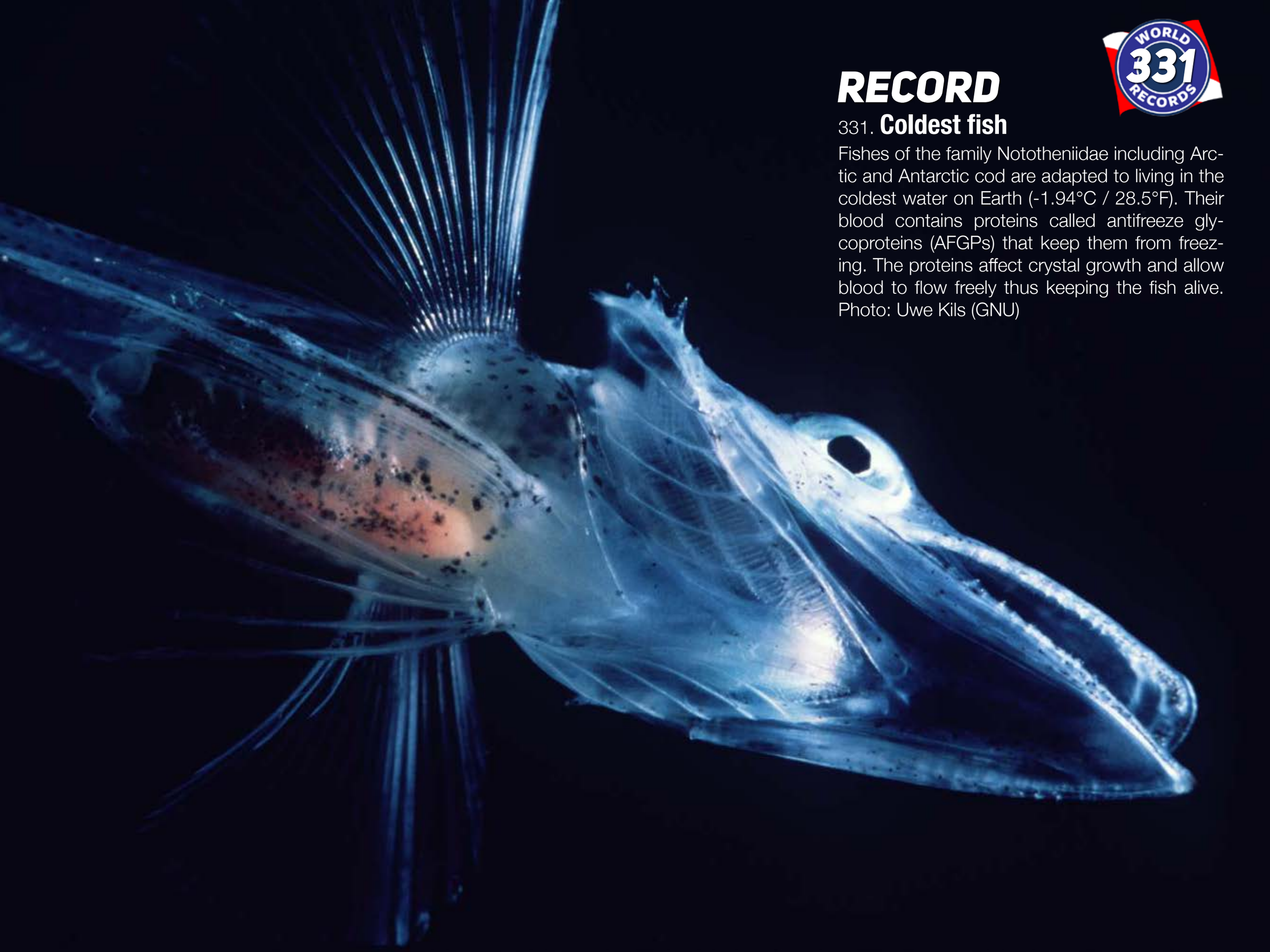
325. Oldest shipwreck ever found [United Kingdom]

A 3,000-year-old Bronze Age trading vessel was discovered by the South West Maritime Archaeological Group (SWMAG) off the coast of Devon (England) in February 2009. The boat carrying tin and copper ingots from the continent sank around 900 BC in a bay near Salcombe. The wreck lies at a depth of only 10 m (33 ft.).

326. Oldest wooden anchor

End of the 7th century BC - Discovered by Haifa University during excavations in the ancient harbour of the Turkish port city of Urla, the ancient site of Liman Tepe, in 2003.

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RECORD

331. Coldest fish

Fishes of the family Nototheniidae including Arctic and Antarctic cod are adapted to living in the coldest water on Earth (-1.94°C / 28.5°F). Their blood contains proteins called antifreeze glycoproteins (AFGPs) that keep them from freezing. The proteins affect crystal growth and allow blood to flow freely thus keeping the fish alive.
Photo: Uwe Kils (GNU)

BIOLOGY

327. Biggest litter [Blue shark]
The record litter for the blue shark (*Prionace glauca*) is 150 pups.

328. Biggest litter [Hammerhead shark]
55 pups - May 2006, Boca Grande Pass, Florida. The shark measured 14.5 ft (4.42 m) and weighed 1,280 lbs (580 kg).

329. Biggest litter [Whale shark]
300 pups - Taiwan, July 1995.

330. Biological immortality
Freshwater hydras can regenerate, which allows them to recover from injury and to reproduce asexually. Hydra cells continually divide and do not appear to undergo senescence (aging).

331. Coldest fish
Fishes of the family Nototheniidae including Arctic and Antarctic cod are adapted to living in the coldest water on Earth (-1.94°C / 28.5°F). Their blood contains proteins called antifreeze glycoproteins (AFGPs) that keep them from freezing. The proteins affect crystal growth and allow blood to flow freely thus keeping the fish alive. Chi-Hing “Christina” Cheng (University of Illinois) has spent two decades studying the Antarctic notothenioids, which make up more than 90 percent of the biomass of the Southern Ocean.

332. Deadliest jellyfish
• The box jellyfish (*Chironex fleckeri*) - a.k.a. sea wasp and Australian box jellyfish - of northern Australia contains one of the most potent animal venoms known to man. A sting from one of these creatures can induce death in minutes from cessation of breathing, abnormal heart rhythms and profound low blood pressure (shock) (Source: **DAN**).
• The Irukandji jellyfish (*Carukua barnesi*) is a smaller relative of the sea wasp measuring only 0.6 in. (1.5 cm) to 1 in. (2.5 cm) across with four 20-inch (50 cm) tentacles. Irukandji has killed at least 70 people in the past 50 years. *Chironex fleckeri* has killed at least 100 people in the past century.



Blue-ringed octopus. Photo by Jens Petersen (CC)

EDITOR’S NOTE
Claims that the Irukandji is more dangerous than the box jellyfish are unsubstantiated. All credible references, including the Tropical Australian Stinger Research Unit at James Cook University - which studies both species - claim that the box jellyfish (*Chironex fleckeri*) is not only the most venomous jellyfish, but possibly the most venomous animal in the world. The record article in the Diving Almanac & Book of Records

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only presents limited statistical data. The number of fatalities is thus not indicative of the number of incidents involving humans and either of these two species, or any of the yet-to-be-named related species discovered in the last decade. The Irukandji may simply be present in larger numbers. Also, the painful effects of coming into contact with *Chironex fleckeri* are instantaneous, so first aid is applied immediately, which improves the survival rate. Irukandji Syndrome sets in much more slowly and in many cases the sting goes unnoticed. Delayed treatment is thus another factor to consider when comparing the number of fatalities.

333. Deadliest octopus

Blue-ringed octopus (genus Hapalochlaena). This small cephalopod measuring 0.8 in. to 8 in. (2 cm to 20 cm) and weighing 0.35 oz to 3.5 oz (10 g to 100 g) bites when attacked or threatened and injects tetrodotoxin contained in its saliva and for which there is no cure. This causes paralysis, respiratory arrest, and possibly cardiac arrest. At least five species of blue-ringed octopus are found in tidepools and shallow water from Japan to Australia.

334. Deadliest shark

The Great white shark (*Carcharodon carcharias*) has killed more people than any other shark species. According to the International Shark Attack File (ISAF), the Great white was the aggressor in 394 attacks on humans between 1580 and 2004.

335. Deepest aquatic animals [Underground]

Scientists discovered 17 species of animals, including worms, rotifers and copepods, living in water trapped in rock up to 1.4 km (4,600 ft) underground in two South African gold mines in 2012 and 2013.

336. Deepest bird [Flying]

210 m (690 ft) - The thick-billed murre (*Uria lomvia*) can remain underwater for over 3 minutes. It uses its wings to swim underwater where it feeds on invertebrates and small fish. It also carries prey items over long distances (+100 km) to feed its offspring. It breeds in the Arctic regions of North America, Europe, and Asia. (a.k.a. Brünnich's Guillemot)

337. Deepest bird [Non-flying]

565 m (1,854 ft) - Emperor penguin (*Aptenodytes forsteri*), Ross Sea (Antarctica). Swimming speed is 6 to 9 km/h (3.7 to 5.6 mph). Scientists



ABOVE: Great white shark at Isla Guadalupe, Mexico. Photo by Terry Goss (CC)



Murre's off Svalbard. Photo by Michael Haferkamp (GNU)

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study penguin's physiology to learn how they can dive to depths of 500 m (1500 ft). Penguins spend much of their life in the ocean hunting for krill, fish and squid. Unlike humans, penguins don't suffer from many problems associated with diving, such as decompression sickness (the bends), shallow water black-out, and free-radical damage to tissues. Researcher's work understanding penguins may someday be applicable to anesthesiology and other medical applications (National Science Foundation).

338. Deepest comb jellyfish

The deepest comb jellyfish ever found was observed at a depth of 7,217 m (23,455 ft) in the Ryukyu Trench near Japan.

339. Deepest crinoid

8,210 m (26,936 ft) - Unidentified species, Kermadec Trench (New Zealand), 1951.

340. Deepest fish [Collected]

8,370 m (27,461 ft) - Cuskeel (*Abyssobrotula galatheae*). The specimen was collected in the Puerto Rican Trench.

341. Deepest fish [Observed]

During his record dive aboard the bathyscaphe *Trieste* on January 23, 1960, Jacques Piccard reported seeing a fish on the seafloor at the deepest known spot in the world, the Challenger Deep, 10,916 m (35,814 ft). "Lying on the bottom just beneath us was some type of flatfish, resembling a sole, about 30 cm (1 ft) long and 15 cm (6 in.) across. Even as I saw him, his two round eyes on top of his head… here apparently, was a true, bony teleost fish, not a primitive ray or elasmobranch... slowly, this flatfish swam away." From: *Seven Miles Down: The Story of the Bathyscaph Trieste* (1961) by J. Piccard and R. S. Dietz. pp. 172-174. Published by the Putnam, New York.

342. Deepest frog

Titicaca frog (*Telmatobius culeus*) as observed by Cousteau divers Albert Falco and Raymond Coll in Lake Titicaca (Bolivia) aboard two Sea



Emperor penguins in Antarctica. Photo by Ian Duffy (CC)

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Flea manned submersibles at a depth of 120 m (394 ft) in 1968. *Telmatobius coleus* is Latin for 'aquatic scrotum.'

343. **Deepest mammal**

• 2,992 m (9,816 ft) - Cuvier's beaked whale (*Ziphius cavirostris*), Southern California, 2011. Maximum duration: 137.5 minutes.

• 2,000 m (6,562 ft) - Bull sperm whale (*Physeter macrocephalus*), Dominica (Caribbean), 1991. Recorded by Woods Hole Oceanographic Institute Dive duration: 1 hour 13 min. The sperm whale is the largest toothed creature to ever inhabit the earth. It also has the largest brain 9 kg (20 lbs) and the thickest skin of any living creature 36 cm (14 in.). The sperm whale was named after the milky-white substance called spermaceti found in its head which was mistaken for sperm.



ABOVE: Mother sperm whale and calf off Mauritius. Photo by Gabriel Barathieu (CC)

344. **Deepest octopus**

Dumbo octopus (*Grimpoteuthis*) - 7,000 m (23,000 ft) grows to 20 cm.

345. **Deepest plant**

382 m (1,253 ft) - The world's deepest plant is a light-dependent crustose coralline alga discovered in 2014 by National Geographic's Pristine Seas Expedition in the Pitcairn Islands. The alga lives in an environment where 99.9% of sunlight is absorbed.

346. **Deepest polar bear (white bear)**

Up to 6 m (20 ft) - While underwater, the polar bear shuts its nostrils and flattens its ears but its eyes stay open to spot prey. Hunting dives are rare since the polar bear is typically a stealth predator and because its coat is highly buoyant. Videographer Mario Cyr has observed or been chased by more than 30 bears underwater in the Canadian Arctic. Claims of deeper dives by polar bears are unsubstantiated.

347. **Deepest sea cucumber**

10,190 m (33,431 ft) - Unidentified species, Philippine Trench (Philippines), 1951.



Dumbo octopus. Photo: NOAA

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348. **Deepest sea star**
7,630 m (25,033 ft) - *Eremicaster tenebrarius*

349. **Deepest sea urchin**
7,250 m (23,786 ft) - Unidentified species, Indonesia, 1951.

350. **Deepest shark**
3,675 m (12,060 ft) - Portuguese Shark (*Centroscymnus coelolepis*).

351. **Deepest sponge**
8,839 m (29,000 ft) - Sponge of the family Cladorhizidae discovered in 1994. It is also the only known carnivorous sponge.

352. **Deepest turtle**
1,200 m (3,937 ft) - Leatherback turtle (*Dermochelys coriacea*), Virgin Islands (West Indies), May 1987.

353. **Deepest white shark**
1,200 m (3,937 ft) - A 4.8 m (16 ft) white shark (*Carcharodon carcharias*) known as 'Shack' was recorded diving to the record depth during its migration from New Zealand to Australia in 2009. Sharks monitored with satellite tags as part of this project swam up to 150 km (93 miles) a day.

354. **Densest fur in the animal kingdom**
The sea otter (*Enhydra lutris*) - The largest member of the weasel family lives along the North Pacific coasts of Canada and the United States. Sea otters were hunted to near extinction in the 19th century for their pelts which they must constantly preen to keep them filled with tiny insulating air bubbles. Unlike other marine mammals such as seals and sea lions, the sea otter has no blubber. It therefore relies entirely on its exceptionally dense fur (up to 150,000 strands of hair per square cm / ~ 1,000,000 per square in.) to stay warm. A layer of waterproof guard hair keeps the layer of underfur dry.

355. **Fastest bird [Swimming]**
36 km/h (22 mph) - Gentoo Penguin (*Pygoscelis papua*).



Sea otter in California. Photo by Mike Baird (CC)

356. **Fastest fish [Burst speed]**
Sailfish (*Istiophorus platypterus*): 109 km/h (68 mph); Wahoo (*Acanthocybium solandri*): 96 km/h (60mph); Mako Shark (*Isurus oxyrinchus*): 96 km/h (60 mph); Bluefin Tuna (*Thunnus thynnus*): 80 km/h (50 mph); Marlin (*Tetrapturus sp.*): 80 km/h (50 mph); Blue Shark (*Prionace glauca*): 69 km/h (43 mph); Swordfish (*Xiphius gladius*): 64 km/h (40 mph); White shark (*Carcharodon carcharias*): 56 km/h (35 mph); Flying fish (gliding): 56 km/h (35 mph); Salmon (leaping): 16.5 km/h (10.2 mph).

357. **Fastest growing seaweed**
• Giant kelp (*Macrocystis pyrifera*) - 61 cm (24 in.) per day, northeastern Pacific. Although giant kelp plants are perennial, each frond survives for about 6-9 months.
• Bull kelp (*Nereocystis leutkeana*) - 15 cm (6 in.) per day, northeastern Pacific.
• *Caulerpa taxifolia*, a.k.a. Killer weed - 8 cm (3 in.) per day, Côte d'Azur (France). Due to its fast-growing nature, *C. taxifolia* is very popular with aquarists. Accidental discharges of *C. taxifolia* in the Mediterranean Sea have led to the infestation of tens of thousands of acres. *C. taxifolia* was recently found in coastal areas in southern California.

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Hawksbill turtle off **Anthony's Key Resort**. Photo by Jeffrey Gallant | Diving Almanac



Orcas off Unimak Island, Aleutian Islands, Alaska. Photo: NOAA

358. Fastest mammal

Orca (*Orcinus orca*) (a.k.a. killer whale) - 56 km/h (35 mph), northeastern Pacific, 1957. The Dall's porpoise (*Phocoenoides dalli*) has also been clocked at 56 km/h (35 mph). In comparison, the Common dolphin (*Delphinus delphis*) can reach 60 km/h (37 mph) while riding a ship's bow wave and 45 km/h (28 mph) in open water.

359. Fastest pinniped

40 km/h (25 mph) - California sea lion (*Zalophus californianus*)

360. Fastest sea star

1 m/min (3.3 ft/min) - Sunflower star (*Pycnopodia helianthoides*). The Sunflower star uses over 15,000 tube feet to reach such a high speed for an animal thought to be extremely slow.

361. Fastest snail

The Finger plough snail (*Bullia digitalis*) may be the fastest snail in the world. It extends its foot underwater and uses it like a sail to catch waves which carry it to shore. Once on the sandy beach, it uses its foot to crawl in the direction of its prey at over 2.5 cm/sec. (1 in./sec.), which it tears apart with its rasping and ripping teeth.

362. First biofluorescent reptile

Hawksbill turtle (*Eretmochelys imbricata*) - In September 2015, scientists reported observing biofluorescence in a reptile for the first time when the shell of a hawksbill turtle glowed neon green and red when exposed to blue light off the Solomon Islands. Further experimenting revealed that the loggerhead turtle also fluoresces green.

363. First cesarean section on a cownose ray

2015, Ripley's Aquarium of the Smokies (Gatlinburg, Tennessee) - Ripley's veterinarian Dr. Robert George, performed a cesarean section on a cownose ray at the aquarium in an effort to save the pup and the mother who was two months overdue. The procedure was successful.

364. First giant squid in captivity

On January 23, 2015, Japanese fishermen caught a giant squid which they released alive in a pool. The 6-m (19.7 ft) squid was recorded swimming with fish before it died after a few hours.

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365. **First live u/w sound transmission from Antarctica**
December 2005 - Perennial Acoustic Observatory (PALAOA, Hawaiian word for “whale”), located on the Ekström ice shelf, Antarctica. Four hydrophones, operated by the Alfred Wegener Institute for Polar and Marine Research (AWI), almost continuously record underwater sounds below the ice shelf, including Weddell seals, crabeater seals, Ross seals, leopard seals, orcas (killer whales), blue whales, fin whales and minke whales. The hydrophones are located at the end of boreholes in 100-m thick floating ice. A compressed data stream is transmitted in real time via wireless LAN from PALAOA to the German Neumayer Base at 15 km distance. A satellite link then transmits the stream to Germany.

366. **First shark teeth marks preserved in a coprolite**
In a paper published on March 10, 2010, paleontologists Stephen Godfrey and Joshua Smith report having discovered what appear to be marine crocodile coprolites* on a Maryland beach (Calvert Cliffs). Two of the coprolites dated to around 15 million years ago, bear characteristic tooth marks of a prehistoric shark, most likely a Miocene ancestor of the tiger shark (*Galeocerdo cuvier*). Because the tooth marks are shallow and found only on one side, the researchers believe that the feces were still in the body of the animal when they were bitten. This would indicate that the shark was possibly attacking a live or dead crocodile. These specimens are also the first known coprolites to preserve vertebrate tooth marks. *Coprolites are rarely found fossilized feces that provide information on animal behavior that cannot be determined from body fossils.

367. **First warm-blooded fish**
In a paper published on May 14, 2015, researchers from the National Oceanic and Atmospheric Administration (NOAA) describe how the opah (*Lampris guttatus*) circulates warm blood throughout its entire body.

368. **Heaviest clam**
Up to 340 kg (750 lbs) - Giant clam (*Tridacna gigas*).

369. **Heaviest crustacean**
Atlantic lobster (*Homarus americanus*) - A specimen weighing 20.14 kg (44 lbs 7 oz) was captured in Nova Scotia (Canada) in 1977. Based on observations made by fishers during the colonization of New England, lobsters of that period may have lived up to 150 years. The oldest age on record is 100 years old (20 kg / 43 lbs).

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Atlantic lobster in Newfoundland. Photo by Jeffrey Gallant | **GEERG**

370. Heaviest invertebrate [and mollusk]

Giant squid (*Architeuthis dux*). A tentacle of a specimen captured in 1878 measured 10.7 m (35 ft) long. It is estimated that the animal could have weighed as much as 1,814 kg (4,000 lbs).

371. Highest density of crabs

The red crab (*Gecarcoidea natalis*) numbers 120 million individuals on Christmas Island. Although a land crab that cannot swim, it releases its eggs into the ocean to hatch.

372. Highest leaping batoid

The manta ray (*Manta birostris*) may leap over 3 m (10 ft) out of the water. This behaviour often associated with smaller specimens may serve to dislodge parasites or remoras, or it could be associated with playing or hunting.

373. Highest leaping shark

Up to 9 m (30 ft) - Shortfin mako (*Isurus oxyrinchus*)



Manta Ray in Hawaii. Photo by Steve Dunleavy (CC)

374. Highest plunge dive by bird

40 m (130 ft) - The northern gannet (*Sula bassana*) plunge dives from heights up to 40 m (130 ft) to capture fish. It then uses its wings and feet to swim in pursuit of its prey to depths up to 22 m (72 ft) where it is swallowed before the gannet reaches the surface.

375. Largest amphibian [and salamander]

The Chinese giant salamander (*Andrias davidianus*) is the largest living amphibian in the world with a maximum length of 180 cm (6 ft). It lives in cool streams and lakes in China where it feeds on fish and crustaceans. It is critically endangered due to over-harvesting and the degradation of its environment from pollution and urban development.

376. Largest amphibian and salamander [Canada]

The mudpuppy (*Necturus maculosus*) is the largest amphibian and salamander found in Canada. It reaches a length of 30 cm (12 in.) although it has been reported up to 48.6 cm (19 in.). The mudpuppy spends its entire life underwater and breathes through external gills. It lives in creeks, rivers and lakes where it mostly feeds on insects, crayfish and fish. It is most often observed by divers during night dives in southern Québec, Ontario and Manitoba.



Blue whale and diver. Image by Chris Huh (WC)

377. Largest animal

Blue whale (*Balaenoptera musculus*). This marine mammal is believed to be the largest animal ever to have lived. A specimen captured near the South Shetland Islands in 1926 measured 33.27 m (110 ft) and weighed an estimated 190 tons. The blue whale has one of the slowest heartbeats of any mammal at 4 to 8 beats per minute.

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RECORD

377. **Largest animal**

Blue whale (*Balaenoptera musculus*). This marine mammal is believed to be the largest animal ever to have lived. A specimen captured near the South Shetland Islands in 1926 measured 33.27 m (110 ft) and weighed an estimated 190 tons. The blue whale has one of the slowest heartbeats of any mammal at 4 to 8 beats per minute. Photo: NOAA

378. Largest animal migration

Daily vertical migration of billions of ocean animals, including fish, squid, krill, jellyfish, and copepods that rise more than 500 m (1,640 ft) to feed on plankton near the surface at night.

379. Largest animal structure [Marine]

Over 2000 km (1,243 miles) - The Great Barrier Reef is made up of over 900 islands and 3,400 reefs. It is the largest structure on the planet - it is visible from space - built by living organisms. The Great Barrier Reef is home to more than 1,500 species of fish, 400 species of coral, 4,000 types of mollusks and more than 200 species of birdlife.



Retired aircraft carrier *Oriskany*. Photo by Matthew Hoelscher (CC)

380. Largest aquarium [Total volume] [NEW]

48,750,000 million litres (12.87 million gallons) - Chimelong Ocean Kingdom, Hengqin, Zhuhai, People's Republic of China.

381. Largest aquarium window panel [NEW]

The acrylic panel of the main tank of the Chimelong Ocean Kingdom measures 39.6 m (129 ft 11.05 in) by 8.3 m (27 ft 2.77 in).

382. Largest artificial reef

The USS *Oriskany* (271 m / 888 ft), a retired U.S. aircraft carrier was scuttled on May 17, 2006 off the coast of Pensacola, Florida. It took the *Oriskany* 37 minutes to disappear below the surface. *Oriskany* (CVA-34), an attack aircraft carrier, was launched on October 13, 1945, and was decommissioned on September 30, 1975. During the Vietnam conflict, a fire raged through five decks, claiming the lives of 44 men.



Chimelong Ocean Kingdom. Photo by Martin Lewison (CC)

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383. Largest audience for a shark necropsy

34,000 people - Public necropsy of a great white shark performed by the Auckland Museum and the Department of Conservation (New Zealand) on January 8, 2009. The event was organised to raise awareness of the threats facing the great white shark. It was watched by a crowd of close to 4000 people, both from grandstands and on screens inside the Museum. The necropsy was also watched live by over 30,000 people around the world on the Internet, and is now available to view from the Auckland Museum website. The procedure was carried out by Marine Scientist Clinton Duffy from the Department of Conservation's Marine conservation Section, and Auckland Museum's Marine Curator Dr. Tom Trnski. "This was a fantastic and rare opportunity to bring the public face-to-face with a Great White, both to promote the conservation this magnificent and vulnerable species, and to further our knowledge of Great White biology," says Dr. Trnksi. The operation examined and measured the shark's internal organs and stomach contents - which included the remains of fish, parasites, a fishhook and nylon wire. (Source: Auckland Museum)

384. Largest audience for a shark necropsy [Canada]

1,347 people watched as scientists from GEERG, the Mote Center for Shark Research, Fisheries and Oceans Canada, and the Maurice Lamontagne Institut, dissected a Greenland shark in front of a live audience. The necropsy in the City of Saguenay, Quebec, lasted more than two hours on June 2, 2006. The event was organized by the Musée du fjord.

385. Largest batoid [Length]

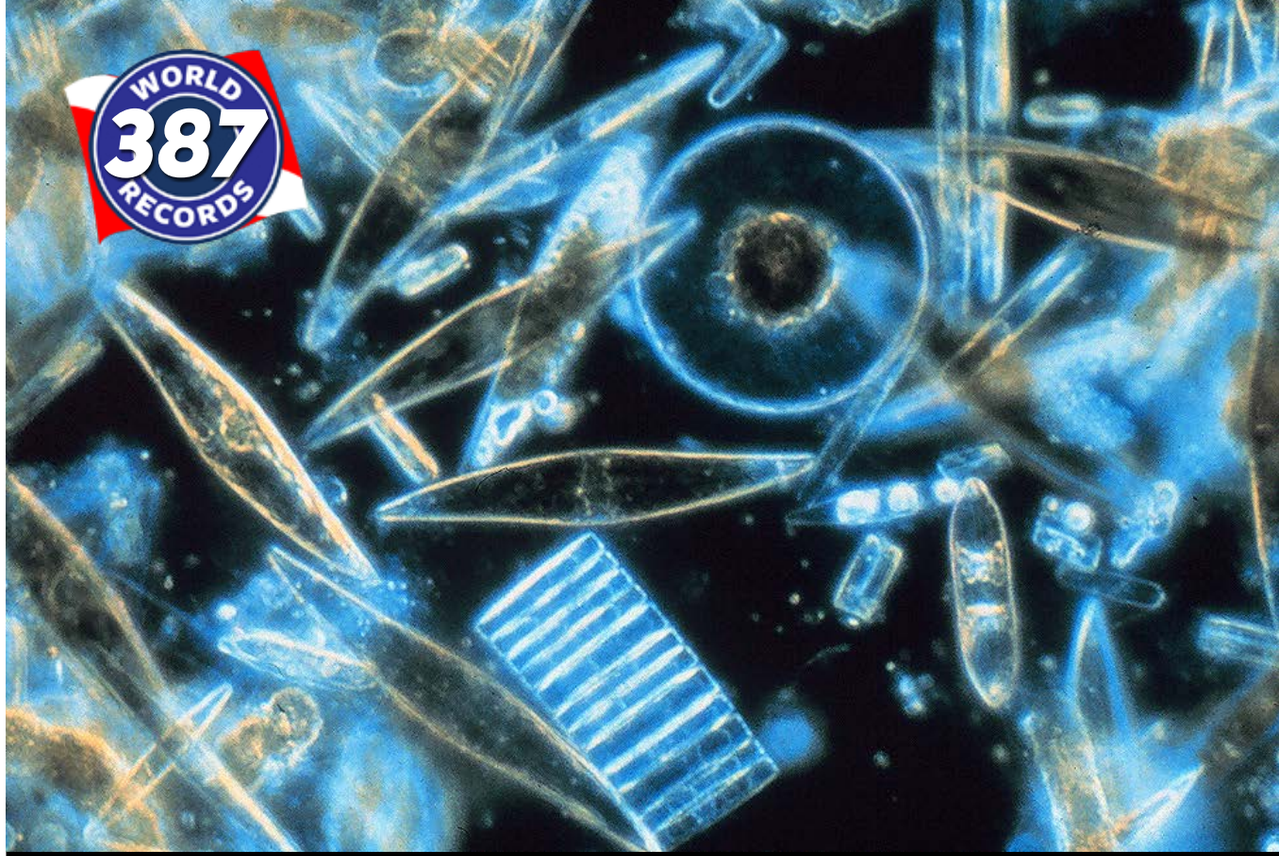
7.3 m (24 ft) - Green Sawfish (*Pristis zijsron*)

386. Largest batoid [Width]

6.7 m (22 ft) - Manta Ray (*Manta birostris*)

387. Largest biomass displacement

Daily movement of zooplankton such as copepods and krill that swim up from deep water towards the light to feed on phytoplankton. The phenomenon is known as phototaxis and it is the largest biomass displacement in the world.



ABOVE: Assorted marine diatoms - a key phytoplankton group - as seen through a microscope. These specimens were living between crystals of annual sea ice in McMurdo Sound, Antarctica. Photo: NOAA



Antarctic krill. Photo by Uwe Kils (CC)

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388. **Largest biomass [Single species]**
Antarctic krill (*Euphausia superba*). At 125 to 725 million tons, this is the world's largest known biomass for a single species.

389. **Largest brain coral**
The world's largest brain coral colony is found at a dive site named Kelleston Drain. The colony located south of Little Tobago, is 3 m (10ft) high and 5.3 m (16 ft) wide.



Brain coral colony off Roatan, Honduras
Photo by Jeffrey Gallant | Diving Almanac | **Anthony's Key Resort**

390. **Largest clam**
Giant clam (*Tridacna gigas*). A specimen at the American Museum of Natural History measures close to 140 cm (55 in.). Another was found off Okinawa, Japan (1956) measuring 115 cm (45.25 in.) and weighing 333 kg (734 lbs.).



Saltwater crocodile. Photo by Faye Pini (CC)

391. **Largest crinoid**
Helimoetra glacialis - 91.4 cm (36 in.) in diameter, Northeast Pacific. The largest known fossil crinoids had a stem measuring 40 m (130 ft).

392. **Largest crocodile**
The saltwater crocodile (*Crocodylus porosus*) is the largest crocodilian and the largest living reptile. Males can reach lengths of 7 m (23 ft). Females are smaller at over 3 m (10 ft). It is found in northern Australia and throughout South-east Asia. Salties, as they are known in Australia, are territorial and killed at least 3 divers in 2005. A 7 m (23 ft) specimen was documented in India's Bhitarkanika National Park in 2006.

393. **Largest crocodilian [Extinct]**
Machimosaurus rex grew to a length of 10 m (33 ft) and lived in a shallow sea of present-day Tunisia around 130 million years ago.

394. **Largest crustacean**
Giant spider crab or Takashigani (*Macrocheira kaempferi*) - 36 cm (14 in.) body width. Claw span: 2.7 m (9 ft). One specimen weighed 18.6 kg (41 lbs) and had a span of 3.7 m (12 ft) between its outstretched claws.

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Giant spider crab. Image by Hans Hillewaert (GNU)



Ocean sunfish caught in 1910 with an estimated weight of 3,500 lbs (1600 kg).
Photo: Library of Congress

395. **Largest eye**

Scientists have extrapolated that the colossal squid (*Mesonychoteuthis hamiltoni*) has the largest eyeballs of any living creature today at up to 27 cm (11 in.) in diameter. It is reported that the eyes of a squid washed up in Newfoundland, Canada, measured 40 cm (15.75 in.).

396. **Largest fish [Bony]**

Ocean sunfish (*Mola mola*) - Length: 3 m (10 ft). Height: 4.3 m (14 ft). Weight: Up to 2,268 kg (5,000 lbs).

397. **Largest fish [Carnivorous]**

White shark (*Carcharodon carcharias*) - Up to 7 m (23 ft), 2,300 kg (5,070 lbs). Average 4.3 m (14 ft), 520 -770 kg (1,150 - 1,700 lbs). The white shark inhabits subtropical waters around the world. It has up to 3,000 teeth. Its colouration enables it to attack its prey without being seen.

Numerous claims around the world have been made about the largest white shark (a.k.a. great white) ever captured. All have been contested due to lack of evidence such as photos or proper measuring. Some sizes were also estimated based on recovered body parts. A 7 m (23 ft) specimen was reported captured off Malta (Mediterranean Sea) in 1987 but the measurement was later discredited. The length of a shark taken off Kangaroo Island (South Australia) in 1987 was estimated to be at least 7 m (23 ft) based on the size of its head and fins; all that was brought into port by the fisherman. A long-standing record holder was a 6.4 m (21 ft) white shark captured off Cuba in 1945. However, careful analysis of its photo would appear to reduce that estimate by at least 0.9 m (3 ft).

A 7 m (23 ft) white shark was reported caught in a net in Seven Star Lake, Hualien County, Taiwan, on May 14, 1997. Its weight was estimated at 2,500 kg (5,512 lbs).

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One of the largest specimens measured with any reliability was a 5.26 m (17.3 ft) white shark captured off Prince Edward Island (Canada) in August 1983. Such large specimens are reported to be relatively common off the Farallon Islands (California).

398. Largest fish [Deep sea]

Greenland shark (*Somniosus microcephalus*) - Can grow to a length of 7 m (23 ft) and has been observed at a depth of 2,200 m (7,218 ft). The Greenland shark uses the entire water column and can also be observed swimming at the surface. It is also known as the sleeper shark due to its lethargic behaviour.

399. Largest fish [Freshwater]

• Chinese paddlefish (*Psephurus gladius*) - Up to 7 m (23 ft), 500 kg (1,100 lbs). The critically endangered paddlefish is found in the Yangtze River Basin.
• The giant stingray (*Himantura chaophraya*) found in northern Cambodia is believed by some to reach 5 m (16.4 ft) and 500 kg (1,100 lbs).
• The Mekong giant catfish (*Pangasianodon gigas*) - Up to 3 m (10 ft) and 300 kg (660 lbs).

400. Largest fish [Marine]

Whale shark (*Rhincodon typus*) - Up to 12.65 m (41.5 ft) in length. A specimen captured in Thailand in 1919 was reported to measure 18 m (59 ft). Warm water shark found in the Atlantic, Pacific, and Indian Oceans. Despite its impressive size, the whale shark feeds only on plankton and is not a threat to people.

401. Largest fish egg

Whale shark (*Rhincodon typus*) - An egg recovered by fishermen in the Gulf of Mexico in 1953 measured 30.5 x 14 x 8.9 cm (12 x 5.5 x 3.5 in). The live embryo was 35 cm (13.8 in) long.



Zeb Hogan with a giant stingray in the Mekong River near Kratie, Cambodia in April 2008.

402. Largest frog [Aquatic]

The Titicaca frog (*Telmatobius coleus*) is the largest, saggiest-skinned aquatic frog in the world. In 1968, a Cousteau team reported frogs up to 50 cm (20 in) long in Lake Titicaca (Bolivia), with specimens commonly weighing 1 kg (2.2 lbs). *Telmatobius coleus* is Latin for 'aquatic scrotum.'

403. Largest gastropod

Australian trumpet conch, a.k.a. Baler conch (*Syrinx aruanus*) - In 1979, a specimen weighing 18 kg (40 lbs) was found off the coast of Australia. Its shell had a length of 77 cm (30.4 in.) and a girth of 101 cm (39.75 in.). Shell lengths up to 1 m (3.3 ft) have been reported.

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RECORD

400. **Largest fish [Marine]**

Whale shark (*Rhincodon typus*) - Up to 12.65 m (41.5 ft) in length. A specimen captured in Thailand in 1919 was reported to measure 18 m (59 ft). Warm water shark found in the Atlantic, Pacific, and Indian Oceans. Despite its impressive size, the whale shark feeds only on plankton and is not a threat to people. Photo by Ken Jones | **www.islandcruiseadventure.com**

404. Largest isopod

Giant isopod (*Bathynomus giganteus*) - The largest known deepsea isopod whose average length is between 19 and 36 cm (7.5 - 14.2 in), reaches up to 76 cm (30 in) and 1.7 kg (3.7 lbs).

405. Largest jellyfish

Lion's mane (*Cyanea capillata*) - The largest specimens have a bell diameter of 2.3 m (7.5 ft) with over 800 tentacles, some reaching lengths of 37 m (120 ft). Its lifespan is only one year. It inhabits the cold waters of the Arctic, northern Atlantic and northern Pacific where much smaller specimens are often encountered by divers. Its stings are painful and can cause severe burns. Divers wearing full-body dive suits can still be stung around the lips.

406. Largest member of the sea bass family

The Atlantic goliath grouper or itajara (*Epinephelus itajara*) is the largest member of the sea bass family, which includes all of the groupers. It can reach a maximum length of 2.5 m (8.2 ft) and weigh up to 400 kg (880 lb). The oldest recorded age for a goliath grouper is 37 years but it is estimated that it may live up to 50 years. Large specimens have occasionally shown aggressive behaviour towards humans. Divers should thus exercise caution in the presence of a large goliath grouper (formerly known as the jewfish).

407. Largest mouth in the animal kingdom

The mouth of a bowhead whale (*Balaena mysticetus*) makes up a third of its body length. The mouth of a fully-grown 18 m (60 ft) bowhead whale is about 6 m (20 ft) wide.

408. Largest octopus

Giant octopus (*Enteroctopus dofleini*) weighs up to 272 kg (600 lbs) and can reach lengths up to 7.3 m (24 ft) from opposing arm tips. Average weight is 23 - 40 kg (50 - 88 lbs). *Enteroctopus dofleini* only lives 3-5 years. Mature female *E. dofleini* have 2240 suckers (280 per arm). The giant octopus is frequently observed in shallow water by divers in British-Columbia (Canada) and the Pacific coast of Russia. When left unmolested, it poses no risk. There are approximately 300 different octopus species.



Despite its potent arsenal, the lion's mane jellyfish (seen here in Lunenburg Bay, Nova Scotia) only feeds on plankton and fish. And although its body is made up of 95% water, it is the main food item of the Leatherback turtle. Photo by Jeffrey Gallant | **GEERG**

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The giant octopus is the largest octopus in the world. This specimen was observed off the Pacific coast of Russia. Photo by **Valeri Darkin**



Male Northern Elephant Seals fighting for territory and mates, Piedras Blancas, San Simeon, California. Photo by Mike Baird (CC)

409. **Largest pearl [NEW]**
30 cm wide (1 ft), 67 cm long (2.2 ft) and 34 kg (75 lbs) - The natural pearl from a giant clam which was found by a Palawan fisherman in the Philippines in 2006 is reportedly worth 130 million.

410. **Largest pinniped**
A Southern elephant seal (*Mirounga leonine*) measuring 6.5 m (21.3 ft) was caught on South Georgia Island (South Atlantic) in 1913. The largest Northern elephant seal (*Mirounga angustirostris*) was recorded off Santa Barbara (California), measuring 5.5 m (18 ft) and weighing 2,722 kg (6,000 lbs).

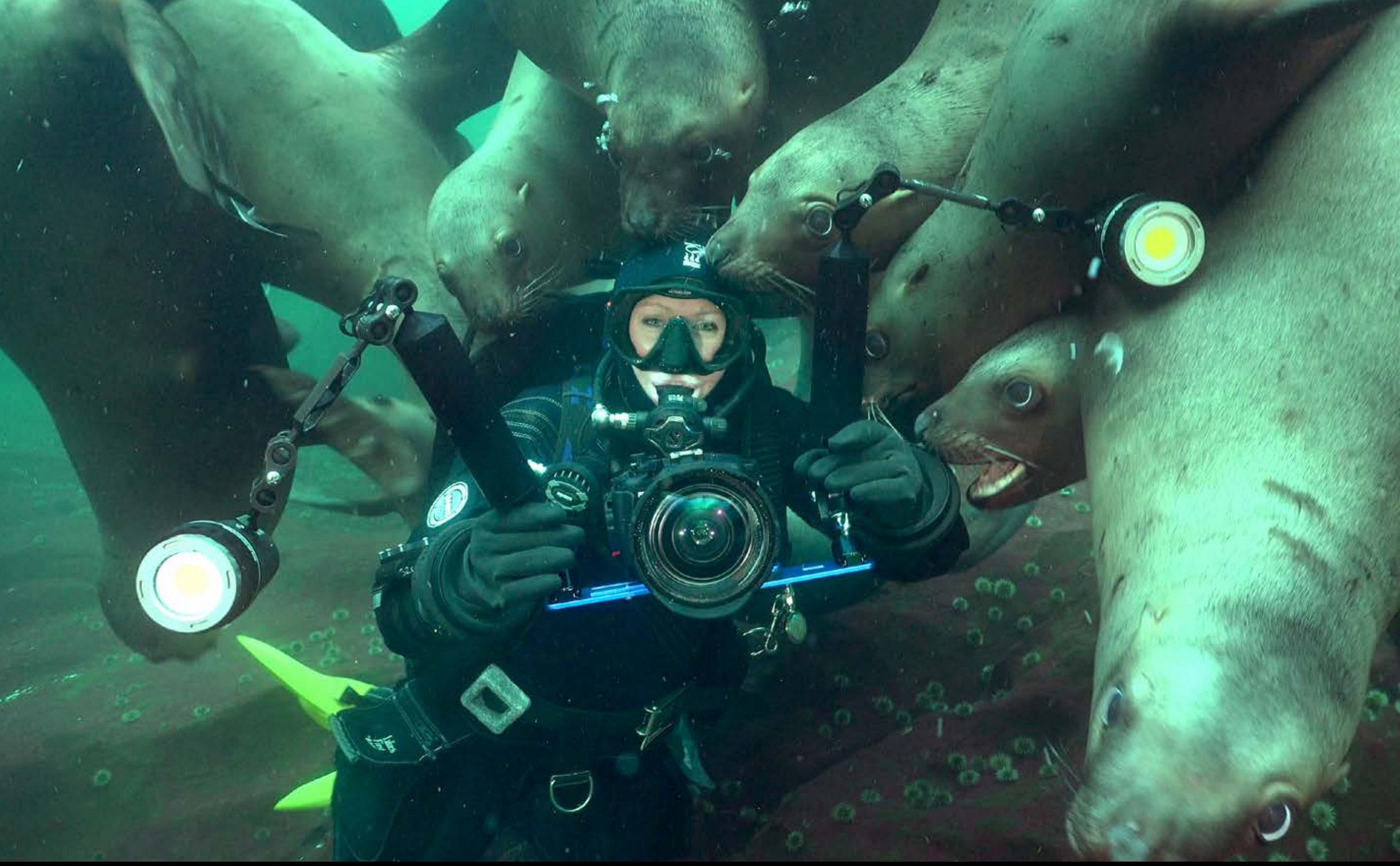
411. **Largest sea cucumber**
Genus *Stichopus* - Up to 102 cm (40 in) in length, 20 cm (8 in) in diametre. *Synapta maculata* is much longer at 3 m (9.8 ft), but it is also much narrower wih a diametre of 5 cm (2 in).

412. **Largest sea star**
Evasterias echinosomo - 96 cm (37.79 in) in diameter. Weight: 5 kg (11 lbs), North Pacific. The arms of the more slender *Midgardia xandaros* reach more than 70 cm (27 in).



Leatherback turtle in Papua New Guinea. Photo by Matt Oldfield (CC)

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413. **Largest sea lion**

Becky Kagan-Schott is surrounded by stellar sea lions at Hornby Island, British Columbia (Canada).
Photo by Trisha Stovel | **www.seaproof.tv** | **www.pacificprodive.com**

413. Largest sea lion

Stellar sea lion (*Eumetopias jubatus*) - Up to 3.1 m (10 ft) length. Weight up to 800 kg (1,764 lbs) or more. Pups weigh up to 23 kg (51 lbs) at birth. The deepest recorded dive is 424 m (1,391 ft).

414. Largest sea turtle

Leatherback turtle (*Dermochelys coriacea*) - In September 1988, a leatherback turtle estimated to be 100 years old was found washed ashore in Gwynedd (UK). Length: 2.74 m (9 ft). Weight: 914 kg (2,015 lbs). Despite its amazing size, the leatherback feeds almost exclusively on jellyfish. A single leatherback may be able to eat the equivalent of its own bodyweight in jellyfish and other plankton every 3 days.

415. Largest sea urchin

Sperosoma giganteum - Test diameter of 38 cm (15 in) (Test: Urchin body without spines). *Diadema setosum* has a smaller test (10 cm / 4 in) but its spines are the longest measuring more than 30 cm (12 in).

LARGEST SHARK / WHITE (SEE LARGEST FISH - CARNIVOROUS).

416. Largest shark [Hammerhead]

4.42 m (14.5 ft) / 581 kg (1,280 lbs) - May 2006, Boca Grande Pass, Florida. The shark was pregnant with 55 pups, the largest number ever observed by scientists.

417. Largest shark [Shortfin mako]

3.4 m (11.17 ft) / 600 kg (1,324 lbs) - July 1999, Stellwagen Bank, Massachussetts.

418. Largest shark tooth

Carcharodon megalodon - The teeth of this extinct shark of the Miocene and Pliocene eras could measure over 18 cm (7 in) long. The largest ever shark species measuring up to 16 m (53 ft) in length ruled the oceans 16 to 1.5 million years ago. Megalodon teeth are commonly found by divers in the Cooper River in South Carolina.

419. Largest skeleton suspended without external support

The skeleton of a 25 m (82 ft) blue whale (*Balaenoptera musculus*) that washed up on the coast of Prince Edward Island in 1987 became the centerpiece of the University of British Columbia's (UBC) Beaty Biodiversity Museum in May 2010. The skeleton, the largest in Canada, is

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Recreated jaws of *Carcharodon megalodon* during an exhibit at the Montreal Science Centre. Photo by Jeffrey Gallant | **GEERG**

also the largest skeleton in the world to be suspended without external support. It is displayed in a glass atrium in the species' signature lunge feeding pose. The skeleton was cleaned and degreased in Victoria after it was recovered from the sand near Tignish, Prince-Edward-Island, where it had been buried for over 20 years. Installation of the blue whale skeleton in the UBC Beaty Biodiversity Museum atrium took approximately one month.

420. Largest sponge

• Subfamily *Lanuginellinae* - A sponge filmed by a NOAA ROV off Hawaii was over 3.5 m (11.5 ft) long and 2.0 m (6.6 ft) wide. The colony was found at a depth of 2,134 m (7,000 ft) in 2015. **[WATCH VIDEO]**

• Barrel sponge (*Xestospongia muta*) - Specimens in the Caribbean measure up to 2.4 m (8 ft) tall and 2.4 m (8 ft) across.

421. Largest squid

Colossal Squid (*Mesonychoteuthis hamiltoni*), a.k.a. Antarctic cranch squid - The Colossal Squid may reach a length of 18 m (60 ft). However, a study published in January 2015 (PeerJ) suggests a shorter length of 12 m (40 ft) for even the largest of squids. Its eyes are over 30.5 cm (12 in.) in diameter. It swims to depths of 2,000 m (6,562 ft) in the Southern Ocean from Antarctica to South America, South Africa, and New Zealand. It feeds on fish and other squid. Large specimens of colossal squid are preyed upon by the sperm whale and sleeper sharks. In February 2007, a colossal squid weighing an estimated 450 kg (990 lbs), and measuring about 10 m (33 ft) long, was caught by a New Zealand fishing vessel, the *San Aspiring*, owned by Sanford Ltd, which was fishing for Antarctic toothfish in the Ross Sea. Only a handful of colossal squid have been sighted. It is believed that colossal squid hunt large fish, such as toothfish, and other squid. Giant squid are represented by at least eight species of the genus Architeuthis. They are believed to reach a length of 10 m (33 ft) for males and 13 m (43 ft) for females, including the two tentacles. A 17 m (56 ft) giant squid was reported washed ashore in Glover's Harbour, Newfoundland, on November 2, 1878. There are unverified reports of specimens measuring up to 20 m (66 ft).



Barrel sponge off the island of Utila.
Photo by Jeffrey Gallant | Diving Almanac | **Deep Blue Utila**

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In September 2005, Japanese researchers produced the first images ever recorded of a live giant squid in its natural habitat. In December 2006, the same team filmed and captured a small specimen on a baited hook at a depth of 650 m (2,150 ft). The small squid then attracted a giant squid which was hooked as it tried to feed on the smaller squid. The relatively small female 3.5 m (11 ft 6 in) long and weighing 50 kg (110 lb is now preserved by the National Science Museum in Tokyo.

422. Largest squid observed on a dive

• Giant squid - Akinobu Kimura (Japan) dove alongside and filmed a 3.7-m (12.1 ft) giant squid near the surface in Toyama Bay (Japan) for several minutes before it swam into deeper water on December 24, 2015.
• Humboldt Squid (*Dosidicus gigas*), a.k.a. Jumbo Squid or Jumbo Flying Squid - Grow to 2 m (6 ft) and weigh 45 kg (100 lbs) during their one-year lifespan. Although they are normally found at depths between 200 m and 700 m (650 ft and 2300 ft) along the Eastern Pacific, they jet to the surface at night to feed. They are aggressive predators hunting in groups of over 1,000 individuals and there are several reports of attacks on divers and fishermen. Divers have suffered lacerations from the squids' hooked tentacles while others have been dragged to deeper water before being let go. Mexican fishermen call them Diablos rojos (red devils). Nonetheless, some researchers consider the Humboldt squid harmless to humans. William Gilly, a biology professor at Stanford University in Palo Alto, has repeatedly snorkeled at the surface at night in the presence of large squid and he has never been attacked.

423. Largest tooth to body size [Shark]

The largetooth cookiecutter shark (*Isistius plutodus*) has the largest tooth to body size of all sharks. Its maximum body length is only 56 cm (22 in.) but its bottom teeth are twice as long as those of the great white shark based on body size.

424. Largest whale stranding

The carcasses of 337 sei whales were found in a remote fjord in Chile's southern Patagonia region on June 23, 2015.





TOP: Colossal squid alongside the *San Aspiring*.
BOTTOM: Skipper John Bennett and colossal squid.
Photos courtesy New Zealand Ministry of Fisheries

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425. **Least fertile fish**
Mpulungu (*Tropheus moorii*), Lake Tanganyika, Africa - Up to 7 eggs.

426. **Longest beaver dam**
850 m (2,790 ft), Wood Buffalo National Park (Alberta, Canada) - The world's longest known beaver dam was discovered with Google Earth on October 2, 2007. Satellite photos from the 1990s and 70's would indicate that the dam was constructed by successive generations of beavers starting sometime after 1975. Because this part of Wood Buffalo National Park is flat, the beavers had to build a long dam to contain the wetland waters. A typical beaver dam stretches less than 100 m (328 ft).

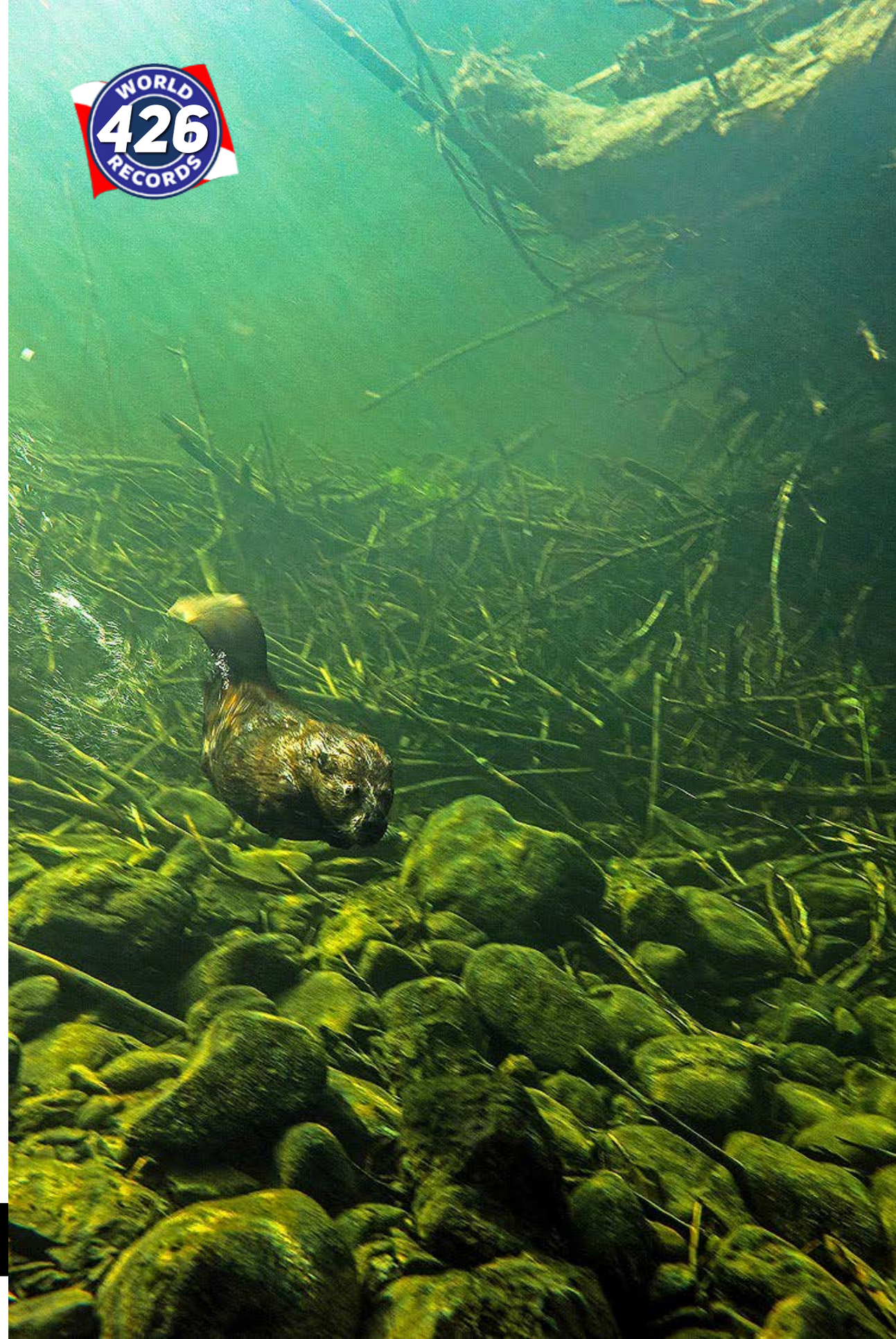
427. **Longest brooding period**
53 months - Deep-sea octopus (*Graneledone boreopacifica*) - Researchers at the Monterey Bay Aquarium Research Institute (MBARI) **recorded** a deep-sea octopus brooding its eggs for 4.5 years (2007-2011) at a depth of 1,400 m (4,600 ft) in Monterey Canyon, the longest brooding period known in the animal kingdom.

428. **Longest bony fish**
Oarfish (*Regalecus glesne*) - Up to 15.2 m (50 ft). Often mistaken for a sea serpent.

429. **Longest dive by a bird**
18 min - Emperor penguin (*Aptenodytes forsteri*), Cape Crozier, Antarctica, 1969.

430. **Longest dive by a mammal**
80 min - The Elephant seal (*Mirounga angustirostris*) can hold its breath longer than any other mammal when it dives as deep as 1,530 m (5,015 ft) in the search for food.

431. **Longest flight by a fish [Distance]**
Flying fish of the family Exocoetidae can glide over distances of 100 m (325 ft) at a speed of 56 km/h (35 mph).



North American beaver defending its hut against an intruder on the Gaspé Peninsula
Photo by Jeffrey Gallant | **GEERG**

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432. Longest flight by a fish [Time]

A Japanese TV crew filmed a flying fish that was completely airborne for 45 seconds in 2008. The fish was gliding parallel to the film crew's ship which was traveling at a speed of 32 km/h (20 mph).

433. Longest gestation period

The frilled Shark (*Chlamydoselache anguineus*) may have the longest gestation period of any animal, including terrestrial animals, at approximately 3.5 years. The basking shark (*Cetorhinus maximus*) is also believed to have a gestation period surpassing three years. It is also the second largest fish in the world measuring up to 15.2 m (50 ft). The basking shark is found in all temperate oceans.

434. Longest invertebrate

• Siphonophore (*Praya dubia*) may be the world's longest animal growing to a length of 50 m (160 ft) or more. This drifting colonial cnidarian delivers a powerful sting and is bioluminescent.

• Cnidarian (stinging creatures) include anemones, corals, hydroids, and jellyfish. The phylum *Cnidaria* contains approximately 9,000 living species worldwide. All cnidarians have tentacles with stinging cells.

435. Longest leap by a salmon

The Atlantic salmon (*Salmo salar*) can leap up to 3.67 m (12 ft) to traverse an obstacle such as a waterfall.

436. Longest migration [Mammal]

The Pacific gray whale (*Eschrichtius robustus*) makes the longest migration of any land or marine mammal traveling up to 22,530 km (14,000 miles), round-trip, from the Arctic Ocean to Baja California, Mexico.





TOP: Basking shark
Photo by Chris Gotschalk, Marine Science Institute, University of California Santa Barbara
BOTTOM: Atlantic salmon resting between rapids on the Gaspé Peninsula in Québec
Photo by Jeffrey Gallant | **GEERG**

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437. Longest migration [Sea bird]

Sooty shearwaters (*Puffinus griseus*) travel about 64,000 km (40,000 miles) a year between their nesting areas in New Zealand to Japan, Alaska, British Columbia, the U.S. west coast, Mexico and even South America. They travel in search of food for which they will dive underwater to depths reaching 55 m (180 ft).

438. Longest migration [Sea turtle]

A leatherback turtle (*Dermochelys coriacea*) crossed the Pacific from Indonesia to Oregon. The battery in its transmitter failed in early 2005 when the turtle was near Hawaii and had 20,558 km (12,774 miles). The turtle was likely on its way back to Indonesia which would add another 8,050 km (5,000 miles) to its record journey. The tag had been fitted at Jamursba-Medi in July 2003.

439. Longest migration [Shark]

Blue shark (*Prionace glauca*) - 5,980 km (3,470 miles), Atlantic Ocean.

440. Longest period of captivity [White shark]

198 days - The Monterey Bay Aquarium received a juvenile white shark in August 2004 after it was accidentally caught in a commercial fishing net. It was held in an ocean pen for 25 days where the shark remained healthy and ate frequently. It was transported to Monterey and placed in the Outer Bay exhibit where it remained for 198 days in the million-gallon Outer Bay exhibit. During that period, the shark grew from a length of 1.52 m (5 ft) and a weight of 28.12 kg (62 lbs) to a length at release of 1.95 m (6.4 ft) and a weight of 73.5 kg (162 lbs).

A young white shark at the Monterey Bay Aquarium. Photo handout Monterey Bay Aquarium





White (polar) bear resting at l'Aquarium du Québec. Photo by Jeffrey Gallant | **GEERG**

441. Longest polar bear (white bear) dive

3 min. 10 sec. - In 2014, scientists timed a male bear as it hunted underwater for seals around a large ice sheet in the Svalbard Archipelago.

442. Longest polar bear (white bear) swim

687 km (426 miles) - In 2008, scientists tracked a female polar bear by radio-collar GPS as it swam without interruption for nine days in the Beaufort Sea. The bear lost 22% of its body mass as well as its yearling cub that did not survive the swim.

443. Longest seaweed

Giant kelp (*Macrocystis pyrifera*) - Species of brown algae measuring up to 60 m (200 ft) of the Pacific coast of North America. The giant kelp life cycle is believed to last 12 to 14 months.



Walrus - Photo: Captain Budd Christman | NOAA Corps

444. **Longest time without food**
10 years - Olms are salamanders that live in flooded underground caves throughout Italy and the Balkan Peninsula. They live in perpetual darkness so they are blind and their skin has no pigment (colour).

445. **Longest walrus teeth**
The longest walrus tusk ever recorded measured 94 cm (37 in.) and had a diameter of 27 cm (11 in.). Its weight was over 5 kg (11 lbs).

446. **Loudest animal in the ocean**
The sperm whale (*Physeter macrocephalus*) produces focalized clicks that reach levels up to 230 decibels underwater. The whistle of the blue whale (*Balaenoptera musculus*) can reach up to 188 decibels and can be heard for hundreds of miles underwater.

447. **Most abundant shark**
Spiny dogfish (*Squalus acanthias*) - This small shark species (the larger female measures slightly more than 1.2 m / 4 ft) congregates in large schools of hundreds or thousands. Total population unknown. The Atlantic spiny dogfish was declared overfished in the U.S. in 1998 and its numbers have been depleted by over 95% in Europe where it is sold in fish and chip shops under the names rock salmon and huss. The spiny dogfish is also harvested for its liver oil, vitamins, leather, sand paper, dog food, fertilizer and biological dissection and research. The spiny dogfish is also known as grayfish, picked dogfish, spiked dogfish, spring dogfish, and spur dog.

448. **Most bioluminescent water**
Mosquito Bay, Vieques Island (Puerto Rico) - The bay has a concentration of up to 720,000 single-celled bioluminescent dinoflagellates (*Pyrodimium bahamense*) per gallon of water. When they are agitated at night, they produce enough light to enable a person to read a book.

449. **Most dangerous seal**
The leopard seal (*Hydrurga leptonyx*) - Leopard seals live around the pack ice in Antarctica where they hunt penguins and other seals. They are the only seal species that feeds on warm-blooded prey. Attacks on humans are rare, but humans rarely interact with the animal. Females can measure up to 3.4 m (11 ft) and weigh up to 591 kg (1,300 lbs). There have been at least three recorded attacks on humans. A leopard seal attacked a member of Sir Ernest Shackleton's Imperial Trans-Antarctic Expedition (1914-1917) and another attacked a British explorer in 1985. In both cases, the seal was either shot or had to be beaten off of its intended prey. Kirsty Brown, a scientist with the British Antarctic Survey, was killed by a leopard seal while snorkeling near Rothera Research Station on July 22, 2003.



Spiny dogfish shark swims by a diver near Campbell River, British Columbia.
Video still by Jeffrey Gallant | **GEERG**

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RECORD

453. **Most jellyfish [Lake]**

Palau's Jellyfish Lake (Palauan: Ongeim'l Tketau: Fifth Lake) contains an estimated 10 million golden mastigia jellyfish (*Mastigia sp.*), a landlocked species which evolved from the spotted jellyfish after it was denied access to the sea.

Photo by Ken Jones | **www.islandcruiseadventure.com**

450. Most fertile marine fish

Ocean sunfish (*Mola mola*) - A 1.4-m (4.5-ft) female was found with an estimated 300 million eggs in her single ovary.

451. Most giant squid washed ashore

Up to 65 specimens of giant squid have been found on the shores of Newfoundland, Canada; one-fifth of all the giant squid ever found in the world. Several more have been caught or observed alive by fishermen and sailors, and there are verified records of giant squid attacking people in small boats close to shore. No diver has ever reported seeing a live giant squid underwater.

452. Most hearts

• Hagfish (Myxini spp.) have four hearts composed of a three-chambered systematic heart assisted by three accessory pumps.
• Cephalopods (octopus and squid) have three hearts composed of a systematic heart and two gill hearts sending blood to and from the gills.

453. Most jellyfish [Lake]

Palau's Jellyfish Lake (Palauan: Ongeim'l Tketau: Fifth Lake) contains an estimated 10 million golden mastigia jellyfish (*Mastigia sp.*), a landlocked species which evolved from the spotted jellyfish after it was denied access to the sea. Over the course of millennia, the jellyfish has lost its sting due to the lack of predators. Swimmers and divers may thus safely go through the masses without concern.

454. Most poisonous fish

The stonefish (*Synanceia verrucosa*), a.k.a. the reef stonefish or dornorn, is a shallow benthic fish with venomous spines that lies in wait camouflaged as a rock. It feeds on small fish and crustaceans. Its dorsal area is lined with spines that release a venomous toxin. Its venom can cause severe pain, shock, paralysis, and tissue death which can be fatal to humans. *Synanceia verrucosa* is found in the Pacific and Indian oceans. It may also inhabit the Mediterranean Sea (unconfirmed).

455. Most poisonous reptile [Aquatic]

All sea snakes (± 50 species) are venomous. The venom of some species is up to 10 times more potent than that of a rattlesnake. They are mostly found in the Indian and western Pacific Ocean. They do not normally seek contact with divers and do not bite unless molested. The two species considered most poisonous are Belcher's sea snake (*Hydrophis belcheri*) and the beaked sea snake (*Enhydrin schistosa*).



Stonefish off the Island of Roatan, Honduras.
Photo by Jeffrey Gallant | Diving Almanac | **Anthony's Key Resort**

456. Most poisonous sea urchin

Flower sea urchin (*Toxopneustes pileolus*). The flower sea urchin can deliver a severe sting even if its spines do not puncture its victim.

457. Most poisonous snail

Cone snails (Conidae) may reach lengths up to 23 cm (9 in). They prey on invertebrates and small fish by injecting a neurotoxin with a venomous harpoon. The venom of some 20 species is potent enough to kill a person. Warm water neoprene dive suits offer little protection to divers as they are easily penetrated by the harpoon. The geographic cone (*Conus geographus*) is also known as the "cigarette snail," as it is believed that a person injected with its neurotoxin has the time to smoke only one cigarette before dying. There is no known antivenom.

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458. Most powerful bite

In 2012, researchers at the University of South Florida estimated that the bull shark (*Carcharhinus leucas*) has a biting force of 3 metric tons (6,000 lbs). The white shark (*Carcharodon carcharias*) has a biting force of 1.8 metric tons (two tons), more than three times that of the bite of an African lion and more than 20 times that of a human. In 2008, researchers at the University of New South Wales in Sydney estimated that the extinct megalodon shark (*Carcharodon megalodon*) had a biting force up to five times that of the bull sha. That would make it even more powerful that the *Tyrannosaurus rex*, a dinosaur which had a maximum biting force of 3.1 metric tons (3.42 tons).



White shark off Gansbaai, South Africa. Photo by Andrew Bellamy (CC)

459. Most sensitive tooth

The narwhal's (*Monodon monoceros*) single spiral tusk is really an overgrown tooth. It has recently been discovered that there are up to 10 million nerves extending from the surface of the tusk to its central core and ultimately to the Narwhal's brain. This enables it to detect minute changes in its environment such as pressure, temperature, salinity, and particle layering.

460. Most teeth (Fish)

Sharks may have over 3,000 at one time. The teeth are aligned in many rows and are not all used at once. When one tooth is lost, it is replaced by another. A shark may shed as many as 50,000 teeth in its lifetime thus making shark teeth one of the most commonly found fossils in the world.



Sand tiger shark. Photo by Jlencion (CC)

461. Most teeth [Mammal]

The spinner dolphin (*Stenella longirostris*) has as many as 260 conical teeth spread evenly along it two jaws (formerly known as long-snouted spinner dolphin).

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462. Most valuable fish

• The bluefin tuna (*Thynnus thynnus*) can measure up to 3 m (10 ft) in length weigh more than 635 kg (1,400 lbs). On January 5, 2013, a single 222-kg (489 lbs) bluefin was sold for 155.4 million yen, or 1.76 million dollars, at Tokyo's Tsukiji fish market. It breaks down to about $8,000 per kilogram, or about $3,600 a pound. The value of the bluefin tuna is so high that U.N. experts believe that Italian and Russian organized crime are now involved in the fish trade.



Bluefin tuna at the Tsukiji fish market in Tokyo. Photo by slettvet (CC)

• Beluga sturgeon (*Huso huso*) - In 1924, a single sturgeon weighing 1,227 kg (2,706 lbs) from the Tikhaya Sosna River produced 245 kg (540 lbs) of caviar. In 2005, the price for beluga caviar could fetch $3,000 per kilogram, putting the value of the 1924 fish at over $700,000.

463. Oldest crustacean [Form]

The Horseshoe crab (*Limulus polyphemus*) has existed in its current form for the past 135 million years.

464. Oldest fossil [Egg-carrying] [MOD]

A 508-million-year-old egg-bearing fossil of *Waptia fieldensis*, a shrimp-like crustacean, was found in Yoho National Park (British Columbia).



Horseshoe crabs mating in the Delaware Bay, New Jersey. Photo (CC)

465. Oldest fossil [NEW]

3.7 billion years - Small humps of bacteria known as stromatolites were found in rocks at Isua, Greenland, in 2011.

466. Oldest lobster

Based on observations made by fishers during the colonization of New England, lobsters of that period may have lived up to 150 years. The oldest age on record is 100 years old (20 kg / 43 lbs).

467. Oldest marine invertebrate

A species of black coral from the genus *Leiopathes* collected off Hawaii between 2001 and 2007 had an estimated age of 4,265 years old using radiocarbon dating methods. This would also make it the oldest known animal on Earth.

468. Oldest marine invertebrate [Non-colonial]

An ocean quahog (*Arctica islandica*) collected off the coast of Iceland in 2006 was born in 1499. The 507-year old bivalve mollusc was accidentally frozen by the researchers that found it, as they were unaware of the animal's record age.

469. Oldest marine vertebrate [NEW]

• Greenland shark (Somniosus microcephalus): According to a study published in 2016 (Nielsen et al.), the Greenland shark has a life expectancy of at least 272 years, and sexual maturity may not be reached

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FEATURE RECORD #469

The oldest vertebrate is a shark!

The Finnish proverb stating that “Age does not give you good sense, it only makes you go slowly,” may hold some truth with the Greenland shark.

By Jeffrey Gallant, M.Sc. | Greenland Shark and Elasmobranch Education and Research Group | GEERG.ca

With an average cruising speed of 0.3 m/sec (1 ft), the Greenland shark is indeed a very relaxed swimmer. Its unusually slow metabolic rate may be attributed in part to its frigid living environment, which may also help explain the latest discovery on this mysterious northerly predator.

Until recently, aging a Greenland shark was impossible since it does not have vertebral growth bands—counted like rings on a tree—as do many other shark species. Therefore, determining its age would require the capture and measurement of a newborn pup followed by periodical recapture and measuring until the end of its natural life. Doing so under controlled conditions—no Greenland shark has ever been kept in captivity for more than a month—would not reflect the natural growth rate of a shark living in an oceanic environment, and a study in the wild over a long period, say 200 years, would require several generations of researchers as well as an extreme range and ongoing tracking system, the likes of which does not yet exist.

Even today, very limited information exists on recaptured sharks, and the only science paper with reliable data is over fifty years old (Hansen, 1963). In that study, a shark that was captured and tagged off Greenland in 1936 was recaptured in 1952. In 16 years, the shark’s length had only increased by eight centimetres (3 in), or 0.5 cm (0.2 in) per year. Two less reliable reports in the same paper obtained from sharks recaptured after two and 14 years suggest growth rates of no more than 1.1 cm (0.43 in) per year, or approximately 0.3 m (1 ft) per 30 years. Assuming the rate is constant—no growth spurts—a fully-grown Greenland shark could theoretically be well over 500 years old.

The Greenland shark’s suspected yet hypothetical longevity was apparently confirmed in a study released in August 2016 by a science team led by Julius Nielsen at the University of Copenhagen. According to the article published in the journal Science, Nielsen et al. used radiocarbon dating to establish the age of 28 Greenland sharks. The age ranges of sharks born before atomic bomb testing in the 1950s—which nearly doubled the amount of carbon-14 in the atmosphere—revealed a **life expectancy of at least 272 years**, that sexual maturity may not be reached before 156 ± 22 years, and that the largest shark (5.2 m / 17 ft) was 392 ± 120 years old. Considering that the largest known length for the Greenland shark is over seven metres (23 ft), there may be living specimens that were swimming in the St. Lawrence when Jacques Cartier laid claim to New France in 1534. Although scientific debate on this discovery may linger for years—radiocarbon dating of deep-dwelling marine organisms is not very precise—, it is safe to say that even with the most conservative margin of error, the Greenland shark is currently and by far the longest-living vertebrate on the planet. For more information, go to **www.geerg.ca**



Greenland shark in the St. Lawrence Estuary.
Photo by Jeffrey Gallant | GEERG

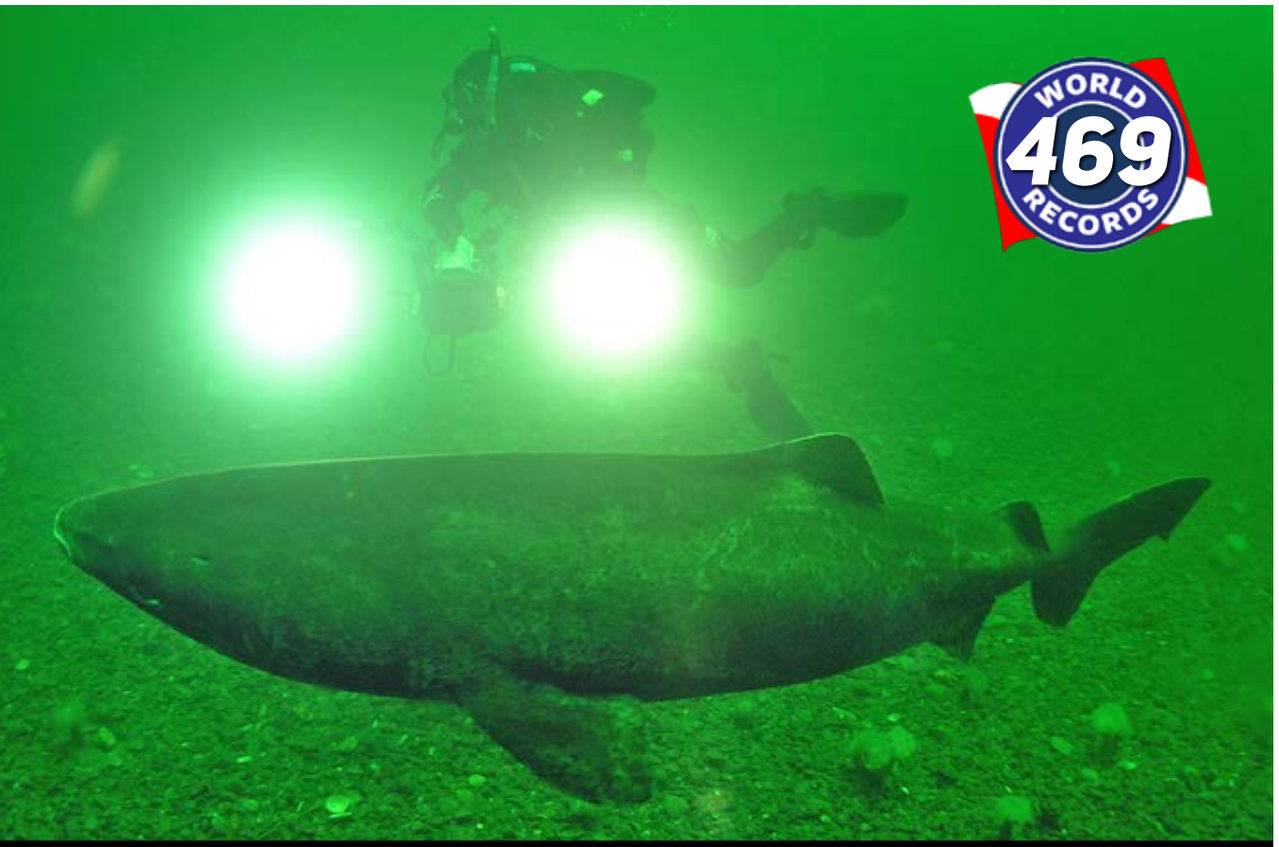
before 156 ± 22 years. A fully grown Greenland shark could potentially live over 500 years (See feature record on the preceding page).

• The bowhead whale (Balaena mysticetus) is believed to live more than 200 years, possibly due to genetic differences that result in very low incidence of disease. The longevity of some individuals was determined by old harpoon points embedded in their blubber. The bowhead whale is also the largest animal ever genetically sequenced.

• Leatherback turtle (*Dermochelys coriacea*) - In September 1988, a leatherback was found washed ashore in Gwynedd (UK). It was estimated to be 100 years old.

470. Oldest pinniped
Ringed Seal (*Phoca hispida*) - 43 years, Baffin Island (Canada); Grey Seal (*Halichoerus grypus*) - 42 years. A specimen was kept in captivity in Sweden from 1901 to 1942.

471. Oldest sea turtle fossil
A skeleton of the now-extinct *Desmatochelys padillai* sea turtle discovered in Colombia in 2007 was found to be 120 million years old. The turtle thus lived during the Cretaceous period when dinosaurs still roamed the Earth.



Greenland shark in the St. Lawrence Estuary. Photo by Jeffrey Gallant | **GEERG**

472. Oldest sponge
A giant barrel sponge (*Xestospongia muta*) discovered off Curaçao in 1997 was estimated to be 2,300 years old.

473. Rarest cetacean
Longman's beaked whale (*Indopacetus pacificus*) - Less than 10 specimens ever reported.

474. Rarest marine mammal
Yangtze River dolphin, aka Baiji (*Lipotes vexillifer*) - Science team declared it extinct in August 2007.

475. Rarest seal
Mediterranean monk seal (*Monachus monachus*) - Numbers less than 400 specimens. Its closest relative, the Caribbean monk seal, is already extinct.

476. Sharpest sense of smell
Some shark species can detect less than one drop of blood in a million drops of water.

477. Shortest lifespan [Vertebrate]
59 days - The coral reef pygmy goby (*Eviota sigillata*) is the shortest lived vertebrate of the animal kingdom.

478. Shortest weaning period for a mammal
4 days - Hooded seal (*Cystophora cristata*) found in the central and western North Atlantic.

479. Simplest vision
Larvae of marine zooplankton can see with just two cells as they search for phytoplankton near the surface. This is believed to be the simplest vision system in the world.

480. Slowest fish
Dwarf sea horse (*Hippocampus zosterae*) - 0.016 km/h (0.001 mph). Size: 4.2 cm (1.7 in).



Pea crab. Photo by Hans Hillewaert (CC)

481. **Slowest growth rate [Animal kingdom]**
Deepsea clam (*Tindaria callistiformis*) - Grows as slow as 8.4 mm (one-third of an inch) in 100 years.

482. **Slowest heartbeat**
The narwhal (*Monodon monoceros*) can slow its heart to as little as 4 beats per minute during a dive.

483. **Smallest crab**
Pea crab (Family Pinnotheridae) - Shell length of 0.64 cm (0.25 in). The Pea crab is so small that it lives inside marine bivalve mollusks such as mussels & oysters.

484. **Smallest crinoid**
Unidentified species - Diameter: 3 cm (1.18 in).

485. **Smallest fish [Freshwater]**
Pygmy goby (*Pandaka pygmaea*) - Average length of male is 0.71 cm (0.28 in). It is found in streams near Luzon (Philippines). Mature females of *Paedocypris progenetica*, a member of the carp family discovered in an acidic peat swamp in Indonesia in 2006, grow to 0.79 cm (0.31 in).

486. **Smallest fish [Marine]**
Dwarf goby (*Trimmatom nanus*) - Average length of male is 8.6 mm (0.34 in). It inhabits the Indo-Pacific.

487. **Smallest pinniped**
Baikal Seal (*Pusa sibirica*) - The adult of this freshwater species attains a maximum size of 1.37 m (4.5 ft). Weight is about 64 kg (140 lbs).

488. **Smallest sea cucumber**
Rhabdomolgus ruber - Length: 1 cm (0.39 in). Found in the North Sea.

489. **Smallest sea star**
Leptychaster propinquus - Diameter: 1.83 cm (0.72 in).

490. **Smallest sea urchin**
Echinocyamus scabe - Test diameter (w/o spines): 0.53 cm (0.21 in).

491. **Smallest shark**
Dwarf lanternshark (*Etmopterus perryi*) - 19 cm (7.5 in).

492. **Smallest vertebrate [Marine]**
Angler fish (*Photocorynus spiniceps*). A mature male specimen collected at a depth of 1,425 m (4,675 ft) measured only 6.1 mm (0.24 in).

493. **Strongest biological material**
Limpet teeth - The radula (tongue) of a limpet is covered in tiny teeth (<1 mm) that are made of a mineral-protein composite up to five times stronger than spider silk, and most man-made materials. The teeth actually excavate rock as the limpet feeds.

494. **Thickest skin**
The whale shark (*Rhincodon typus*) has the thickest skin of any animal in the world. It is as thick as 23 cm (9 in) in places.

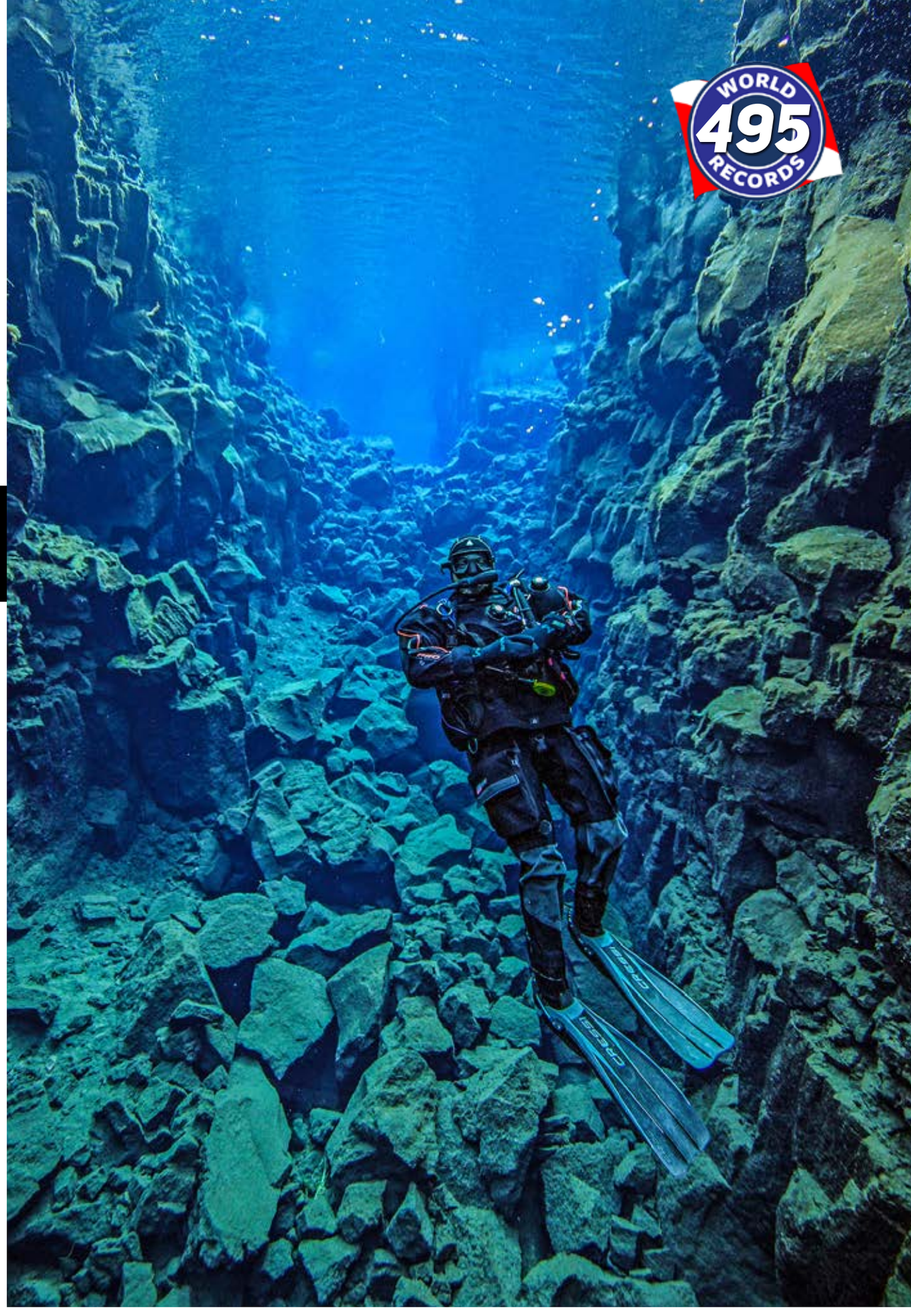
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OCEANOGRAPHY

495. Clearest water

80 m (262 ft) or the approximate visibility of distilled water. A few locations are claimed to equal the visibility of distilled water, including the the Weddell Sea (Antarctica), New Zealand's Blue Lake, and the Silfra Fissure in Iceland. Claims of visibility surpassing 80 metres anywhere are likely overstated. However, the Weddell Sea has the added distinction of being composed of seawater that is teeming with life, including plankton.

RIGHT: Teddy Wignall of DIVE.IS in the Silfra Fissure, in Iceland.
Photo by Jeffrey Gallant | Diving Almanac | **DIVE.IS**
BELOW: Scientists in McMurdo Sound, Antarctica. Photo by Rob Robbins | NSF





496. Coldest salt water

-10°C (14°F) - Lake Vida, Antarctica (1996). The water of Lake Vida has seven times the salt concentration of sea water and remains liquid at much colder temperatures. Sea water with an average salinity of 35 ppt (parts per thousand) freezes at -1.94°C (28.5°F).

497. Coldest sea water

Sea water with an average salinity of 35 ppt (parts per thousand) freezes at -1.94°C (28.5°F).

498. Deadliest lake

Crater Lake Nyos, Cameroon - Deadly eruptions of carbon monoxide emanating from the lake bottom have killed thousands of people. Lake Nyos is one of only three lakes in the world known to be saturated with carbon dioxide. On August 21, 1986, a limnic eruption (sudden outgassing of CO2) released approximately 1.6 million tonnes of CO2 over the lake and into a series of valleys killing at least 1,700 people and 3,500 livestock within a range of 25 km (16 mi). Based on shore scouring, the wave of water also caused by the eruption reached an estimated height of 24 m (80 ft).



Diving in the St. Lawrence Estuary at Les Escoumins, Québec.
Photo by Jeffrey Gallant | **GEERG**

499. Deepest blue hole (sinkhole) [NEW]

• Dragon Hole, 300 m (987 ft), Paracel Islands (16°31′N 111°46′E), South China Sea (aka the Eye of the South China Sea) - At least 20 species of fish have been observed above 100 m (328 ft) depth. The blue hole is largely devoid of oxygen—and life—beyond 100 m (328 ft).

• Dean's Blue Hole, 202 m (663 ft), Long Island, Bahamas - A blue hole is a steep vertical cave or sinkhole filled with different layers of water. Water circulation is poor therefore little life is found in its depths. Blue holes are nonetheless connected to the sea through fissures or branches. Black holes are land-based versions of blue holes. The water in a black hole is virtually stagnant and thus contains large amounts of bacteria and dangerously high levels of acidity. Diving in a black hole is extremely dangerous.

500. Deepest cave [Freshwater] [NEW]

• Hranická Propast, Czech Republic, 404 m (1,325 ft) - Discovered by Krzysztof Starnawski (Poland) in 2016.

• Pozzo del Merro, Italy, 392 m (1,286 ft)

501. Deepest cave [Ocean] [NEW]

• Dragon Hole, 300 m (987 ft), Paracel Islands (16°31′N 111°46′E), South China Sea (aka the Eye of the South China Sea)

• Dean's Blue Hole (Bahamas) - 202 m (663 ft). Depth of opening: 5.5 m (18 ft). Diameter of the upper ledge: 18.3 m (60 ft). Average diameter of cave: 76 m (250 ft). Estimated volume: 1.25 million sq m (1.5 million sq yd). The first diver to reach the bottom was Jim King (USA) in 1992. King took 11 min to descend to the bottom on TRIMIX. After spending 3 min on the bottom, his ascent back to the surface required nearly five hours of decompression.

502. Deepest coral reef

75 m (246 ft) - 40-Mile Reef is a seamount located 75 km (47 miles) southeast of Pitcairn Island. Surveyed in 2012, it is believed to be the deepest and most well-developed coral reef known in the world.

503. Deepest erupting volcano

1,219 m (4,000 ft) - Scientists funded by NOAA and the National Sci-

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ence Foundation recorded the deepest erupting volcano yet discovered. Eruption of the West Mata Volcano (Lau Basin) in May 2009, occurred in an area bounded by Fiji, Tonga and Samoa.

504. Deepest fjord

1,308 m (4,291 ft) - Sogne Fjord, Norway.

505. Deepest hot vent [Active]

5,000 m (16,404 ft) - The world's deepest known active hot vent (a.k.a. black smoker) was discovered in the Cayman Trough (Caribbean Sea) on April 6, 2010. Using a deep-diving vehicle remotely controlled from the Royal Research Ship James Cook, the scientists found slender spires made of copper and iron ores on the seafloor, erupting water hot enough to melt lead, nearly half a mile deeper than anyone has seen before.

506. Deepest lake

1,741 m (5,712 ft) - Lake Baikal (Siberia).

507. Deepest point in Earth's oceans

10,994 m (36,070 ft) (Surveyed by the United States Center for Coastal & Ocean Mapping in 2010*) - The Challenger Deep located in the Mariana Trench, 250 miles (400 km) southwest of Guam in the Pacific Ocean, is the deepest known point on the planet. It is named after the British survey ship Challenger II, which first surveyed the trench in 1951. *(± 40 m / 130 ft)

508. Deepest ray of light

The deepest a ray of solar light can be perceived by the human eye is 488 m (1,600 ft).

509. Deepest recorded Secchi depths

The theoretical maximum value for a Secchi disk immersed in pure water is 80 m (262 ft).

- 80 m (262 ft) - Weddell Sea (Antarctica), 1986.
- 66 m (217 ft) - Sargasso Sea, 1972.
- 53 m (174 ft) - Eastern Mediterranean, 1985.



Dean's Blue Hole (Bahamas). Photo courtesy **Vertical Blue**

510. Farthest point from land [NEW]

2,688 km (1,670 mi) - The oceanic pole of inaccessibility, aka Point Nemo (48°52.6′S 123°23.6′W), lies in the South Pacific Ocean, south-east of the Pitcairn Islands and southwest of Easter Island.

511. Fastest localized current

16.1 knots (29.6 km/h / 18.4 mph) - Sechelt Rapids (Skookumchuck Narrows), British Columbia, Canada. It is estimated that for a 3.6 m (12 ft) tide, 757 billion liters (200 billion gallons) of seawater flow through the Sechelt Rapids in 6 hours.

512. Fastest shrinking sea

The Aral Sea (Sea of Islands), located in Kazakhstan and Uzbekistan, has been shrinking for the last 40 years due to irrigation. Since irrigation began, Aral's original surface area of 68,000 sq km (26,000 sq mi) has shrunk by approximately 60% and its volume by 80%.

513. First oceanographic vessel

HMS *Challenger* (1872) - In December 1872, *Challenger* sailed from Portsmouth (England) on a 3.5-year global oceanic expedition. The ship's mission was exclusively scientific and was lead by the academicians of the British Royal Society. Its objectives were to circumnavigate the globe, to take soundings at regular intervals, and to measure the physical and biological characteristics of the ocean, taking biological samples from the surface to the bottom using nets and dredges.

The ship traveled 68,890 nautical miles (127,666 km / 79.328 miles) through every ocean except the Arctic charting 363 million sq km (140 million sq miles) and collecting 4,417 new species of marine plants and animals. The findings of the *Challenger* science team would influence the world of biology and earth sciences for the next century. The oceanographic vessel was the namesake of the ill-fated space shuttle *Challenger* lost in 1986.

514. First pipeline to cross the Arctic Circle

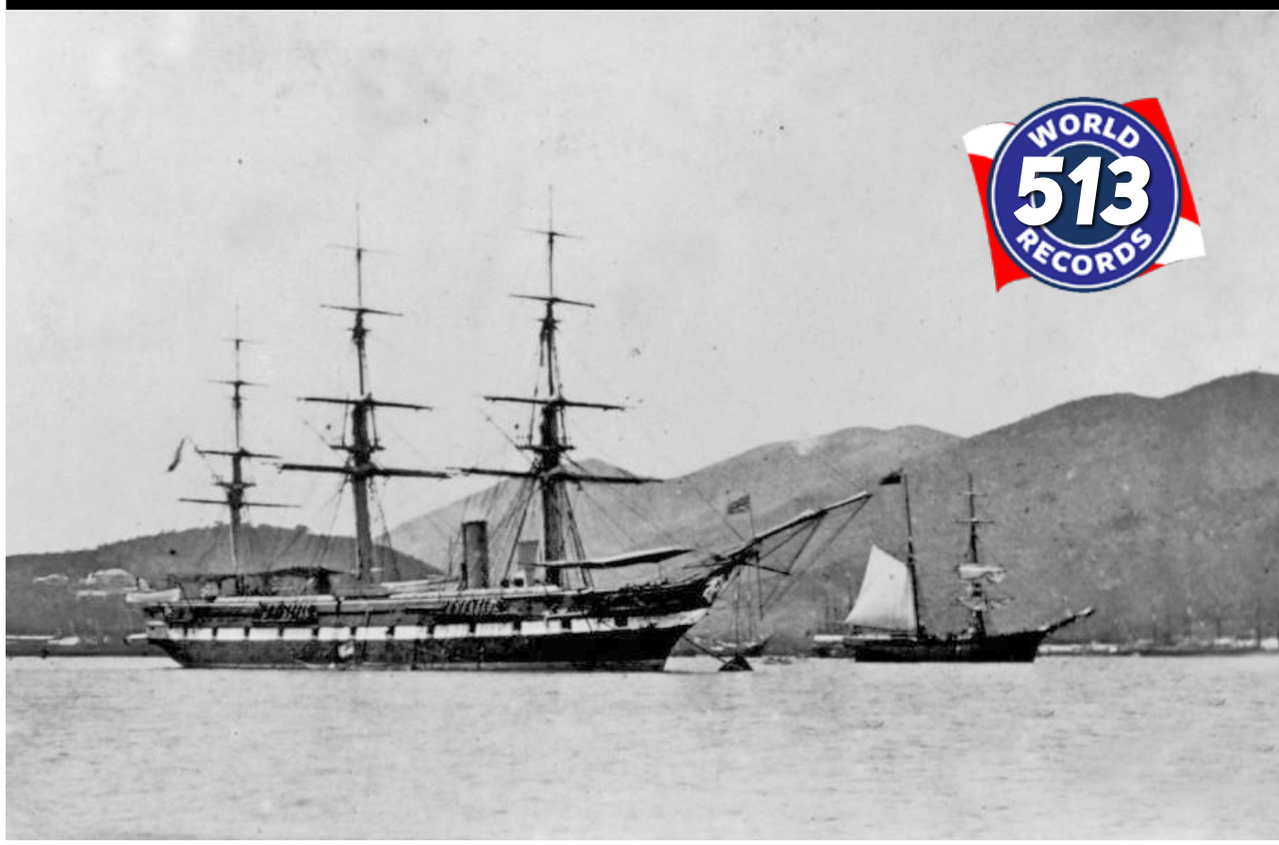
The Polarled gas underwater pipeline (Statoil) linking the Aasta Hansteen natural gas field in the Norwegian Sea to a processing plant on the mainland (300 miles) was laid in 2015.

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ABOVE: Abandoned ships in the former Aral Sea in Kazakhstan.
Photo by P. Christopher Staecker (WC)

BELOW: HMS *Challenger* in St. Thomas Harbor in 1876 (PD)



515. First sharks observed inside a live volcano

2015 - Scientists deploying National Geographic's deep-sea Drop Cam into Kavachi, an undersea volcano in the Solomon Islands, observed hammerhead and silky sharks swimming in the hot and acidic water.

516. Greatest oceanic current

Antarctic Circumpolar Current - 130 million cu. m (34 billion gallons) of water per second. The wind-driven current moving eastward measures 21,000 km (13,049 miles) in length and reaches depths up to 4,000 m (13,123 ft). In comparison, the maximum flow rate of the Gulf Stream is 80 million cu. m (2.8 billion cu. ft) per second.

517. Greatest river flow

The Amazon River - Average 200,000 cu. m/sec (7,100,000 cu. ft/sec) and 300,000 cu. m/sec (10 million cu. ft/sec) during floods. The Amazon Basin holds two-thirds of all the flowing freshwater water in the world. It is fed by more than 1,000 tributary rivers from Colombia, Bolivia, Brazil, Ecuador, Peru, Paraguay and Venezuela.

518. Highest lake

6,390 m (20,965 ft) - Unnamed pool on Ojos del Salado (highest volcano in the world) which borders Argentina and Chile.

5,791 m (19,000 ft) - Crater Lake, Licancabur Volcano (Chile / Bolivia). In 1982, a team led by Johan Reinhard made 11 dives. Max depth 6.1 m (20 ft).

519. Highest lake [Commercially navigable]

3,812 m (12,507 ft) - Lake Titicaca. The lake which borders Peru and Bolivia is also the largest freshwater lake in South America.

520. Highest tides

Burntcoat Head, Bay of Fundy (Canada) - The tidal range of Minas Basin in Nova Scotia is 17 m (55.8 ft). A record spring tide of 21.6 m (71 ft) was reportedly observed on Oct. 4-5, 1869, during a tropical cyclone named the Saxby Gale. Each tide cycle (12.4 hours) of 115 billion tonnes of seawater in the Bay of Fundy is more than the combined flow of all of the world's freshwater rivers. In Mi'kmaq First Nation folklore, the huge tides are caused by a giant whale. Leaf Basin, in Nunavik's Ungava Bay



High and low tides in Alma, New-Brunswick. Photo: Dylan Kereluk (CC)

(Canada), has a 16.8 m (55.1 ft) tidal range.

521. Highest tsunami

The highest tsunami (tidal wave caused by earthquake) ever recorded reached 64 m (210 ft) above sea level when it slammed into the Kamchatka Peninsula (Russia) in 1737.

522. Highest wave [Recorded]

524 m (1,720 ft) - Lituya Bay, Alaska. On July 9, 1958, an earthquake measuring 8.3 on the Richter Scale dislodged 40 million cubic yards of dirt and glacier ice from a mountain located at the head of the bay. Three boats were in the bay when the wave hit. Only two of the boats survived and two people were killed.

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523. **Highest wave [Wind-generated]**
34 m (112 ft) - The wave was measured by the USS *Ramapo* in the Pacific Ocean on February 6, 1933. Wind force was measured at 68 knots (126 km/h / 78 mph).

524. **Hottest water**
Seawater shooting out of hydrothermal vents can reach temperatures up to 407°C (765°F), hot enough to melt lead. The extreme pressure at depth prevents the water from boiling. The temperature of the superheated water almost immediately drops to 2°C (35.6°F), the ambient temperature of the deep ocean.

525. **Lake [Saltwater w/crocodiles]**
Lake Enriquillo (Dominican Republic) is the only saltwater lake in the world (with no outlet) inhabited by crocodiles.

526. **Largest atoll**
Great Chagos Bank (Indian Ocean) - 13,000 sq km (5,019 sq miles). The atoll is mostly submerged. The total land area of the atoll is only 6 sq km (2.32 sq miles).

527. **Largest iceberg [Northern Hemisphere]**
The largest northern iceberg on record was observed near Baffin Island in 1882. It measured 13 km (8 miles) long, 6 km (3.7 miles) wide and had a freeboard (height above water) of about 20 m (66 feet). Its estimated weight was over 9 billion tons.

528. **Largest iceberg [Southern Hemisphere]**
B15 - Ross Sea, Antarctica. When it broke off the Ross Ice Shelf in March 2000, B15 had a surface area of over 11,000 sq km. It has since broken up into smaller icebergs.

529. **Largest island**
Greenland (Denmark) - 2,175,600 sq km (840,000 sq miles). Australia is regarded as a continental land mass.

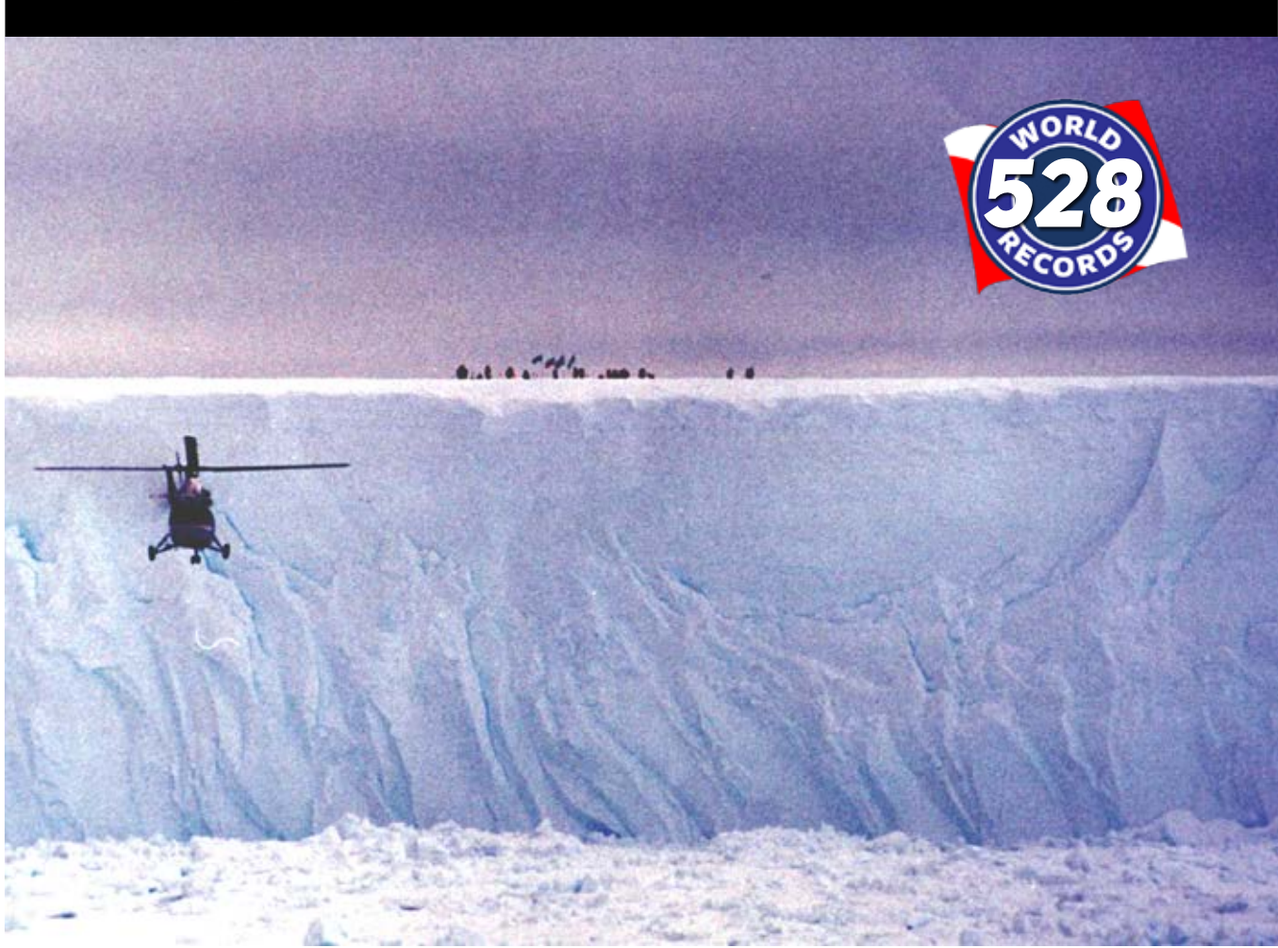
530. **Largest lake [Atomic]**
Lake Chagan (Kazakhstan) with a volume of 10,000,000 cu. m (2.6 billion gallons) was intentionally created with a nuclear bomb in 1965. (a.k.a. Lake Balapan).

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ABOVE: The southernmost atoll of Diego Garcia in the Chagos Archipelago. Image: NASA

BELOW; Iceberg B15-A adrift in the Ross Sea in 2001. Photo by Mila Zinkova (GNU)



RECORD

527. Largest iceberg [Northern hemisphere]

The largest northern iceberg on record was observed near Baffin Island in 1882. It measured 13 km (8 miles) long, 6 km (3.7 miles) wide and had a free-board (height above water) of about 20 m (66 feet). Its estimated weight was over 9 billion tons. In this image, the **MV *Cape Race*** cruises by an iceberg in Disko Bay, Greenland. Photo by Jeffrey Gallant | **Arctic Kingdom**

531. Largest lake [Freshwater by surface area]
Lake Superior (USA, Canada) has a surface area of 82,414 sq km (31,820 sq miles).

532. Largest lake [Freshwater by volume]
Lake Baikal (Russia) has a volume of 23,600 sq km (5,662 sq miles) which is equivalent to 20% of the world's fresh surface water or the combined volume of all five North American Great Lakes. It is also the deepest lake in the world at 1,741 m (5,712 ft).

533. Largest lake [Saltwater]
The Caspian Sea has a surface area of 436,000 sq km (168,341 sq mi). It is bordered by Azerbaijan, Iran, Kazakhstan, Turkmenistan and Russia.

534. Largest lake [Underground]
Dragon's Breath Cave (Namibia) - When discovered in 1986 by the South African Speleological Association, its surface area was 2.6 ha (6.4 acres). Its greatest depth was 89 m (292 ft).

535. Largest marine reserve [NEW]
Papahānaumokuākea Marine National Monument (Hawaii, USA) | 1,508,870 km^2 (582,578 mile^2) - Papahānaumokuākea Marine National Monument is nearly the size of the Gulf of Mexico. The extensive coral reefs found in Papahānaumokuākea are home to over 7,000 marine species, one quarter of which are found only in the Hawaiian Archipelago. Many of the islands and shallow water environments are important habitats for rare species such as the threatened green turtle and the endangered Hawaiian monk seal, as well as the 14 million seabirds representing 22 species that breed and nest there. Land areas also provide a home for four species of bird found nowhere else in the world, including the world's most endangered duck, the Laysan duck.

536. Largest ocean
The Pacific Ocean encompasses almost one third of the Earth's surface, more than the total land area of the world, with a surface area of 155.557 million sq km (60.061 million sq mi).



Hawaiian monk seal (*Neomonachus schauinslandi*). Photo by James Watt | NOAA

537. Largest polynya
The Weddell Polynya in the Southern Ocean had a record surface area of 350,000 sq km during the austral winters from 1974 to 1976. Located in the Arctic Ocean (Canada), the polynya known as the North Water has a surface area reaching up to 50 000 sq km (19,305 sq mile) every July.

538. Largest reef system
Geographically the Bahamas Islands are not in the Caribbean. They are in the Atlantic just outside of the Caribbean. This gives the Bahamas a great variety of life; both Atlantic and Caribbean species are found here. The Turks and Caicos though not politically part of the Bahamas, having gone separate ways in the early 70s, are geologically part of the same reef system. The Bahamas reef system is by far the largest in the world, encompassing almost 200,000 sq miles. The Great Barrier Reef, by contrast, is 135,000 sq miles.

539. Largest river basin
Amazon River (South America) - 7,045,000 sq km (2,720,000 sq miles).

540. Largest tidal bore
• Qiantang River (China) - Up to 9 m (30 ft) at speeds up 40 km/h (25 mph).

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• The Amazon River tidal bore is known as the Pororoca. It reaches up to 3.7 m (12 ft) high and speeds up to 24 km/h (15 mph).

541. Largest tsunami [Most destructive]

The 2004 Indian Ocean tsunami that killed 230,000 people in 14 different countries is the largest on record.

542. Longest coral reefs

• Great Barrier Reef (Australia) - Over 2,000 km (1,243 miles). The Great Barrier Reef is made up of over 900 islands and 3,400 reefs and it is so large that it can be seen from space. It is the largest structure on the planet built by living organisms. The Great Barrier Reef is home to more than 1,500 species of fish, 400 species of coral, 4,000 types of mollusks and more than 200 species of birdlife. It is a very popular destination for scuba divers.

From space, the Great Barrier Reef looks like a string of iridescent aquamarine jewels around Cape Flattery, Australia. In this northern zone the barrier reef forms a nearly complete ribbon along the margin of the continental shelf.

• The New Caledonia Barrier Reef is the world's second-largest coral reef. It surrounds Grand Terre, Île des Pins, and several smaller islands. Its total length is 1,500 km (932 miles) and it surrounds a lagoon of 24,000 sq km (9,266 sq mile), with an average depth of 25 m (82 ft).

• The Belize Barrier Reef (Caribbean Sea) is the longest in the western hemisphere with a length of approximately 260 km (162 miles). The barrier reef comprises three non-volcanic atolls - Lighthouse Reef, Turneffe Atoll and Glovers Reef - which are uncommon in the Caribbean. The Belize Barrier reef is estimated to contain at least 65 coral species and over 300 species of fish.

543. Longest estuary

885 km (550 miles) - Ob Estuary, Russia. Maximum width is 80 km (50 miles).

544. Longest fjord

313 km (195 miles) - Nordvest Fjord, Scoresby Sund (Norway).



Tsunami strikes Ao Nang, Thailand, on December 26, 2004. Photo by David Rydevik (CC)

545. Longest lake [Freshwater]

660 km (410 miles) - Lake Tanganyika (Central Africa). Length is measured along the lake's center line.

546. Longest river

The Nile - 6,727 km (4,180 mi). Its source is Lake Victoria (east central Africa) and streams in Burundi.

547. Longest tidewater glacier [Alaska]

The Hubbard Glacier is the longest tidewater glacier in Alaska. Its longest source originates 122 km (76 miles) from its snout and its calving face is over 10 km in length. As the glacier slowly slides toward the ocean, large pieces calve (break off) to form icebergs. Most tidewater glaciers calve above the surface resulting in a thunderous crash of ice into the ocean. Some tidewater glaciers calve underwater thus causing the iceberg to surge up to the surface from below. Water displaced during calving often produces huge waves. Diving anywhere near a calving glacier would be extremely dangerous and should never be attempted.

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548. **Longest underwater cave system**
153 km (95 miles) - Nohoch Nah Chich and Sac Actun systems, Yucatan Peninsula (Mexico) - Discovered by cave divers Steve Bogaerts (UK) and Robbie Schmittner (Germany) in 2007.

549. **Longest underwater stalactite**
12.8 m (42 ft) - Xich Ha Tunich, Chac Mool Cenote (Mexico).

550. **Longest waves**
Lunar tides travel across the oceans over periods of 12 to 24 hours.

551. **Lowest lake**
418 m (1,371 ft) below sea level - The Dead Sea borders Israel and Jordan.

552. **Most famous oceanographic vessel [MOD]**
The *Calypso* (1951) - The *Calypso* was a retired American minesweeper converted to an oceanographic vessel by Jacques-Yves Cousteau in 1951. Cousteau and his team pioneered the world of underwater exploration sailed all over the world aboard *Calypso* for more than 35 years. The *Calypso* sank in Singapore after being hit by a barge in 1996. She was raised and eventually towed back to La Rochelle where she lay in an advanced state of decay for a decade. The *Calypso* was towed to Concarneau (France) in 2007 to undergo a complete refit that was halted in 2009. *Calypso* was moved to a shipyard in Turkey in 2016 for a full refit, including new engines.

553. **Most people killed by a single wave**
300,000 to 500,000. East Pakistan (Bangladesh), 1970.

554. **Most powerful tidal turbine**
The 1.2 MW Seagen tidal turbine in Strangford Narrows, Northern Ireland. Its 16 m (52 ft) diameter twin rotors operate for up to 18-20 hours per day to produce enough clean, green electricity for 1000 homes.

555. **Oldest body of seawater**
Scientists drilling the United States' biggest crater tapped into the oldest body of seawater ever found. The age of the ancient water that was trapped 1.8 km (1.1 miles) deep by the massive impact was estimated to be 100 to 145 million years old (Cretaceous Period).



Calypso undergoing refit in Concarneau (France) in 2007. Photo by Olivier Bernard (CC)

556. **Oldest coral reef system**
The Bahamas - The volcanic core of the Bahamas is the Canary Islands. When the North American and African tectonic plates went their separate ways, the Bahamas stuck to the North American Plate. This makes the Bahamas not only the largest reef system in the world, but also the oldest, as the Bahamas predates the formation of most of the Atlantic Ocean. Drilling expeditions have found that the reef is almost 600 m (2,000 ft) thick.

557. **Oldest lake**
More than 25 million years old - Lake Baikal, Russia.

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558. Saltiest body of water

• 671 ppt - Don Juan Pond, Antarctica. Don Juan Pond is approximately 20 times saltier than sea water (35 ppt). Although its average depth is less than 30 cm (1 ft) and the surface temperature can reach -53°C (-63.4°F), the pond never freezes.
• The salinity of the Dead Sea can reach up to 400 ppt in the top 35 m (115 ft). Below this level, the water is saturated with salt, which precipitates out of solution and sinks to the sea floor.

559. Shallowest sea

Sea of Azov (part of the Black Sea) - Max depth: 13 m (42 ft).

560. Smallest ocean

The Arctic Ocean is the smallest of the world's five oceans with a surface area of 14.056 million sq km (5.427 million sq mi).

561. Tallest iceberg

The tallest verified height for an iceberg is 167 m (550 ft) - Melville Bay (Greenland), 1957. The largest northern iceberg on record was observed near Baffin Island in 1882. It measured 13 km (8 miles) long, 6 km (3.7 miles) wide and had a freeboard (height above water) of about 20 m (66 ft). Its estimated weight was over 9 billion tons. Recent icebergs in Antarctica are the largest ever recorded.

562. Thickest lake ice

19 m (62 ft) - Lake Vida, Antarctica (1996). The ice thickness is caused by meltwater which accumulates and freezes over the already frozen surface of the lake.

563. Thickest land ice

4,776 m (15,670 ft) - Antarctica polar ice cap. At the other pole, the thickest portion of the Greenland ice cap is 11,483 ft (3,500 m) deep.

564. Thickest sea ice

Multiyear ice in the Arctic Ocean can reach more than 4 m (13 ft) thick with ridges up to 20 m (66 ft) thick.

565. Widest tidal power plant

La Rance (France) stretches 700 m (2,297 ft) across the La Rance Estuary near Saint-Malo, in Brittany. Its 24 reversible turbines generate 500 million kWh every year.

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Man reading a newspaper in the Dead Sea (GNU)



DIVING & AQUATIC NOVELTIES

566. **Biggest gold nugget found by diver [UK]**
23 carats, 97 g (0.2 lbs) - Vince Thurkettle (UK), 2012. The professional gold prospector found the egg-sized nugget while scuba diving near the wreck of the *Royal Charter* off Anglesey in North Wales. It is also the biggest gold nugget ever found in Britain.

567. **Bog snorkeling [Men]**
1 min 29 sec. - Andrew Holmes (UK), 2011. Competitors must complete two consecutive lengths of a 60 m (197 ft) water filled trench cut through a peat bog, wearing a snorkel and flippers. The event takes place at the Waen Rhydd peat bog, near Llanwrtyd Wells in Wales.

568. **Bog snorkeling [Women]**
1 min 22.56 sec. - Kirsty Johnson (UK), 2014. Competitors must complete two consecutive lengths of a 60 m (197 ft) water filled trench cut through a peat bog, wearing a snorkel and flippers. The event takes place at the Waen Rhydd peat bog, near Llanwrtyd Wells in Wales.

569. **Cat on scuba**
Hawkeye, a calico cat trained by Gene Alba of California, author of *Mutley Goes Diving*, a book on a scuba diving dog.

570. **Deepest book signing**
July 10, 2005 - The world's fastest talking woman, Fran Capo, signed five books while in a Mir submersible by the wreck of the RMS *Titanic* at a depth of 4 km (2.5 miles).

571. **Deepest card trick [Scuba]**
50 m (164 ft) - Steve Bateman (United Kingdom), Dorothea Quarry, November 8, 2009. Steve is a member of the UK's Magic Circle and the International Bureau of Magicians (IBM). He is also a PADI Master Instructor and he uses several card tricks at depths of 40m+ for testing skills, dexterity, coordination, and to check levels of narcosis.

572. **Deepest card trick on one breath of air [Freediving]**
In April 2007, Dave Womach set the world record for the deepest underwater card stab without an air source. A card was selected at the surface and then, a team of divers made their descent to 19 m (62 ft). The cards were dropped to the ocean floor from a depth of 15 m (50 ft).



Rosemary Lunn waiting for the whistle at the 2015 World Bog Snorkelling Championships in Llanwrtyd Wells (UK). Photo courtesy **The Underwater Marketing Company**

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Just before they hit the bottom, Womach fired a spear gun and hit the selected card, the Queen of Diamonds.

573. Deepest Christmas tree

37.5 m (123 ft) - Tulamben, Bali (Indonesia), December 15, 2012.

574. Deepest diving tank (and deepest pool)

• 42 m (137 ft) - Y-40 located at the Hotel Terme Millepini, in Italy. Volume: 4,300,000 litres (1,135,939 gallons) of thermal water kept at a temperature of approximately 33°C (91°F). The pool includes platforms, caves and a transparent tunnel for pedestrians. The pool was officially opened on June 5, 2014.

• 33 m (108.27 ft) - NEMO 33 located in Brussels, Belgium. Volume: 2,500,000 litres (660,286 gallons) of drinkable (non-chlorinated) spring water. The pool includes levels at various depths, airpockets, simulated cave, 12 portholes, and temperature of 33°C (91°F).

575. Deepest nuclear explosion

610 m (2,000 ft) - A Mark 90 Betty nuclear bomb was detonated about 500 miles southwest of San Diego (California) during Operation Wigwam on May 14, 1955. The test was to determine the effects of deep nuclear blasts on submarines.

576. Deepest recovered sandwich

1,585 m (5,200 ft) - In September, 1969, three bologna sandwiches are recovered during the salvage of the *Alvin* submersible which has spent nearly a year on the sea floor with its hatch open. Despite being soaked in sea water and exposed to extreme pressure for 10 months, the sandwiches look so good that a scientist takes a bite and discovers that they are still palatable.

577. Deepest underwater concert

303 m (994 ft) - Katie Melua, the UK's biggestselling female artist, performed a concert for staff of the Statoil Troll A gas rig (North Sea) on October 2, 2006. The concert which took place at the bottom of one of the rig's legs was to celebrate the 10th anniversary of the Norwegian gas production company.

578. Deepest watch [Consumer]

A Jaeger-LeCoultre Master Compressor Diving GMT was placed on an ROV in November 2007 off the coast of Manado, Indonesia. The watch survived a trip to a depth of 1,088 m (3,570 ft) at an estimated pressure of 1,600 PSI.



NEMO33, the world's second deepest diving tank. Photo courtesy **NEMO33**.

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579. Deepest watch [Prototype]

On January 23, 1960, a ROLEX third-generation prototype Deep Sea Special watch is strapped to the bathyscaphe *Trieste* which descends to 10,916 m (35,814 ft) in the Challenger Deep (Mariana Trench). The watch returns to the surface in perfect working order. The Challenger Deep is the deepest known point on earth. Hydrostatic pressure: 16,000 PSI (1,089 ATM). PSI: Pounds per square inch. ATM: Unit of pressure roughly equal to the average atmospheric pressure at sea level on Earth.

580. Dog on scuba [Certified]

Mutley, a dog trained by Gene Alba of California, was the first dog ever certified by a training agency (NAUI K9-0001). Mutley is the subject of *Mutley Goes Diving*, a book on his scuba diving adventures.

581. Fire & Ice diver

Harry Donenfeld was the first diver known to dive an active lava flow (Big Island, Hawaii) and under icebergs in Antarctica.

582. First deep-sea sleepover

Twelve trainees from the UK and Australia spent a night in a recompression chamber at the National Hyperbaric Centre in Aberdeen in order to experience the realities of living and working in a saturation system. The event which took place in August 2007, lasted 14 hours.

583. First diving gnome

The Travelocity Roaming Gnome was awarded an SSI Advanced Discover Diver card by instructor Brendal Stevens at Green Turtle Cay, Abaco, Bahamas. ‘’He had a fantastic time!’’ said Holly Eurns, the gnome’s handler and a writer at Travelocity.com.

584. First head of state to dive at the North Pole

The Governor General of Canada, the Right Honourable Ed Schreyer, was taken on a dive at the North Pole by Dr. Joe MacInnis during Operation LOREX in 1979.

585. First gay underwater submarine deterrent

The Singing Sailor Underwater Defense System was installed off Stockholm, Sweden, in April 2015. The Singing Sailor is a subsurface sonar system that broadcats a message in Morse code: “This way if you are gay”. For any submarines passing close by, The Singing Sailor also features the message “Welcome to Sweden. Gay since 1944.” (the year Sweden legalized homosexuality) as an animated neon sign.

586. First league of underwater superheroes

Faster than a speeding starfish, able to leap (onto) lobster boats in a single bound, members of **The League of Underwater Superheroes** stand

Mini-Ed #157 after his body recovery of Mini-Ed #124 on August 7, 2014. Mini-Ed #157 perished soon after in a lobster attack. Photo by Eddie “Diver Ed” Monat.



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ready to explore the depths of Frenchman Bay, Maine. The “league” is led by Eddie “Diver Ed” Monat and his brave crew of Playmobile Mini-Ed’s. To date, 167 Mini-Ed’s have been killed by various sea villains, including lobsters, while in the service of the league.

587. First live WiFi broadcast of a sinking ship

Valeo Films broadcast the first live high definition video of a sinking ship on the Internet on May 27, 2009. The ship was the USNS *Vandenburg* artificial reef being scuttled off Key West, Florida.

588. First living person bitten by a cookiecutter shark

Mike Spalding, 61, was bitten on his left calf on March 16, 2009, as he was attempting to swim across Alenuihaha Channel from the Big Island to Maui (Hawaii). Spalding was about 11 miles into the crossing when the attack occurred. He was first bitten on the chest and then he was bitten on his calf. The 7.6 cm (3 in.) diameter, 2.5 cm (1 in.) deep wound was typical of a cookiecutter shark (*Isistius brasiliensis*).

589. First mermaid tag

A live mermaid was tagged with an underwater tracking device by Ocearch during SharkCon 2015 in Tampa, Florida.

590. First naked swim with beluga whales [NEW]

2011 - Natalia Avseenko (Russia) swam naked with two beluga whales from the Utrish Dophinarium in the White Sea (Murmansk Oblast). The swim took place in a large opening through the ice. Water temperature was -1.5°C (29°F).

591. First orchestra to draw whales to surface

In 2009, an Australian chamber orchestra serenaded humpback whales from a barge off the coast of Queensland as part of an advertising campaign for the telecommunications company Optus, and with the assistance of researchers from the Scripps Institution of Oceanography (SIO), the Woods Hole Oceanographic Institution (WHOI), Australia’s Defence Science and Technology Organization (DSTO), and the University of Queensland (UQ).

592. First pop-down shop

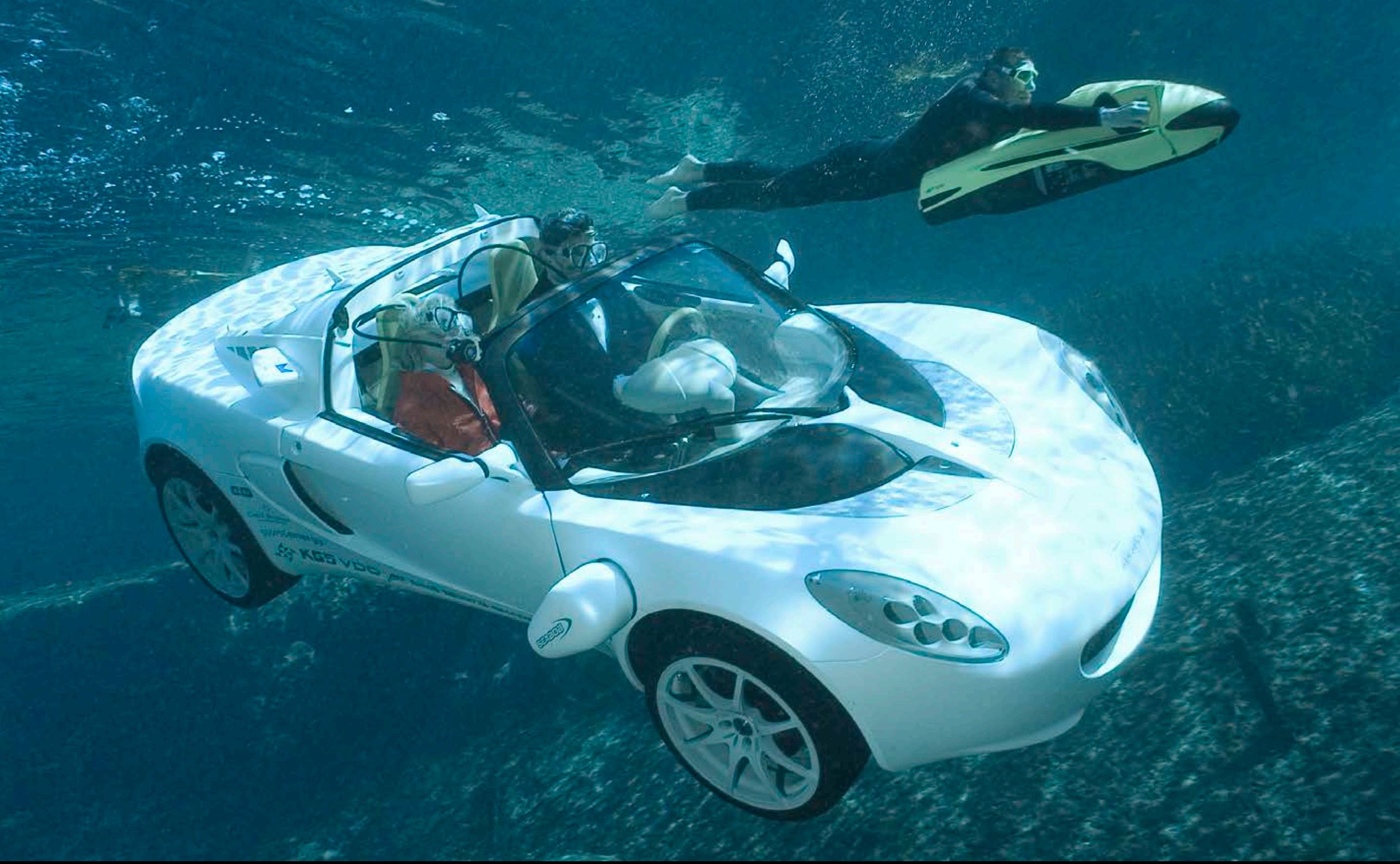
Fourth Element launched the world’s first underwater pop-up shop - in this case a suspended “pop-down” shop - at a depth of 6 m (19 ft) during TEKCamp.2015. Pop-up shops are set up at events to market, test or



A diver surveys the wreck of the USNS *General Hoyt S. Vandenberg* in 2015
Photo by U.S. Navy



The Singing Sailor Underwater Defense System
Photo by Swedish Peace and Arbitration Society



WORLD 595 RECORDS

RECORD

592. **First underwater car**

The *sQuba* was designed and built by Frank M. Rinderknecht (Switzerland) 30 years after the James Bond thriller *The Spy Who Loved Me*. However, the car "Wet Nellie" driven by Roger Moore underwater was a prop. Launched in 2008, the *sQuba* is a real car that flies at a depth of 10 m (33 ft) underwater. Photo courtesy **Rinspeed**

sell products. The pop-down shop resembles a recompression chamber that divers enter from below.

593. First prayer on wreck of the *Titanic*

July 10, 2005 - The world's fastest talking woman, Fran Capo, descended 4 km (2.5 miles) under the Atlantic Ocean to say a speedy prayer for the victims of the RMS *Titanic*'s sinking. Capo was sponsored by Internet casino Golden Palace.com. Capo had herself officially ordained for the dive and the US Navy chaplain wrote a special maritime, non-denominational memorial prayer for her to read at the site of the *Titanic*, something that has never been done. "This has got to be my greatest adventure," said Capo in a post-dive interview. "I was 2 1/2 miles down in the sea, a place few have gone. I did the first ever prayer down there and I visited one of the most talked about ships of all time."

594. First shampoo and body wash for divers

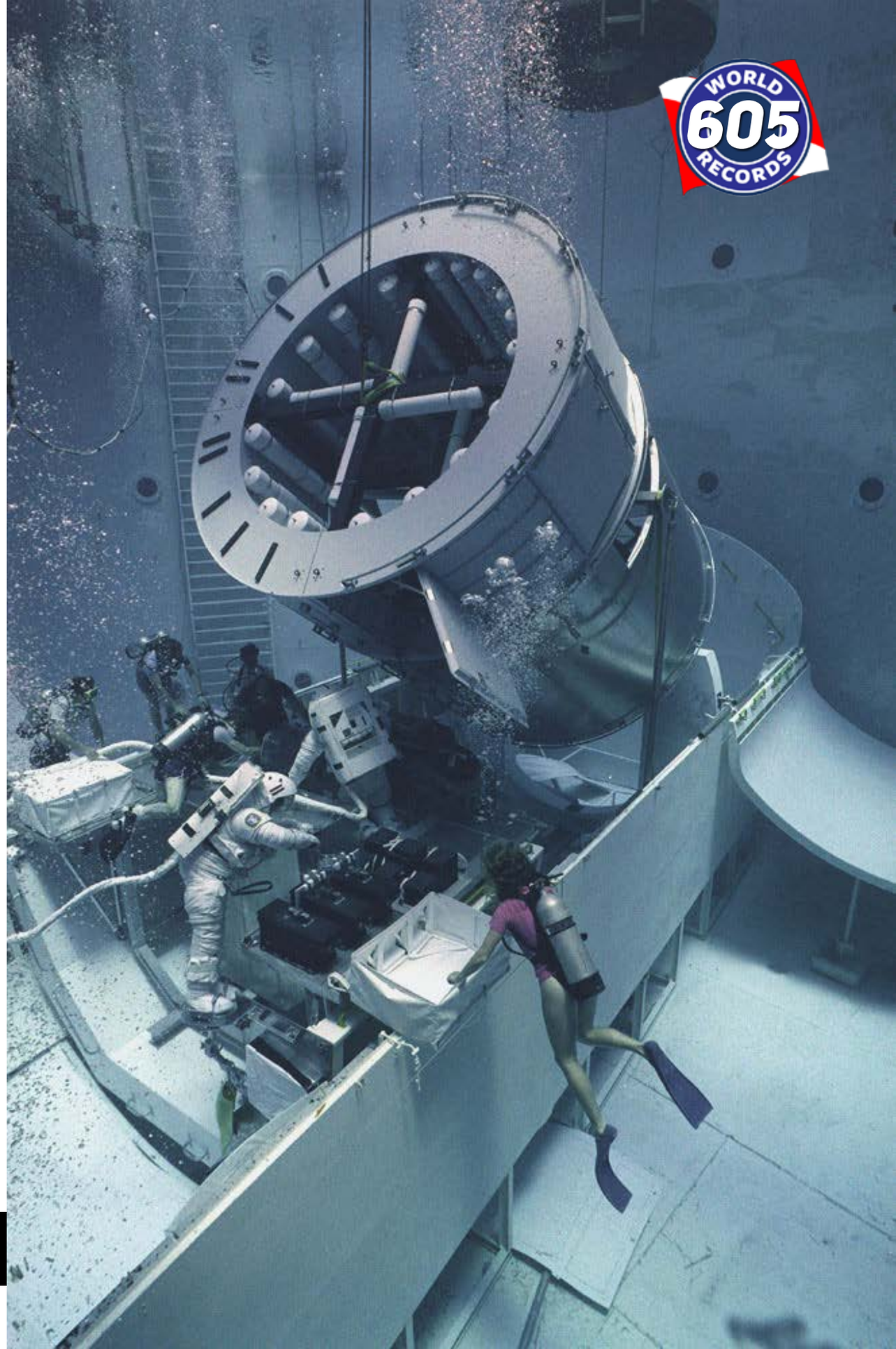
Subseries professional hair & skin care.

595. First underwater car

The *sQuba* was designed and built by Frank M. Rinderknecht (Switzerland) 30 years after the James Bond thriller *The Spy Who Loved Me*. However, the car - *Wet Nellie* - driven by Roger Moore underwater was a prop. Launched in 2008, the *sQuba* is a real car that flies at a depth of 10 m (33 ft) underwater. To do so, its combustion engine was removed and replaced by several electric motors. Three motors are located in the rear. One provides propulsion on land, the other two drive the screws for underwater motoring. They are supported by two powerful Seabob jet drives in the front, which 'breathe' through special rotating louvers from HS Genion (for opening and closing the water intake). Power is supplied by rechargeable Lithium-Ion batteries. Rinderknecht: "The *sQuba* is a zero-emission car as documented by the rotating license plate in the rear. It produces no exhaust emissions."

596. First underwater chess tournament [Openwater]

In August 2008, Dutch International Masters Hans Böhm and Robin Swinkels and US Women's Champion Anna Zatonskih played underwater matches during the 16th Annual Curacao Chess Festival.



Divers in the Neutral Buoyancy Laboratory (NBL) at the Sonny Carter Training Center at the Johnson Space Center (JSC). Photo: NASA

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597. First underwater mausoleum

The Neptune Memorial Reef was created five kilometres (3 miles) off the shore of Key Biscayne (Florida) in 2008. The memorial structures placed underwater are made of cremated remains mixed with concrete.

598. First underwater mosque

In 2012, a group of Saudi divers used PVC pipes filled with sand to build what they described as the world's first underwater mosque in the Red Sea near the town of Tabuk.

599. First underwater poker tournament [Openwater]

In November 2005, professional poker players from around the world took part in the Caribbean Poker Classic Extreme at a depth of 10 m (30 ft) off the island of St Kitts. The event was won by Juha Helppi (Finland) in 40 minutes.

600. First underwater thesis defence [Openwater]

2015 - On April 20, Mike Irvine, a 27-year-old University of Victoria student, defended his masters thesis at a depth of 6 m (20 ft) off the Saanich Peninsula. The subject of his thesis was the use of footage from underwater cameras in education. His defence was **broadcasted live on the Internet**.

601. First underwater throat singer [NEW]

On July 30, 2016, Alexia Galloway-Alainga (Canada) performed Inuit throat singing, or katajjaq, while snorkeling in Frobisher Bay (Nunavut), during the Sedna Katujjiqatigiit Expedition (Sedna Epic Expedition).

602. First underwater video shot by an octopus

Victor Huang was filming an octopus when it suddenly snatched his camera from his hands and swam away with the unit still recording. After a 5-minute chase, Mr. Huang was able to distract the octopus with his speargun and he recovered his camera. The unusual event took place while he was freediving at the Wahine Memorial off Wellington, New Zealand in April 2010.

603. First under ice hockey tournament

The Nayada diving club held the world's first under ice hockey tournament in February 2015. The three-day competition in which the participants play upside down in full scuba gear took place in Temirtau, Siberia.

604. Largest collection of Sea Hunt memorabilia

Alec Peirce of Toronto (Canada) has assembled one of the largest collections of vintage scuba equipment in North America including every two-hose regulator, every issue of Skin Diver Magazine and dozens of masks, fins, spearguns, gauges, cameras, books and other items dating from the 50's. He also owns what is considered the largest collection of *Sea Hunt* and Lloyd Bridges memorabilia anywhere in the world, including every episode of the famous TV series with many on the original film and lots of personal items from Lloyd Bridges himself. Mr. Peirce is the owner of **Scuba 2000**, Canada's largest dive center.

605. Largest enclosed diving tanks

• The Johnson Space Center's Sonny Carter Training Facility Neutral Buoyancy Laboratory - 8.69 m (28.5 ft) deep, 34.14 m (112 ft) wide, and 65 m (212 ft) long. The pool floor is built from concrete 1.83 m (6 ft) thick; the floor and walls include more than 1,300 tons of reinforcing steel, including 513.38 km (319 miles) of steel tie wire; and a total of almost 7,000 tons of concrete were used in construction. The pool extends 6.1 m (20 ft) below ground and 6.1 m (20 ft) above, and a 2,601 sq m (28,000 sq feet) pool deck was built to house training offices, control rooms and mechanical equipment. The pool is used by astronauts to train for spacewalks.

• In 1980, the Soviet Union constructed a pool large enough to contain a full-size 20-ton space station module. The pool is still used today to train Russian cosmonauts. It has a depth of 12 m (39.37 ft), a diameter of 23 m (75.46 ft) and a volume of 5,000 cubic m (176,573.33 cubic feet). The Cosmonaut Training Center known as Star City is located 40 km (25 miles) from Moscow.

606. Largest hyperbaric chamber

Aberdeen's National Hyperbaric Centre operates what may be the world's largest and deepest hyperbaric test chamber, capable of testing subsea equipment to simulated depths up to 8,000 msw (metres salt water) (26,247 feet) or approximately five miles below the surface. The centre can also simulate altitudes up to 16,764 m (55,000 ft).

607. Largest mobile scuba pool

The "Be A Diver.com" pool measures 6 m x 9 m (20 ft x 30 ft) and has a volume of 15,000 gallons.

608. **Largest scuba class [Most students]**
2,465 - Manado, North Sulawesi (Indonesia), August 16, 2009. The record was set during Sail Bunaken 2009.

609. **Largest u/w chess tournament [Confined water]**
50 divers challenged each other over a period of 30 hours at East Rand Mall in Benoni (South Africa) in October 2003. The tournament was organised by the Ecstasea Dive School.

610. **Largest underwater clean-up**
644 divers - The event led by Ahmed Gabr took place off Hurghada in the Red Sea on June 5, 2015 (World Environment Day).

611. **Largest underwater explosion [Non-nuclear]**
Seymour Narrows - Destruction of Ripple Rock, an underwater mountain and navigation hazard in Discovery Passage, British Columbia. The peak was only 3 m (9 ft) underwater at low tide. 1,270 metric tons of Nitramex 2H explosives were used to blast 635,000 metric tons of rock and water up to 300 m (1,000 ft) into the air on April 5, 1958. The depth at low tide after the explosion was lowered to 14 m (45 ft).

612. **Largest underwater poker tournament**
In November 2006, poker players from around the world took part in the Caribbean Poker Classic Extreme at a depth of 9 m (30 ft) on St Kitts. Twelve players competing for a $5,000 first prize were installed at a depth of 9 m (30 ft). Players included InterPoker pros, online qualifiers and a government minister of St. Kitts and Nevis.

613. **Longest buddy breathing**
8 hours - On December 10, 2015, Keith Sagray and Kevin Rodgers breathed off a single regulator at Coral World in St. Thomas, USVI.

614. **Longest dive with sharks [Men]**
7 hours 49 min - Mubarak Abuhaimad (Kuwait), Stuart Cove's Dive Bahamas, March 3, 2016.

615. **Longest dive with sharks [Women]**
5 hours - Reem Aleidan (Kuwait), Stuart Cove's Dive Bahamas, March 3, 2016.

616. **Longest underwater human chain [Ocean]**
245 - The group of Egyptian and foreign divers led by Walaa Hafez (Egypt) were linked at a depth of 20 m (66 ft) for 20 minutes off Sharm el-Sheikh (Egypt) on December 25, 2015.

617. **Longest survival in a sunken ship**
60 hours - Harrison Okene, a Nigerian cook, survived for nearly three days (May 26-28, 2013) in an air bubble after his tugboat, the *Jascon-4*,



621. **Most divers submerging simultaneously [Women]** - 129 women immersed themselves all at once in a quarry during the first edition of ***Femmes à la mer*** in 2015. The second edition in 2016 set a new record at 149 women. The event raises funds for a women's charity and for environmental conservation. No men are allowed in the water. Photo by Jeffrey Gallant | Diving Almanac

capsized and sank in rough seas 30 km (20 miles) off the coast of Nigeria. His 11 crewmates all died. Okene was rescued from a depth of 30 m (100 feet) by a team of divers sent by Chevron and the ship's owners, West African Ventures. He then had to spend another 60 hours in a decompression chamber.

618. Longest underwater performance

Indian diver and musician Sabir Bux played music underwater in a Saudi river for seven hours while recording an album for the Indian National Cricket Team in 2007.

619. Marathon in full hardhat dress

Lloyd Scott set the world record for the slowest marathon with a time of six days, four hours, 30 minutes and 56 seconds, at the Edinburgh Marathon in 2002. Scott wore a 50 kg (110 lbs) diving suit with hardhat for the entire race. Scott also 'ran' the Flora London Marathon wearing the same suit earlier that same year.

620. Most continuous bubble rings on a single breath of air

34 - On June 27, 1989, Doug "Shaka" Corbin produced 34 continuous and perfectly formed bubble rings on a single breath of air while lying in the wreck of the *Cartanser Sr.* at Buck Island, St. Thomas, U.S. Virgin Islands. The record was captured on video.

621. Most divers submerging simultaneously [Women] [NEW]

149 I ***Femmes à la mer*** **-** On September 10, 2016, 149 women led by Nathalie Lasselin immersed themselves all at once to raise funds for a women's charity and environmental conservation. No men were allowed in the water.

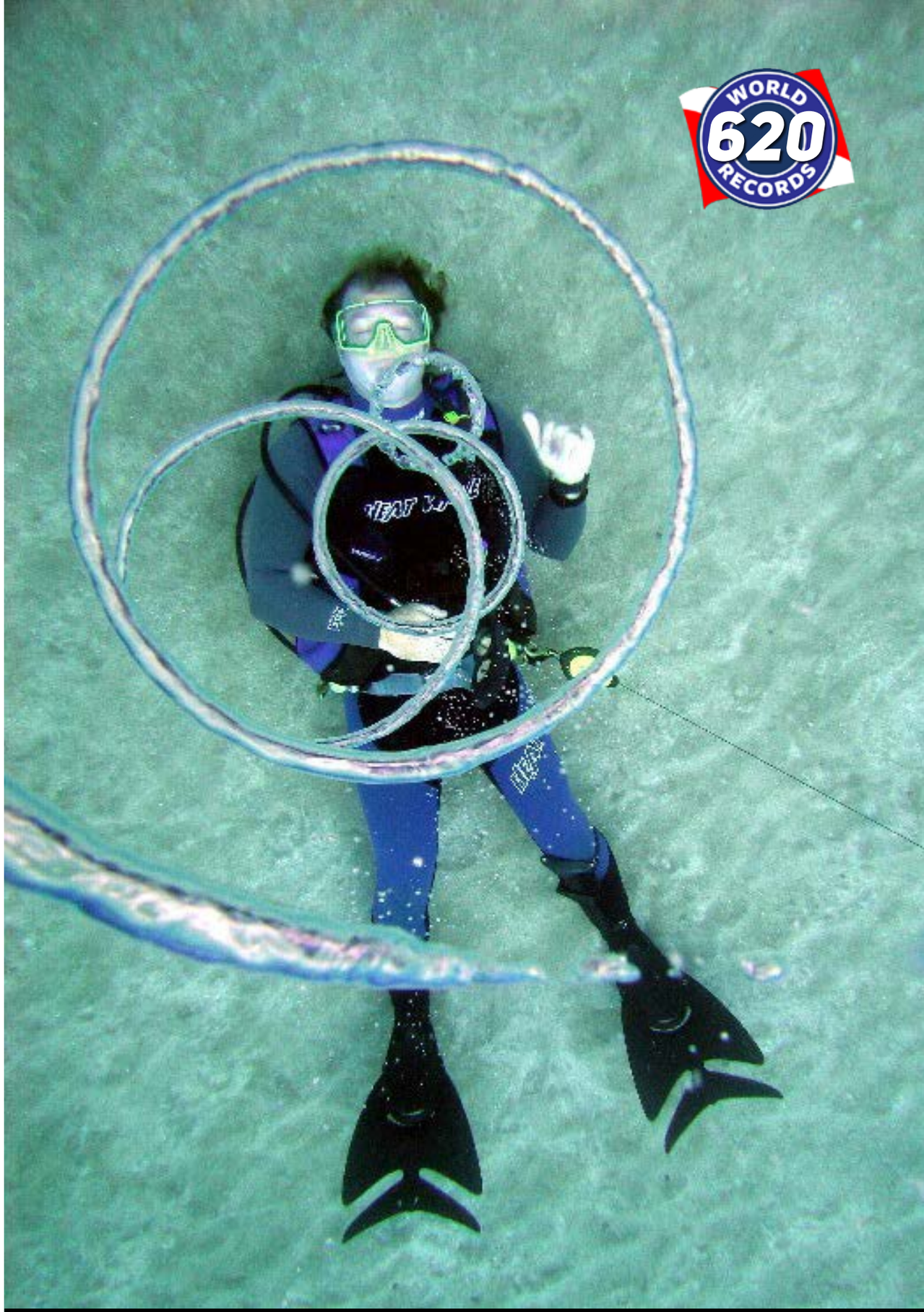
622. Most divers treated simultaneously for DCI [UK]

On June 9-10, 2007, 13 divers were treated simultaneously for decompression illness (DCI) in the Diving Diseases Research Centre's (DDRC) three hyperbaric chambers. The DDRC Medical Centre is located in Plymouth.

623. Most divers watching TV underwater

114 English soccer fans in full SCUBA gear watched a televised soccer match underwater on April 1, 2009. The event took place at the Action Underwater Studios and Dive Centre in Basildon. England won 2-1.

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"Shaka-Doug" Corbin performing bubble rings off Maui.
Photo courtesy **Shaka Divers**

624. Most fin patents

Bob Evans (USA) - Since 1971, he has patented 33 revolutionary fin designs including the Force Fin Tan Delta (polyurethane) which is part of the permanent collections of the New York Museum of Modern Art for changing the way we perceive moving through water. “His inspiration was the ocean and its natural inhabitants. His research also revolved extensively around that of a diver’s foot and the movements of the human leg. As art, he has hanging in his house an interesting chart that shows the human leg in several horizontal kicking positions. His notebooks are profuse with photos and drawings of different configurations of fins. “Some look like the fins of a squid. Others like a tuna and then some like a porpoise. He studied the fins of the fastest fish, and tried numerous designs and configurations to get just the right shape.” - Harry J. Wirth for “*The Art of Design: An Exhibition of American Design*” The American Design Network, 1993.

625. Most generations from same family diving together

Three generations of the Ivey family dove together from the dive boat *Sundiver* on July 30, 2007. Harry D. Ivey (71), his son Mike (40), and his granddaughter Shelby (11), dove off Catalina Island (California) during Shelby’s open water certification dive.



TOP: Bob Evans (Force Fin) has patented more than 35 revolutionary fin designs. Photo by Chris Kostman

BOTTOM: Bob Evans Extra Force Fin. Photo courtesy **Force Fin**

626. Most mermaids [Country]

According to the United States Bureau of Statistics, 1000 American men and women work as full-time mermaids and mermen.

627. Most money raised by diving charity [Canada]

Dive for a Cure raised $237,000 CAD for cancer research.

628. Most people breathing from a single 1st stage

75 divers breathed simultaneously from one 1st stage regulator on August 31, 2002. Seventy-five Scubapro R190 octos were rigged up through an elaborate hose and manifold system and connected to a single Scubapro Mk25 1st stage. The entire regulator system was fed by a 50 l (1,415 cu. ft), 4,350 PSI (300 bar) cylinder. The participants had to synchronize their breathing so that everyone was inhaling and exhaling at exactly the same instant. Due to the extremely high flow, ice formed all over the cylinder valve, 1st stage and even on the low pressure hoses. The air supply was depleted in 10 min. 9 sec.



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629. **Most people scuba diving simultaneously**
2,486 - Manado, North Sulawesi (Indonesia), August 17, 2009. The record was set during Sail Bunaken 2009, a tourism event promoting Manado. Divers taking part in the record also unfurled the flag of Indonesia to celebrate its Independence Day. **EDITORS NOTE:** There is conflicting information on the actual number of divers taking part in the event. Several sources, including Guinness World Records, claim that 2,486 divers were on the record dive. Other claims are as high as 2,861 divers.

630. **Most powerful underwater explosion [Man-made]**
30 kilotons - A Mark 90 Betty nuclear bomb was detonated at a depth of 610 m (2,000 ft) about 800 km (500 miles) southwest of San Diego (California) during Operation Wigwam. The test on May 14, 1955, was to determine the effects of deep nuclear blasts on submarines. An underwater explosion is also known as an UNDEX.

631. **Most radioactive dive site**
Bikini Atoll (Marshall Islands) - The most radioactive dive site accessible to recreational divers was opened in 1996, 50 years after the site was blasted with 22 atomic bombs. At the time, the assembled American and enemy ships used in the atomic tests was the world's fourth largest fleet. The ships sunk by the nuclear tests in 1946 now belong to the

21-kiloton underwater blast codenamed Baker at Bikini Atoll on July 29, 1946. **Photo: U.S. Department of Defense**



people of Bikini. Diving at Bikini is administered by the Bikini Atoll Council, under the name of Bikini Atoll Divers. The Kili/Bikini/Ejit Local Government Council met in August, 2008, to consider its fiscal year 2009 budget. It was decided that Bikini Atoll would remain closed for normal tourism operations during 2009. However, certain types of vessels are allowed to visit Bikini Atoll and dive on the wrecks provided definitive prior arrangements are made with Bikini Atoll Divers.

632. Most "Shaka" diver signs

165+ - Doug "Shaka" Corbin has compiled a list of over 235 (2008) different versions of the "Hawaii" Shaka Sign. According to "Shaka Doug," this is important to divers since it is very common to use the "Shaka" instead of the traditional "OK" sign. Underwater, the "Shaka" means "It's all good". One of Doug's latest additions: the "Diving Almanac Shaka."

633. Most underwater Santas

175 - On December 15, 2013, 175 divers clad in Santa Claus outfits dove simultaneously at Vobster Quay (UK) to raise funds for the Royal National Lifeboat Institution.

634. Most vertical wreck

HMS *Victoria*, a Victoria class battleship of the Royal Navy, sank off Lebanon in 1893 after a collision with another warship. The wreck was discovered in 2004 at a depth of 150 m (492 ft) by Christian Francis of Lebanon Divers. The latter 1/3 of the wreck stands vertical as a result of its massive deckgun which buried the bow into the mud. The *Rusalka* (Mermaid), a 62 m (204 ft) ironclad monitor of the Imperial Russian Navy, sank in the Gulf of Finland in 1893. It was discovered by sonar standing vertically in 2003.

635. Most volunteer dives at an aquarium

Ted Churchill (USA) logged 1,286 diving hours at the South Carolina Aquarium from December 2000 to September 2009.

636. Oldest drinkable champagne

In 2010, Swedish divers recovered 168 bottles of champagne from a 170-year-old shipwreck south of the Åland archipelago (Finland). The bottles found at a depth of 50 m (165 ft) were preserved by constant darkness, temperature (4-6°C), and pressure. A single bottle was sold at auction for €30,000 EUR ($32,625 USD).

637. Sword swallowing underwater

Matty Blade (Australia), January 1, 2004 - Matty claims to have swallowed a sword underwater in a swimming pool during a private party in North Perth, Western Australia. No photos or other proof available.

638. Sword swallowing u/w [Tank | Sharks | Stingrays]

Chayne Hultgren (Australia), May 9, 2006 - Chayne, a.k.a. the *Space Cowboy*, swallowed a sword underwater in a tank of live sharks in front of a live audience at the Manly Ocean World Aquarium in Sydney, Australia.

639. Sword swallowing u/w [Tank | Sharks | Stingrays | USA]

Dan Meyer (USA), May 18, 2007 - Dan swallowed a sword underwater in a tank of live sharks and stingrays at the Ripley Aquarium of Myrtle Beach, South Carolina. The record was witnessed on live television by over 25 million viewers.

640. Underwater aging [Cheese]

L'abysse du fjord (Fromagerie Boivin) - In November 2004, 800 kg of cheddar cheese worth $50,000 was submerged at a depth of 50 m (164 ft) in the Saguenay Fjord (Baie des Ha! Ha!) to test the effects of pressure on the aging process. The cheese was lost and never recovered.

641. Underwater aging [Wine]

600 bottles of Loire Valley wine (*Anjou Village de Brissac-Quince*) (300 white Burgundy and 300 Rhone Valley Crozes-Hermitage red) spent a year (2006-2007) submerged 10 m (30 ft) off the port of Solidor (Saint-Malo). Testers stated that the wine had better aged underwater than they would have in a cellar. The bottles were auctioned for the benefit of a French charity to feed the homeless, the *Restaurant du Coeur*, and the National Sea Rescue Society (SNSM).

642. **Underwater bench press [Most]**
Gerald Rioual (France) lifted a 50-kg (110 lb) barbell 36 times in 90 seconds on a single breath of air in November, 2014.

643. **Underwater cycling competition [Openwater]**
On September 4, 2005, 19 underwater riders from Guernsey and Jersey raced across a 60 m (200 ft) track in Havelet Bay, Guernsey (UK Channel Islands).

644. **Underwater cycling competition [Pool]**
Piero Gros (Italy) and Claudius Chiappucci (Italy) rode mountain bikes underwater over a distance of 600 m (1,969 ft) while using diving equipment in the communal swimming pool of La Spezia on June 24, 2001.

645. **Underwater cycling [Deepest]**
Vittorio Innocente (Italy) pedaled to the depth of 60 m (197 ft) off Genoa, Italy, on July 13, 2005. Mr. Innocente had to pedal over 250 m (820 ft) to reach the record depth.

646. **Underwater cycling [Distance | Openwater]**
Vittorio Innocente (Italy) cycled 65 m (213 ft) in 9 min. at a depth of 28 m (92 ft) off Portofino (Italy) on July 21, 2008.

647. **Underwater cycling [Distance | Pool]**
Vittorio Innocente (Italy) cycled 1.2 km (3,937 ft) in 23 min. 54 sec. in a swimming pool in Chiavera (Italy) on April 12, 2000.

648. **Underwater cycling [Speed]**
Vittorio Innocente (Italy) reached the speed of 0.87 m/sec (2.85 ft/sec) in a swimming pool in Chiavera (Italy) on April 12, 2000.

649. **Underwater dinner party**
500 divers sat down to a three-course underwater banquet on September 22, 2007, at The Park Club in West London. The food is coated in waterproof jelly to prevent it from breaking down in the pool. The Underwater Dinner Party raises over £200,000 for six charities, including the British Heart Foundation and Save the Children.

650. **Underwater flag raising [Most divers]**
2,486 - Manado, North Sulawesi (Indonesia), August 17, 2009. Indonesian Navy divers unfurled the flag of Indonesia to celebrate Independence Day. The record was set during Sail Bunaken 2009, a tourism event promoting Manado. **EDITORS NOTE:** There is conflicting information on the actual number of divers taking part in the event. Several sources, including Guinness World Records, claim that 2,486 divers were on the record dive. Other claims are as high as 2,861 divers.

651. **Underwater golf**
On May 28, 2007, 5 golfers take part in an underwater tournament at the Zuohai Aquarium in Fuzhou City, Fujian province. Hazards in the 15 m (50 ft) deep tank include sea creatures and currents. Whoever gets the ball in the hole first wins regardless of the number of shots.

652. **Underwater haircuts**
33 - David Rae cut the hair of 33 people in one hour at the London School of Diving (UK) in 2007.

653. **Underwater hula hooping**
Ashrita Furman hula hoped underwater for 2 min 38 sec in August 2007.

654. **Underwater ironing [Deepest]**
Louise Trewavas (UK) ironed a T-shirt at a depth of 137 m (452 ft), on August 17, 2006, off Dahab, Egypt.

655. **Underwater ironing [Most divers | Australia]**
On March 30, 2008, 72 divers ironed various items off Melbourne Pier, in Australia.

656. **Underwater ironing [Most divers | New Zealand]**
On May 20, 2005, 50 scuba divers from Dive Tutukaka! ironed various items at a depth of 29 m (95 ft) off Northland, New Zealand. The following equation is applied to measure the extremeness of Extreme Underwater Ironing: number of divers multiplied by the depth at which they iron. The Dive! Tutukaka record with 55 divers at 30 m (98 ft) thus achieved the extreme level of 1650.

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657. Underwater ironing [Most divers | UK]

On January 10, 2009, 86 divers (including 6 freedivers) ironed various items at depths varying from 6 to 55 m (20 to 180 ft) at the National Diving and Activity Centre (NDAC) near Chepstow, Gloucestershire. Water temperatures were in the region of 5°C (41°F) and air temperatures as low as -2°C (28°F). The event was organised by Gareth Lock, Morag Ward and John Turnock of the Yorkshire Divers Internet Forum. The goal was to raise money for the RNLI, the charity of choice for the forum for 2008-2009.

658. Underwater ironing [Most divers | World | Openwater]

On January 10, 2009, 86 divers (including 6 freedivers) ironed various items at depths varying from 6 to 55 m (20 to 180 ft) at the National Diving and Activity Centre (NDAC) near Chepstow, Gloucestershire. Water temperatures were in the region of 5°C (41°F) and air temperatures as low as -2°C (28°F). The event was organised by Gareth Lock, Morag Ward and John Turnock of the Yorkshire Divers Internet Forum. In addition to breaking the world record, the aim was to raise money for the RNLI, the charity of choice for the forum for 2008-2009.

659. Underwater ironing [Most divers | World | Indoors]

On March 28, 2011, 173 divers from the De Waterman dive club celebrated the club's 40th anniversary by ironing in an indoor pool in the city of Oss, Netherlands.

660. Underwater juggling

• Zdeněk Bradáč juggled three balls while diving for 1 hour 30 min on February 18, 2011.

• Ashrita Furman juggled three balls while diving for 48 min. 36 sec. at Kelly Tarlton aquarium in Auckland (New Zealand) in 2002. Furman's attempt at breaking his own record in February 2006 was disrupted by a nurse shark nicknamed Guinness at the Aquatheatre Aquaria in Malaysia after 37 min and 45 sec.

661. Underwater marathon

Lloyd Scott completed the world's first underwater by walking a 42 km (26 miles) stretch at the bottom of Loch Ness in 12 days, Scotland, in 2003.

662. Underwater pogo stick

Ashrita Furman traveled a distance of 512 m (1,680 ft) on a pogo stick underwater in August 2007.

663. Underwater post office [Deepest]

10 m (32.8 ft) - Susami Bay, Japan. Divers can use a mailbox to send waterproof postcards anywhere in the world. The mailbox is serviced by the Susami Post Office.

664. Underwater post office [First]

Sea Floor, Bahamas - J.E. Williamson converted an underwater sphere (the *Photosphere*) which had been used to film underwater scenes for *Twenty Thousand Leagues Under The Sea* (1915), into the world's first underwater post office. Collectible letters were sold and then postmarked from Sea Floor, Bahamas in 1939 and 1940.

665. Underwater post office [Most northerly]

The Risør Undervannspostkontor was first opened in Norway in 2004 at a depth of 4.5 m (15 ft). When no staff is present, divers simply leave their mail in the post office for later pick up.

666. Underwater post office [Staffed]

Vanuatu Post Hideaway Island (Port Vila) - The post office is only 50 m (164 ft) offshore and at just three metres below the surface. Thousands of visitors have posted one of the special waterproof postcards available in Vanuatu. The cards are collected regularly by one of Vanuatu Post's four trained scuba divers and "canceled" underwater with an embossing cachet. Mail that requires a normal Underwater Post Office date stamp is canceled in the Main Post Office. Since opening in 2003, the underwater post office has received an estimated 100,000 visitors. The underwater branch is manned daily for usually about an hour, longer on cruise ship days or with demand. "I love working at the underwater branch," says VPL's Samuel Robert. "It's great fun and really pleasing to see so many visitors each day who cannot believe their eyes!"

667. **Underwater rope skipping**
In October, 2014, Peter Nestler (USA) skipped rope 1,871 times in 60 min. in Raleigh (UK). He averaged seven to nine jumps per breath.

668. **Underwater Rubik's Cube [Fastest]**
Kevin Hays (USA) solved a Rubik's Cube in 13.40 sec. while holding his breath underwater on April 21, 2015.

669. **Underwater Rubik's Cube [Most]**
Kevin Hays (USA) solved eight Rubik's Cubes in 2 min. 4 sec. while holding his breath underwater on April 21, 2015.

670. **Underwater Rubik's Cube [One hand]**
Chris Dzoan (USA) solved a Rubik's Cube in 25.502 sec. using only one hand while holding his breath underwater in 2007.

671. **Underwater table football**
60 teams of two divers spent a total of 30 hours playing underwater table football in an aquarium in Kassel, Germany, on September 15-16, 2008. They played on a waterproof table and used steel balls.

672. **Underwater violinist**
Mark Gottlieb (USA) performed Handel's *Water Music* underwater at Evergreen State College in Olympia (Washington) in 1976. The music was played by speakers at the surface in the pool. He later played the Jaws theme underwater in the Shark Tank at Marine World in Northern California. An underwater violin is known as an aqualin.

673. **Underwater wedding [Largest]**
208 divers - Bakersfield, California, March 26, 2005. Married couple: Stuart J. Rex and Misty Kuykendall.

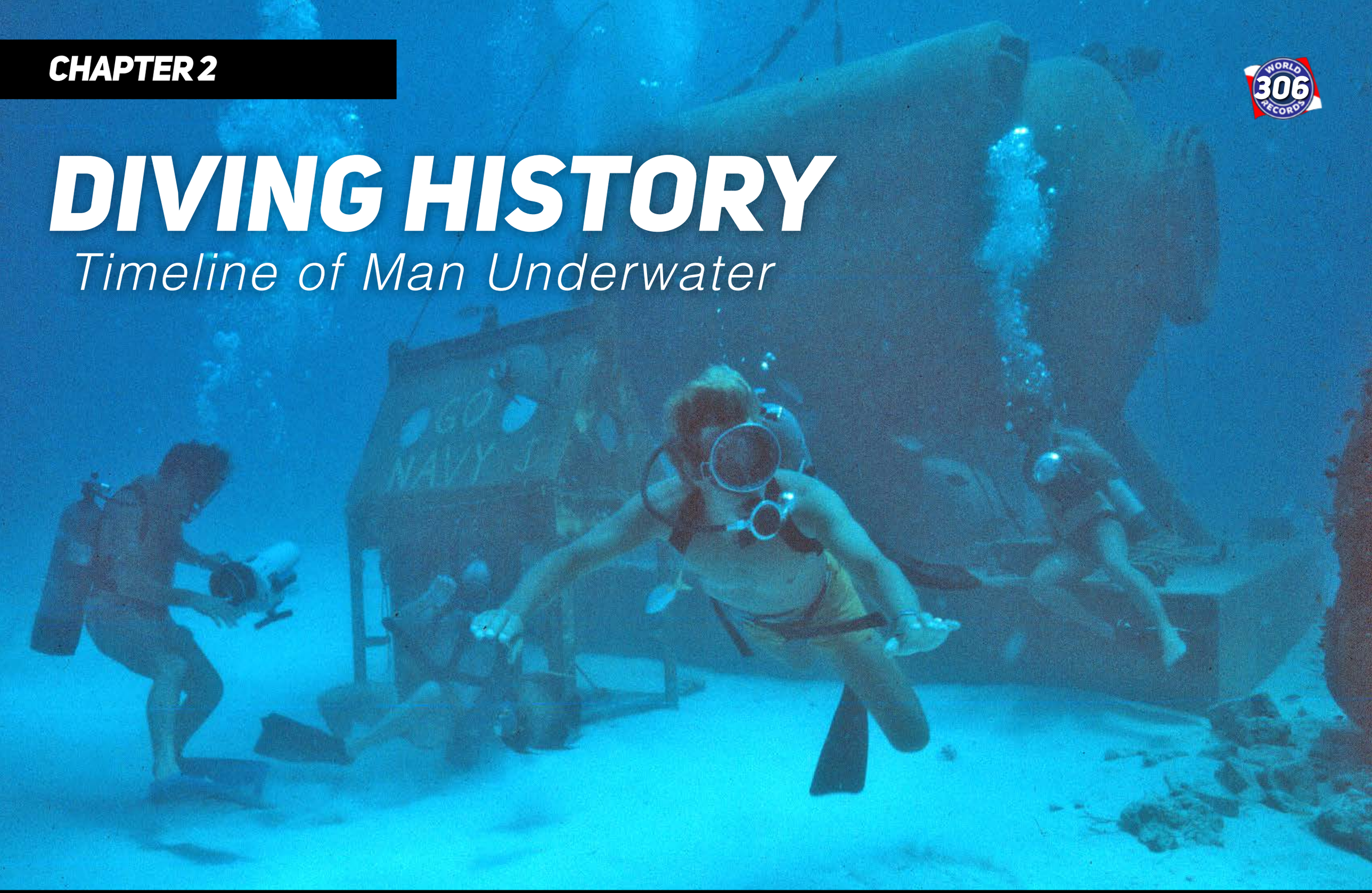
674. **Underwater wedding [Most couples]**
34 couples from 22 countries simultaneously exchanged wedding vows. Location: Kradan Island, Thailand, February 14, 2001. Depth: 10 m (33 ft). The couples had to be certified divers.



CHAPTER 2

DIVING HISTORY

Timeline of Man Underwater



Hydrolab is built. It begins its career as a NOAA underwater research laboratory in 1970. During its 15 years of operation, it becomes the busiest research habitat of its time. Crews of up to four people conduct approximately 100 missions in the Bahamas until the mid 1970s, and then 80 missions at St. Croix, in the United States Virgin Islands from 1977 to 1985. Photo: NOAA

DIVING ALMANAC RECORD #306

"And you may ask yourself, well … how did we get here?"



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CHAPTER 2

DIVING HISTORY

Timeline of Man Underwater

Man has been exploring the sea from the beginning of time, first in the search for food and then to undertake commercial and military exploits. Until the invention of the diving bell, men held their breath and dove upwards of 30 m (100 ft) often several times per day, sometimes never to return to the surface. Early evidence of breath-hold diving is found in drawings, ornaments and other artifacts made from mother-of-pearl and other seashells. Much of this historical evidence connects man to the sea as far back as 4,000 BC and earlier.



16th century painting of Alexander the Great, lowered in a glass diving bell. Image: OAR/NURP



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INTRODUCTION

The quest for sustenance was likely the first reason why people started to dive. Sea life was harvested for food, while sponges, pearls and seashells were collected to make tools and ornaments. Sponge diving dates back to ancient times. It offered a good source of revenue but it was also challenging and dangerous work for the divers. Small boats brought them out to sea where they used a glass-bottomed cylinder to spot the sponges on the sea floor.

The divers descended by holding a heavy stone that was tied to the boat. This stone allowed a fast descent to the bottom where the diver collected sponges into a net for as long as he could hold his breath. Divers could reach depths up to 30 m (100 ft) and, depending on lung capacity, could stay underwater for two to five minutes.

Today, freediving for food and pearls is no longer commonplace with the exceptions of South Korea and Japan, where the age-old practice is still performed by small groups of women known as haenyo (South Korea), and ama (Japan).

"So that sponge fishers may be supplied with air for respiration, vases are lowered in the water with the mouth downward so they fill not with water, but with air; these vases are forced steadily down, held perfectly upright, for if tipped slightly, the water enters and knocks it over."

- Aristotle

In 1599, Samuel de Champlain noted in his West Indian Journal, that pearl diving had already established itself in the New World.

"From this port, Margarita, more than three hundred canoes leave every day, going a league offshore to fish for pearls in ten or twelve fathoms. The fishing is done by slaves of the king of Spain, who take a little basket under their arm, and with it plunge to the bottom of the sea, and fill it with oysters, and climb back into their boats."



Ama (Sea People) divers in Japan have been diving for pearls and food for over 2,000 years. Photo: GNU

Divers have long taken part in military activities. Historical documents and drawings show divers performing underwater operations in the 5th century BC, during the Persian wars, in the siege of Tyre in 332 BC, and in other conflicts.

"There was some skirmishing in the harbor around the palisades the people of Syracuse had planted in the sea so that their ships could not be reached by the enemy. The Athenians sent a 250-ton ship with wooden towers to pull up the palisades or they dived and sawed through them underwater, at length destroying most of the stakes. There were some stakes out of sight in the water, the most dangerous of all, and these were sawn off by hired divers."

- Thucydides, Siege of Syracuse

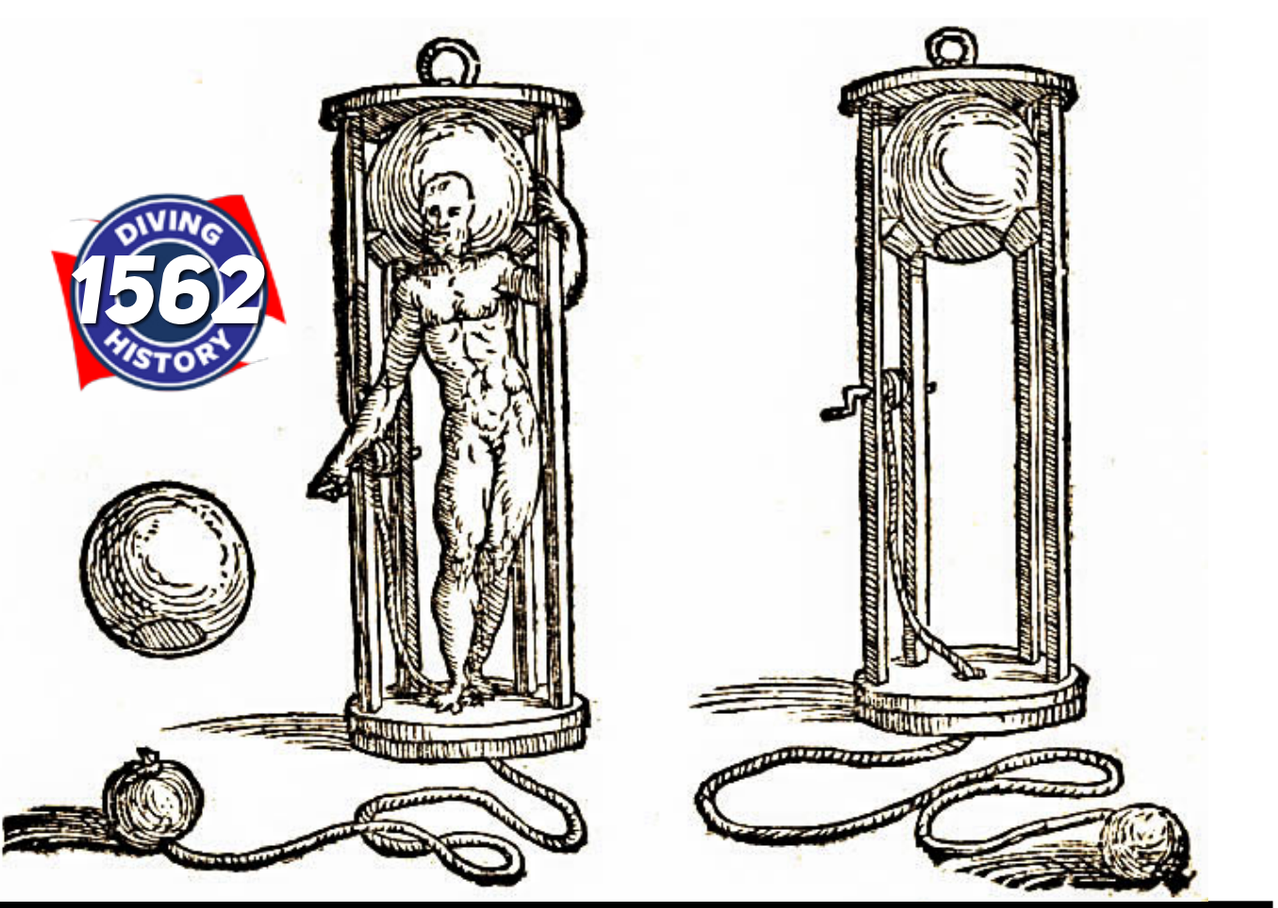
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In his work *Problemata*, Aristotle writes about Alexander the Great himself going underwater in a diving bell during the siege of Tyre.

Around 100 A.D., the business of underwater salvaging was so well organized that a set salary rate was instated: at 8 m (26 ft), a diver could keep half of what he recovered; at 4 m (13 ft), one third; at 1 m (3 ft), one tenth. Since the diver was limited by the air he could carry in his lungs, staying submerged for extended periods required the invention of devices that would make air available underwater. This would ultimately lead to the invention of the diving bell.

THE DIVING BELL

The first diving bell was of a very simple design resembling an overturned bucket. It was negatively buoyed by weights and divers could exit from the bottom and return to breathe the trapped air, which was compressed by water pressure, inside the bell. The divers could thus go back and forth for as long as the air was breathable.



Diving bell proposed by Nicolo Tartaglia (1562). Image: NURP

A more sophisticated device appeared in 1531 when Italian inventor Guglielmo de Lorena constructed a small glass bell encompassing the diver's head, which was later successfully used to recover Caligula's pleasure galleys in Lake Nemi.

In 1690, Edmund Halley improved upon the diving bell by providing for a supply of fresh air sent down in barrels from the surface, thus greatly increasing the amount of time that could be spent at the bottom. Records show that he was able to keep three men underwater for 90 minutes at a depth of 18 m (60 ft). Halley also provided a leaden helmet, fed with air from the bell through a hose, thus enabling a diver to work outside the bell.

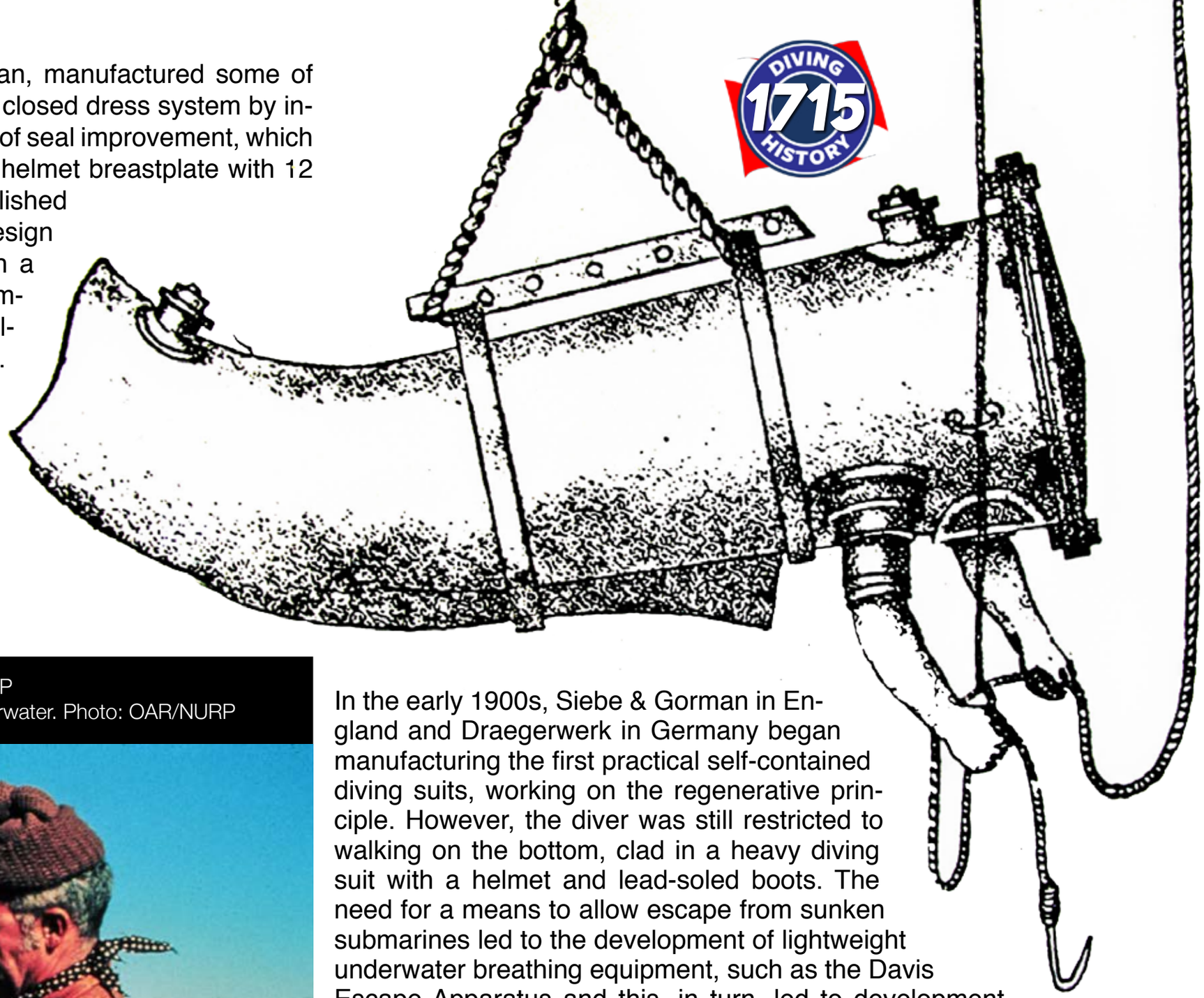
In 1715, Englishman John Lethbridge constructed a cylindrical wooden diving engine, in which he lay prone with his arms passing through tightly bound leather cuffs, so that he could work on the bottom. A small window allowed him to see below and air was replenished approximately every 30 minutes by hauling the machine to the surface and removing plugs to allow air to be blown through by means of a bellows. Lethbridge recorded that he worked many times at depths of 18 m (60 ft), sometimes remaining in the machine for more than six hours. Because the arm seals were made of leather, they leaked constantly. Jacob Rowe, a contemporary of Lethbridge, constructed a similar diving engine from copper and brass.

DIVING SUIT AND HELMET

After the diving bell came variations of the diving helmet. In 1771, French scientist Freminet invented the hydrostatergatic machine, a helmet fitted with an air hose allowing the diver to remain submerged for up to 45 minutes.

In 1787, German mechanic Karl Heinrich Klingert devised a diving suit made from tinplate and waterproofed leather, which was intended to be supplied with air from a large reservoir. The suit itself - without the reservoir - was successfully used in the River Oder where the diver breathed air through tubes supplying air from the surface.

Augustus Siebe, a German-born Englishman, manufactured some of the early Deane helmets. He developed the closed dress system by incorporating George Edward's 1838 waterproof seal improvement, which connected the neck to the perimeter of the helmet breastplate with 12 nuts, bolts and retaining straps. Siebe established this as the most successful closed dress design in 1840 when he modified the system with a removeable bonnet and face port. Siebe's improvement to the original diving helmet allowed divers more safety at greater depths. It revolutionized diving and was used in both salvage operations and underwater engineering. This design also included weighted boots and an overpressure valve in the helmet. Siebe would eventually be known as the father of diving.



TOP RIGHT: *Rowe Diving Machine* (1715). Image: OAR/NURP
BELOW: Early hard hats were heavy in air, but buoyant underwater. Photo: OAR/NURP



In the early 1900s, Siebe & Gorman in England and Draegerwerk in Germany began manufacturing the first practical self-contained diving suits, working on the regenerative principle. However, the diver was still restricted to walking on the bottom, clad in a heavy diving suit with a helmet and lead-soled boots. The need for a means to allow escape from sunken submarines led to the development of lightweight underwater breathing equipment, such as the Davis Escape Apparatus and this, in turn, led to development of military closed-circuit apparatus used by frogmen and clearance divers in the Second World War.

The availability of high-pressure gas cylinders in the early 1900s also made possible the first practical compressed air open-circuit apparatus, such as that invented by Frenchman Yves Le Prieur and later, Cousteau & Gagnan's hugely successful Aqua-Lung. Le Prieur's apparatus had a full-face mask fed via an adjustable regulator connected to a small chest-mounted air cylinder. However, the Aqua-Lung was equipped with

a demand valve, which brought air to a mouthpiece at the same pressure as the surrounding water, and at the exact rate required by the diver, so that no adjustment was needed, and there was no waste of air. SCUBA, as we now know it, had arrived.

SCUBA

The 19th century saw several inventors develop autonomous - self-contained - diving apparatus in order to eliminate the diver's dependence on surface support. In practice, the first designs were more of a novelty than a useful working tool, since the diver's physical link to the surface was what had made diving a relatively safe occupation. Not knowing the whereabouts of a diver in murky water and lacking means to communicate with him would prove to be very dangerous.

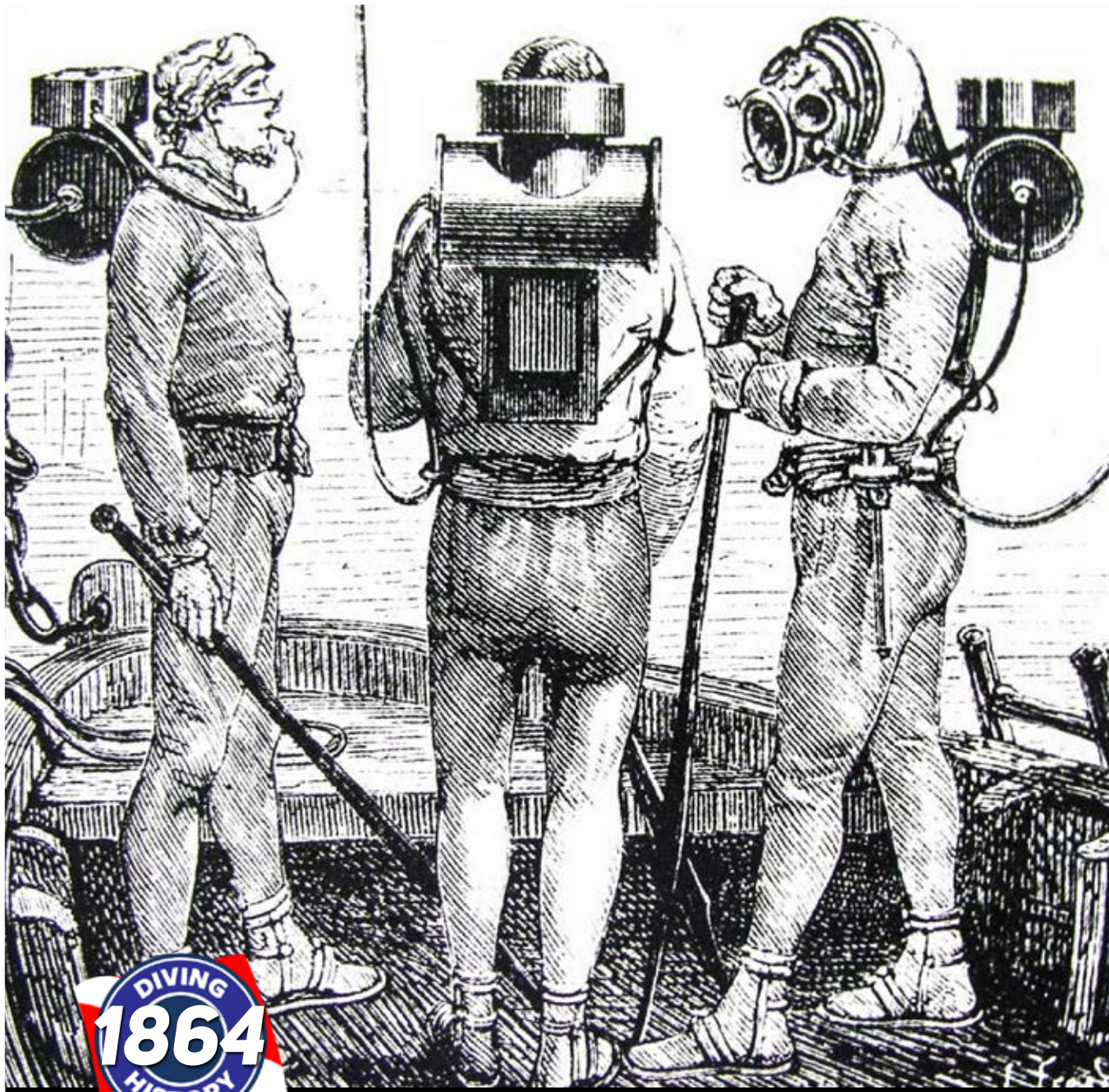
In 1825, Englishman William James devised a self-contained diving suit equipped with a helmet supplied with air from a reservoir worn around his waist. In 1831, American Charles Condert built a similar apparatus. Despite an initial series of successful dives using the apparatus, he was killed when the tube supplying air to his helmet fractured.

In 1864, two Frenchmen, Rouquayrol & Denayrouze, developed an improved compressed air diving apparatus that could be used with or without surface supply. A cylindrical iron reservoir carried compressed air on the diver's back.

A simple diaphragm-operated demand valve atop the reservoir supplied air at ambient pressure to the diver when needed. This device was the true forerunner of the Aqua-Lung regulator although air was supplied from a surface pump. The reservoir could only hold a supply of approximately ten minutes of air. Jules Verne equipped Captain Nemo and his crew with Rouquayrol & Denayrouze diving apparatus in his classic tale *Twenty Thousand Leagues Under the Sea*. A later development of this apparatus, used for rescue work in mines, was called the Aerophore.

In 1878, Englishman Henry Fleuss developed a closed-circuit autonomous diving dress. Although it attracted a great deal of interest at the time - it was used to rid the Severn railway tunnel of flood water - the design was not a commercial success. However, a simpler version developed for rescue work in mines eventually became a popular product. The Fleuss apparatus was the ancestor of the Davis Submarine Escape Apparatus and its derivatives, which were used by Italian and British divers during the Second World War.

It was not until the 20th Century that diving would become a recreational activity. The simple invention of Americans William Dunn and William Miller, the Divinhood (1915), would make the underwater world accessible to almost anyone by eliminating bulky, complicated, and expensive



Rouquayrol and Denayrouze self-contained air supply device.
Wood print: Le Musée de l'Espalion

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Denayrouze three-bolt helmet (1867). Photo courtesy **David Dekker**

diving equipment. Gone were the lead boots, the suit and weights, and the heavy pump. All that was needed was a miniature diving bell resting on the user's shoulders. The device was weighted at the bottom edge to keep it upright, and it was fed with a garden hose and a lightweight pump operated by a friend or colleague.

Marine biologists such as William Beebe and Roy Waldo Miner were quick to recognize the possibilities of this simple device that finally enabled them to study marine life in its natural environment. Their writings aroused a new public interest in the undersea world and from these beginnings evolved the sport of underwater exploration.

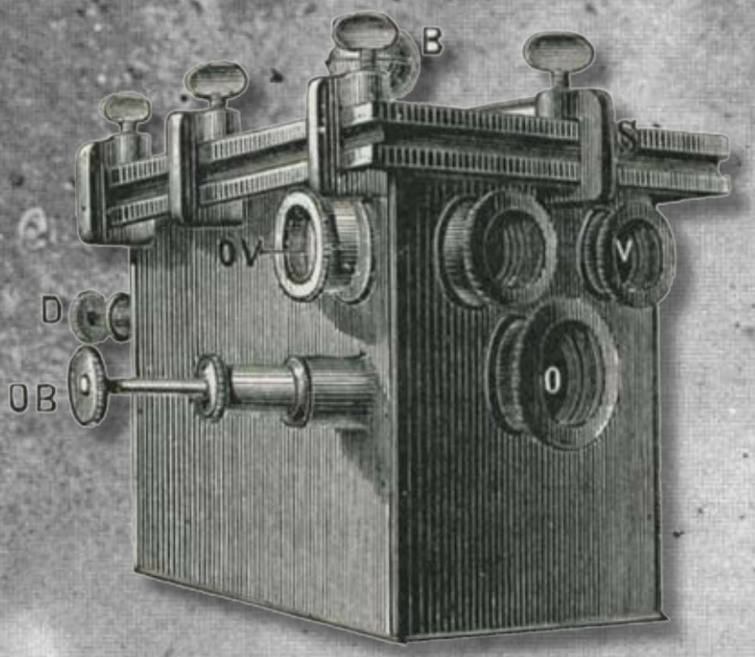
The 1930s saw the rapid development of diving goggles, masks, fins and snorkels, making the underwater world accessible to everyone. At last, even the not-so-wealthy could become explorers, spearfishers and treasure hunters. The invention of the Aqua-Lung in 1943 greatly extended the range of depth that divers could explore. The sport diver, as we know him now, was born.

PHYSICS AND PHYSIOLOGY

Thanks to the development of new equipment and techniques, depths attained by divers and the amount of time spent underwater increased dramatically. Coincidentally, the number of divers afflicted by a strange malaise became commonplace. Researchers therefore spent a lot of time studying what came to be known as decompression sickness or the bends. One of the first studies on pressure changes was by Frenchman Paul Bert who suggested that gradual ascent would prevent the problem and recompression would relieve the pain of divers who had surfaced too quickly. In the early 1900s, detailed studies were published by John Scott Haldane, Arthur E. Boycott and Guybon C. Damant. These studies included tables with recommended decompression stop times based on the depth and duration of dives, which were later tested by the U.S. Navy.

In the early 1900s, many innovations in diving equipment were made by the U.S. Navy. Among them was the Mark V Diving Helmet. Testing dive tables and stage decompression, American divers went from diving to 18 m (60 ft) to eventually reaching 84 m (274 ft). The U.S. Navy also experimented with helium-oxygen mixtures, and studies showed that these mixtures were advantageous for deep dives, leaving divers without undesirable mental effects while shortening decompression time. From these studies came reliable decompression tables and specialized apparatus. Today, the causes and treatment of decompression sickness are still the focus of much research and discussion.

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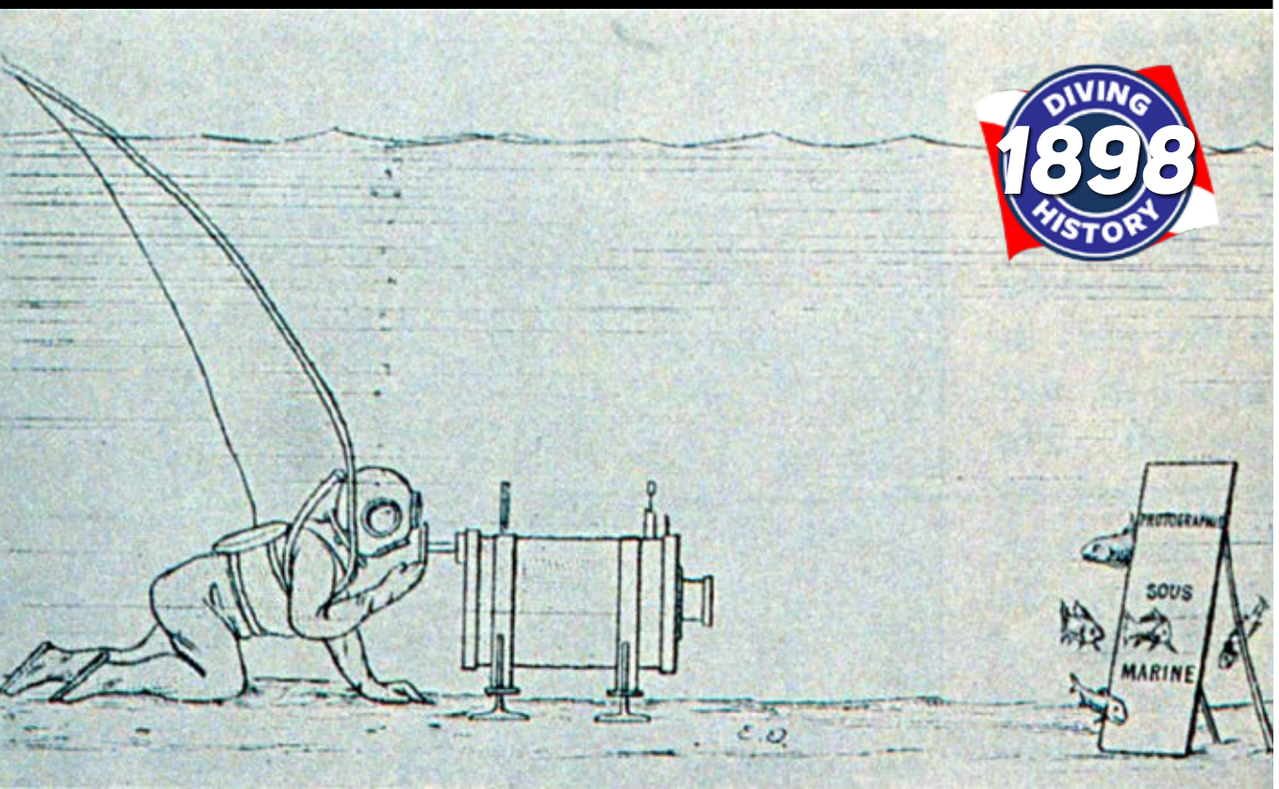
Louis Boutan autoportrait taken with a Detective camera inserted into a wooden housing designed by himself and Joseph David. This photo is likely the world's first underwater selfie! (PD) ***DIVING ALMANAC RECORD #177***

UNDERWATER PHOTOGRAPHY

Modern underwater cameras come in all shapes and sizes. In the early days, camera housings were leaky behemoths and lighting systems were as huge as they were ineffective. Taking even one photo required much preparation and hard work wearing cumbersome dive gear. The first photo taken underwater was by Englishman William Thompson (1822-1879) in February, 1856. He got the idea while watching a wave battered bridge from a public house. Thompson used the collodion process to take the single photo during which the camera flooded. Although the resulting image was by no means a masterpiece, it was nonetheless a technical success.

[…] I knew that, could we sink a glass plate, prepared with collodion, to the bottom of the sea, in theory there was no reason why we should not obtain as good an image as we do on land, provided the sea water could be kept from the camera, and that the light was sufficient. I was not, sufficiently versed in optics and chemistry to know whether or not the water obstructed any and what light ray.

Louis Boutan's third underwater camera system (1898). Image: NOAA



Following my idea, we made a box as nearly watertight as we could, and large enough to enclose the camera. This box is fitted, in front with a piece of plate glass and on the outside is a wooden shutter, heavily leaded, and which is raised by a string attached to it and communicating with the boat. […]

[…] Up to the present point everything has been done on land. We now lash the whole of the apparatus, properly set, to the stern of the boat, and, when we arrive at the proper spot, sink the camera. By means of the lowering rope we can find when the camera is upright at the bottom. When satisfied on this point, we raise the shutter in front of the camera box, by means of the string attached to it, and the other end of which communicates with the boat. The camera is now in action. […]

[…] When I opened the camera and found it full of water, I despaired of having obtained a view; but it would appear that salt water is not so injurious as I had feared. I took the precaution of washing the plate gently with fresh water, and then of dipping it, for an instant in the silver bath. The plate was exposed for ten minutes on an ordinary day in the month of February; it took nearly the same time to develop with pyrogallic acid, using Horne and Thornthwaite's collodion; you will see the negative is a weak one. […]

[…] This application of photography may prove of incalculable benefit to science. We may take (to a reasonable depth) sketches of submarine rocks, piers of bridges, outlines of sandbanks, in fact, everything that is required under water. Should a pier of a bridge require to be examined, you have but to suit your camera, and you will obtain a sketch of the pier, with any dilapidations; and the engineer will thus obtain far better information than he could from any report made by a diver […]

- William Thompson, Weymouth, May 6, 1856

After taking a single photo, Thompson made no further attempts with his crude device and nearly 40 years went by before Frenchman Louis Boutan designed and repeatedly used a sturdier and more reliable sys-

tem in 1893. Boutan's housing weighed approximately 180 kg (400 lbs) in air. It was constructed with the help of his brother Auguste, an engineer, and Joseph David, a mechanic in the French navy.

[…] The boat being anchored securely to the bottom and kept stationary with the help of a series of cables fixed to the rocks of the coast, I put on my diving suit and went in at the point chosen in advance as the center of operations. After having landed at the desired depth, I signaled the captain to lower the different parts of the photographic equipment. On the end on a line I received the iron platform, the copper-covered camera, and a weight to anchor everything.

The view chosen, I would set up the base of the apparatus at leisure and arrange the camera in such a way as to have only to press a button to open the shutter. This done, I sent another signal to the captain who held the lifeline in his hand. This signal indicated that the exposure had begun, and I would wait patiently for the captain to indicate the end of the operation.

You understand, of course, that it is impossible or, at least, very difficult without a special gadget, to take a watch down in a diving suit to time the exposure. Thanks to the method that I had adopted, this difficulty was overcome; the captain's job was to consult his watch and warn me in time.

It was thus that the photographs were obtained, after exposures that lasted up to a half-hour. […]

- Louis Boutan (Date unknown)

The emergence of underwater photography in public awareness truly began in 1916 with the Williamson Brothers' underwater film *Twenty Thousand Leagues Under the Sea*. In the 1920s, naturalist William Beebe began using underwater photography to study marine environments and to illustrate his books. In 1929, E. R. Fenimore Johnson began scientific experimentation in underwater photography and became America's first commercial manufacturer of underwater camera housings.

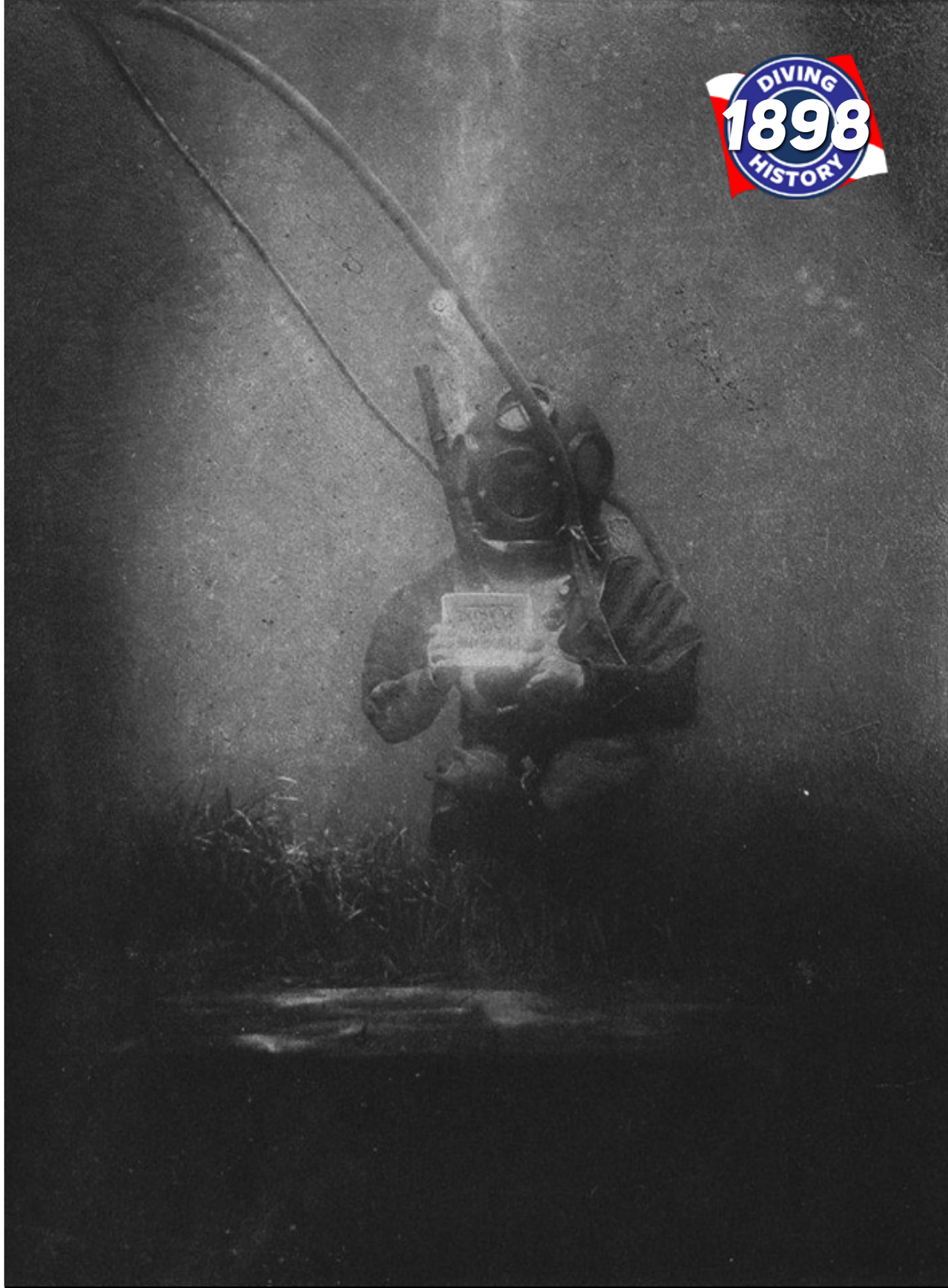


Photo of oceanographer and biologist Émile Racovitza from Louis Boutan's book on underwater photography titled *La photographie sous-marine* (1899) (PD)

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Model Carlos Parraga uses a **Seacam** housing to document a coral reef off Cape Kri, Raja Ampat, Indonesia. Photo courtesy **Stephen Frink**

From the 1950s, authors wrote books presenting how-to information on underwater photography. At the same time, camera housings progressively became available to sport divers. In 1953, Jordan Klein introduced the first amphibious camera, the Mako Shark, which introduced thousands of divers to underwater photography.

Over the years, advancements in technology and the abundance of literature have made underwater photography one of the most popular diving activities.

SCIENCE AND EXPLORATION

The 1900s was a time of great explorers in the diving industry. In 1934, William Beebe and Otis Barton made a descent to 923 m (3,028 ft) in the *Bathysphere*, a diving vessel that was attached by a steel cable to its mother ship.

Beebe and Barton's exploit as well as subsequent records would all be eclipsed on January 23, 1960, when Swiss inventor Auguste Piccard and Don Walsh (USN) descended to the deepest point on earth, the Challenger Deep (Mariana Trench, Guam) at the depth 10,916 m (35,814 ft) aboard the bathyscaphe *Trieste* (Project Nekton). No other human would see the bottom of the Challenger Deep until James Cameron repeated the exploit during a solo submersible dive 52 years later, in 2012. Many of the principles used in the building of the Bathysphere and bathyscaphe Trieste are incorporated in research submersibles today, including James Cameron's *Deepsea Challenger*.

If humans were now able to admire the wonders of the sea from below the surface, they would soon become aware of the effects of pollution, unbridled development, and overfishing. This led people such as Jacques-Yves Cousteau to contribute to the development of the environmental movement in the 1970s. Today, divers all over the world, including scientists and sport divers, continue to make discoveries and promote environmental awareness.

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Diver examining unexploded ordnance on the wreck of HMS *Raleigh* in Labrador

DIVING ALMANAC RECORD #318 Photo by Jeffrey Gallant | Diving Almanac

PUBLICATIONS

In addition to the development of user-friendly equipment, scuba diving has become more accessible thanks to the publication of books, magazines and websites. Englishmen Charles and John Deane authored the first diving manual in 1836. More than a century later, diving legends such as Hans Hass (*Diving into Adventure*, 1951) and Jacques-Yves Cousteau (*The Silent World*, 1953) mesmerized readers and thousands of future divers with their adventurous stories on underwater exploration. The first national diving magazine in the United States, The Skin Diver, was first published in December, 1951. The inaugural issue contained only 16 pages and catered mostly to underwater spearfishers. By comparison, the June 1990 issue contained 270 pages and had a paid circulation of 223,077 copies. Skin Diver was to become the longest-lived diving publication in the world (51 years) until its last issue in November, 2002. The longest established diving publication still in print in North America is Canada's Diver Magazine (est. March 1975 under the name Pacific Diver). In 2014, over 100 diving magazines were published around the world in several languages.

At the turn of the millennium, a multitude of independent web-based magazines and portals catering to divers could be found on the Internet. Unfortunately, many of these websites were short lived as webmasters couldn't keep up with the countless hours of work required to keep their product updated and esthetically pleasing. Much of the initial wave of dive-related websites quickly became inactive or went offline. Slowly but surely, the Internet has nonetheless played an increasing role in the demise of several print magazines and in the decrease in popularity of books.

Today, the dive publishing industry is composed of a few large publishers, and of several smaller companies that put out a steady number of magazines and new book titles every year, ranging from specialty items on underwater photography and technical diving, to coffee table books containing award-winning photos from around the world. Most print publications now offer digital versions of their magazines and books, and a

few publications are entirely web-based.

DVD sales have flourished as more and more divers produce their own films on marine biology, wreck diving, history, training and travel.

DIVE TRAVEL

Dive travel has established itself as a major staple of the tourism industry. Traveling for diving began to take hold in the 1960s in Florida and in the Caribbean. Today, resorts and liveaboards offer diving venues on every ocean and major body of water in the world, including Antarctica. Much information is available on the Internet where divers can plan trips based on the desired type of diving (sport, technical, rebreather, expedition, sharks, etc.), or other considerations (gay & lesbian, singles, etc.).



Dive boat at **Anthony's Key Resort** on the island of Roatan
Photo by Jeffrey Gallant | Diving Almanac

FREEDIVING

Long before breathhold diving became a recreational activity and a competitive sport, it was part of the daily lives of thousands of people who dove for reward or sustenance. In most cases, it was very dangerous work. Divers often descended to depths of 30 m (100 ft) to carry back heavy loads on a single breath of air and in many cases, without fins or any kind of thermal protection.

For thousands of years, pearls were a much-sought-after commodity and divers were very active on the Persian Gulf, the Indian Ocean and the Philippines. Native Americans even collected pearls in lakes and rivers.

In the Pacific, the haenyo (sea women) of Jeju Island (South Korea) took over diving from men in the 18th century because they were exempt from a new tax. Many such women became the biggest earners in their families while the men stayed at home to take care of the children. Some have made small fortunes diving for high-priced abalone and conch. Unfortunately, the haenyo may become part of Korean folklore in the near future. In 1950, the number of haenyo was about 30,000 on Jeju. In 2003, there were only 5,650 and 85% were over 50 years old.

The ama (sea person) divers of Japan have been diving for food and pearls for 2,000 years. Unlike the haenyo, ama divers include a few men although the vast majority are women. Traditional ama divers wear only a loincloth and no diving equipment. Today, this is mostly done for tourists while others dive with masks, fins, and even a wetsuit.

In 2015, the motivations and activities for recreational freediving are much the same as for recreational scuba, but without most of the equipment. For many, what is lost in the range of depth is more than compensated by the feeling of freedom offered by the absence of cumbersome dive tanks, suits and weights.



Haenyo (Sea Woman) at Jeju Island, South Korea (GNU)

World champion freediver William Trubridge begins his descent in Dean's Blue Hole in the Bahamas. Photo courtesy **Vertical Blue**

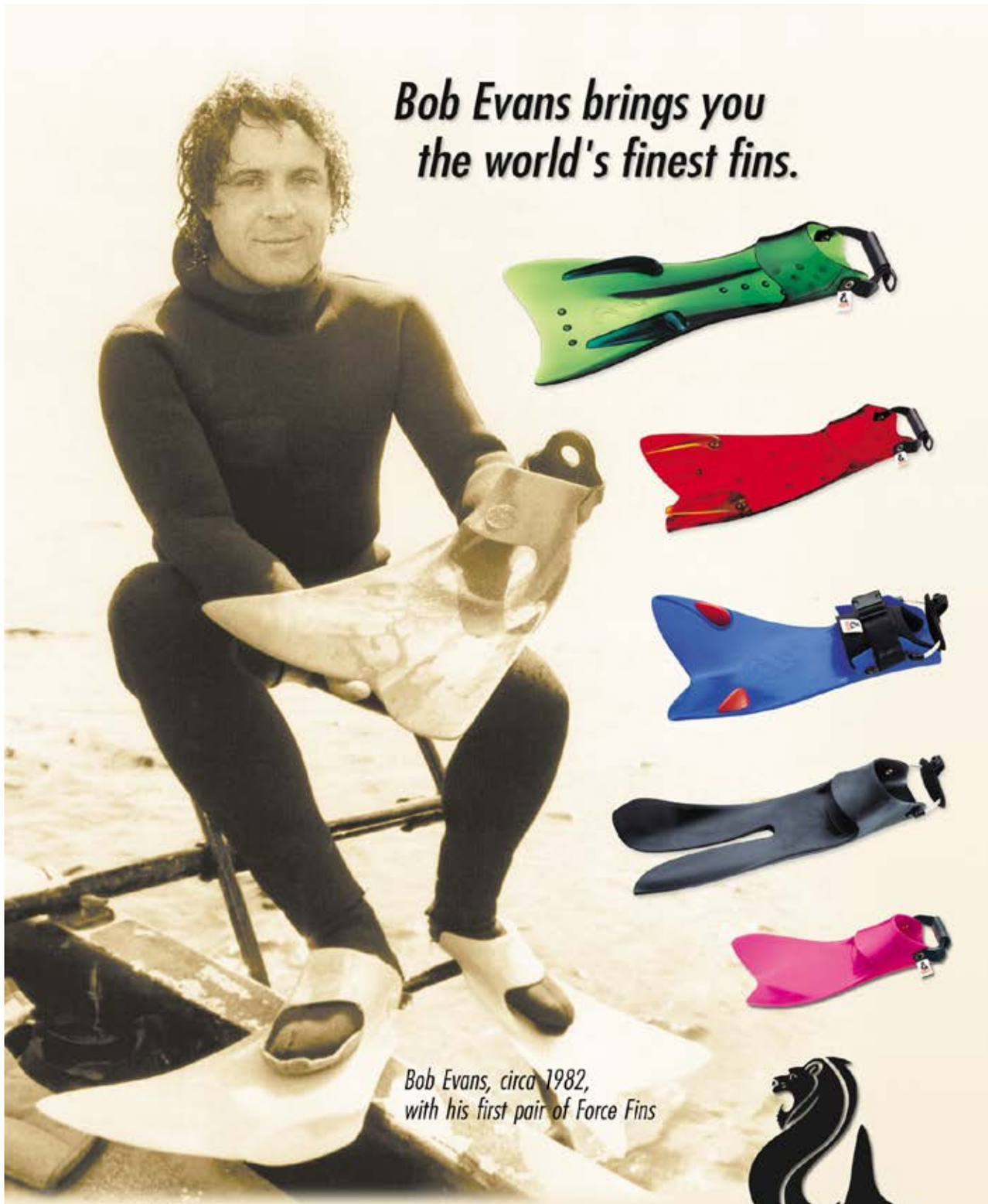


Competitive freediving first took hold in Europe, where world champions such as Frenchman Jacques Mayol and Italian Enzo Maïorca traded world records in the 70's. Luc Besson's cult movie *The Big Blue* (1988) was the inspiration for hundreds of new freedivers in the 80's where divers such as Umberto Pelizzari and Francisco 'Pipin' Ferreras pushed depth limits to new extremes.

Today, competitive freediving is popular on all continents and it is practiced by people of all walks of life.

RIGHT: World champion freediver William Trubridge. Photo courtesy **Vertical Blue**





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TIMELINE OF MAN UNDERWATER

This timeline is a chronological overview of the key events that have marked the evolution of diving. Topics covered include equipment development, exploration, science, underwater warfare, depth milestones, freediving, photography and cinematography.

4000-4500 B.C

Seaside communities in many parts of the world, including the Mediterranean, the Middle-East, Asia and the Pacific, dive for sustenance and to conduct war.

1194 B.C.

Homer writes of divers attacking ships during the Trojan War in the *Iliad*.

500 B.C.

• **H**erodotus tells of Cyana and her father Scyllias, a pair of divers who recovered sunken treasure for the Persian King Xerxes. When he refused to let them return home, they cut the anchor ropes of the entire Persian fleet under the cover of darkness and fled to aid the Greeks.

• **E**arliest records of divers for treasure go back to Persian King Xerxes during the Persian Greek wars.

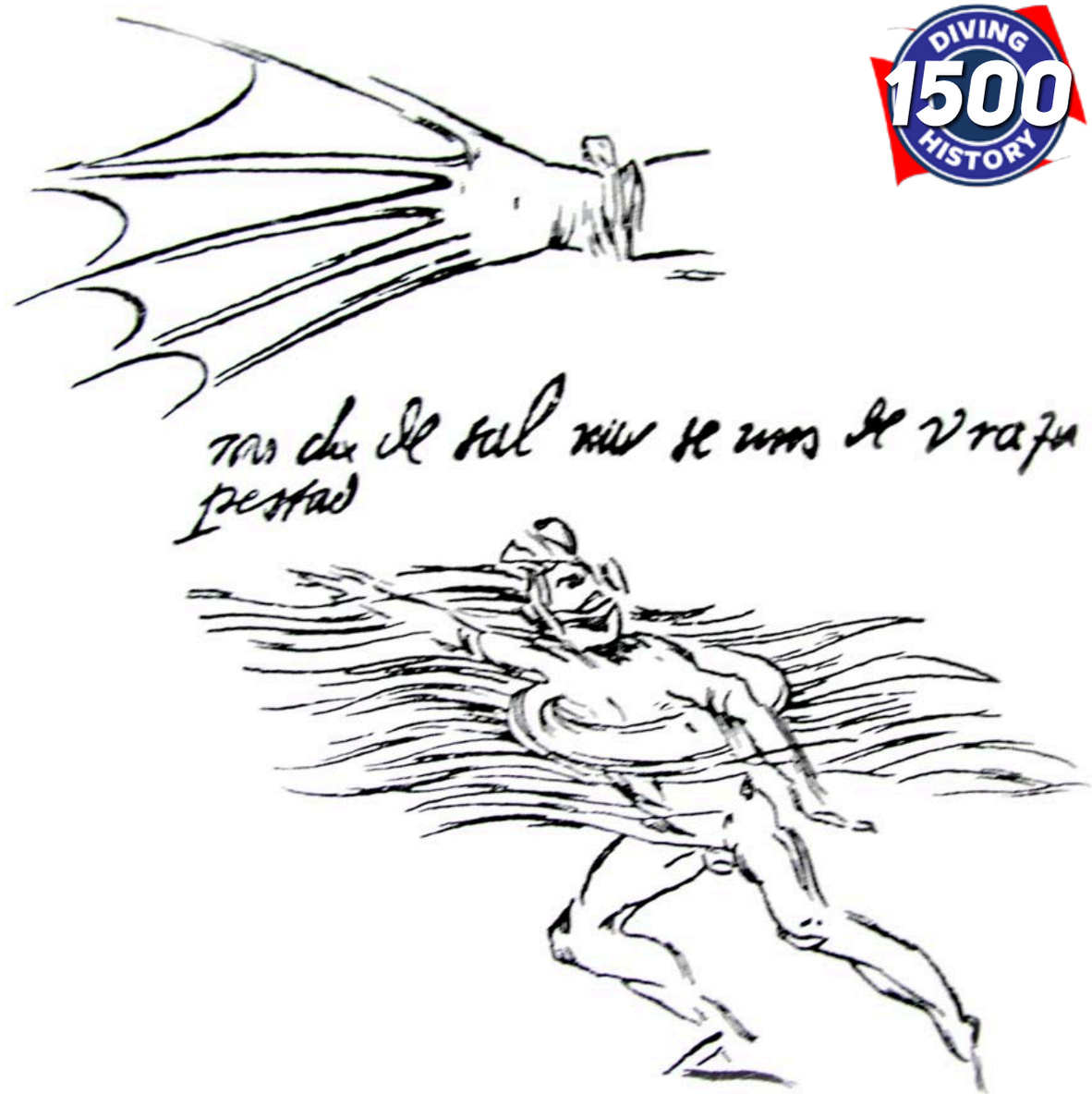
EDITOR'S NOTE: While researching historical data for the following timeline, several discrepancies were found with names, dates and places. If you find errors or if you would like to suggest historical events for consideration in the next edition, please contact us so that we may make corrections or updates. Thank you.

history@divingalmanac.com

332 B.C.

• **A**ristotle describes a diving bell in his *Problematum*. The bell has an open bottom and is lowered upright into the water. It is used by sponge divers in the Aegean. It is also used by Alexander the Great during the siege of Tyre in 332 B.C.

• **T**he diving bell was by far the most used method of diving for the next 21 centuries.



Drawing from Da Vinci's *Codex Arundel* (PD)

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CIRCA 1500

Leonardo Da Vinci designs a diving suit and flexible snorkel system for breathing at depth. The snorkel is made of cane tubes joined by pig leather and reinforced with steel rings to counteract the effects of water pressure. The system is successfully tested in shallow water in the Venetian Lagoon by Jacquie Cozens in 2003 for Leonardo's Amazing Inventions (BBC). Da Vinci also develops the first known self-contained diving system using a leather wineskin to hold air and a urination bottle within the suit for prolonged immersions. The drawings appear in his Codex Arundel. There is no evidence that the apparatus was ever built.

1535

Italian Guglielmo de Lorena successfully uses a diving bell equipped with a glass port to recover Caligula's pleasure galleys in Lake Nemi.

1551

Nicholas Tartaglia proposes a bell device resembling a weighted hour-glass. The entire air supply is contained in a small dome at the top, which makes the design impractical. More than 400 years later, Al Giddings builds a replica that is tested by Pete Romano to a maximum depth of 9 m (30 ft).

1570s

William Bourne, an English mathematician draws the first plans for an underwater boat powered by oars.

1597

Lorini describes a square diving bell made of wood and bound with iron bands. The bell also has glass ports to enable the diver to scout his surroundings.

1616

German inventor Kessler designs an unstable diving bell with glass ports.

1620s

Dutch physician Cornelis Drebbel builds the first submarine made of wood reinforced with iron and leather. Like Bourne's earlier design, it is oared from the inside by a 12-man crew. The sub is operated successfully in the Thames River at depths of up to 4.6 m (15 ft).

1620

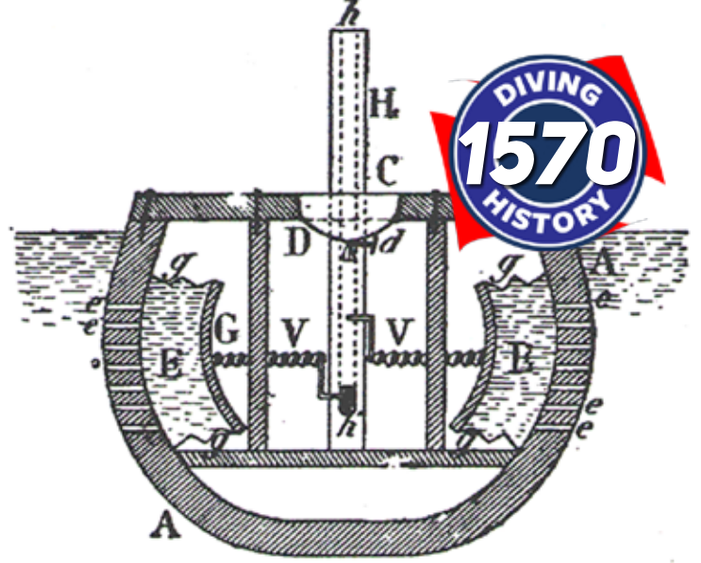
Lord Francis Bacon describes a diving bell made of metal in *Novum Organum*. It is used to recover items from submerged vessels.

1626

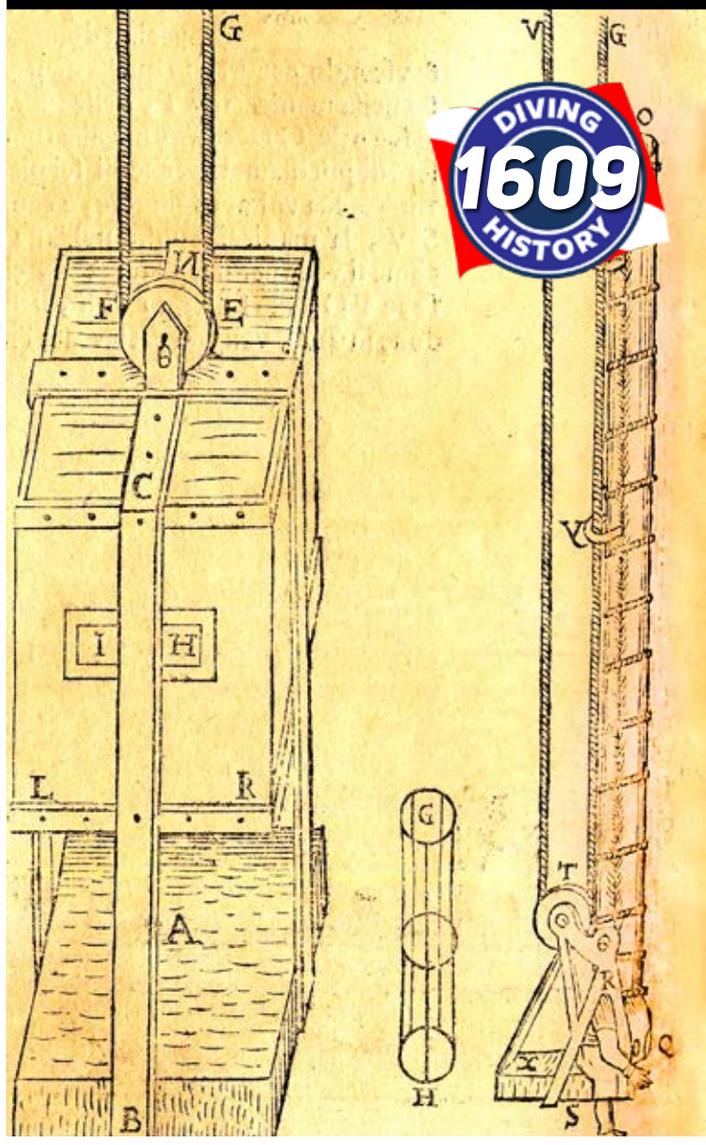
A Spanish salvage operation in the Florida Keys locates the wreck of the *Santa Margarita* - sunk in 1622 - using a bronze diving bell with glass view ports at a depth of 8 m (25 ft). They also discover that Native Americans have already salvaged part of the treasure, an indication that the natives have some knowledge of diving. Nine natives are hired by the Spanish in 1628 and they are found to be better divers than the Europeans.

CIRCA 1640

American Edward Bendall builds two wooden diving bells to salvage the wreck of the *Mary Rose* off Charlestown, England.



TOP: Bourne underwater boat
BOTTOM: Lorini diving bell *Le fortificationi*, 1609
Original drawings (PD)



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Cornelius Drebbel's 12-oar submarine on the Thames River in 1621.
Lithography by G.H. Tweedale (1626)

1680

Giovanni Borelli designs a self-contained diving apparatus in which the air is recycled. He also proposes claw-like footwear to enable the diver to pull himself along the bottom with his feet. Despite the fact that the footwear is not designed for swimming, Borelli is credited by some to be the inventor of swim fins.

1681

French priest Abbé Jean de Hautefeuille publishes *L'art de respirer sous l'eau* (The Art of Breathing Underwater) in which he explains why it is not possible to breathe at atmospheric pressure underwater.

1685

A diving bell is used by Sir William Phips to recover treasure from the wreck of the Spanish galleon *La Nuestra Señora de Almiranta* in the West Indies.



Giovanni Borelli rebreather design (1680)
Image: Library of Congress (Original plan)

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Edmund Halley's Diving Bell (1690)

1687

William Phips' salvage of a Spanish galleon using a diving bell off San Domingo earns him a knighthood and eventually makes him High Sheriff of New England. Phips unsuccessfully tries to take the city of Quebec (New France) in 1690. The remains of one of his ships, the *Elizabeth & Mary*, are discovered in the St. Lawrence Gulf at a depth of 3 m (10 ft) by diver Marc Tremblay in 1994.

1689

French physicist Denis Papin designs but never builds a surface-supplied diving bell.



Lethbridge Diving Machine (1715). Photo: OAR/NURP

1690

English astronomer Edmond Halley - of Halley's Comet fame - improves the diving bell. Additional air is available in weighted barrels connected to the diving bell in order to replenish the air supply. Dives of 90 minutes to depths of 18 m (60 ft) are recorded. An improved version later allows Halley to remain immersed for over four hours.

1715

• **A** fully enclosed diving 'machine' is developed by Englishman John Lethbridge. The *Lethbridge Diving Machine* consists of a barrel of air with a glass porthole and two watertight sleeves. Divers can thus use their arms for salvage work. An air pipe connected to the barrel supplies it with compressed air.

• **E**nglish inventor Andrew Becker also develops a leather diving suit complete with metal helmet and window. The helmet has three tubes for air to enter and exit. The air is pumped into two of the tubes from the surface.

• **F**rench aristocrat Pierre Rémy de Beauve develops a surface-supplied diving suit and helmet with eye-shaped portholes.

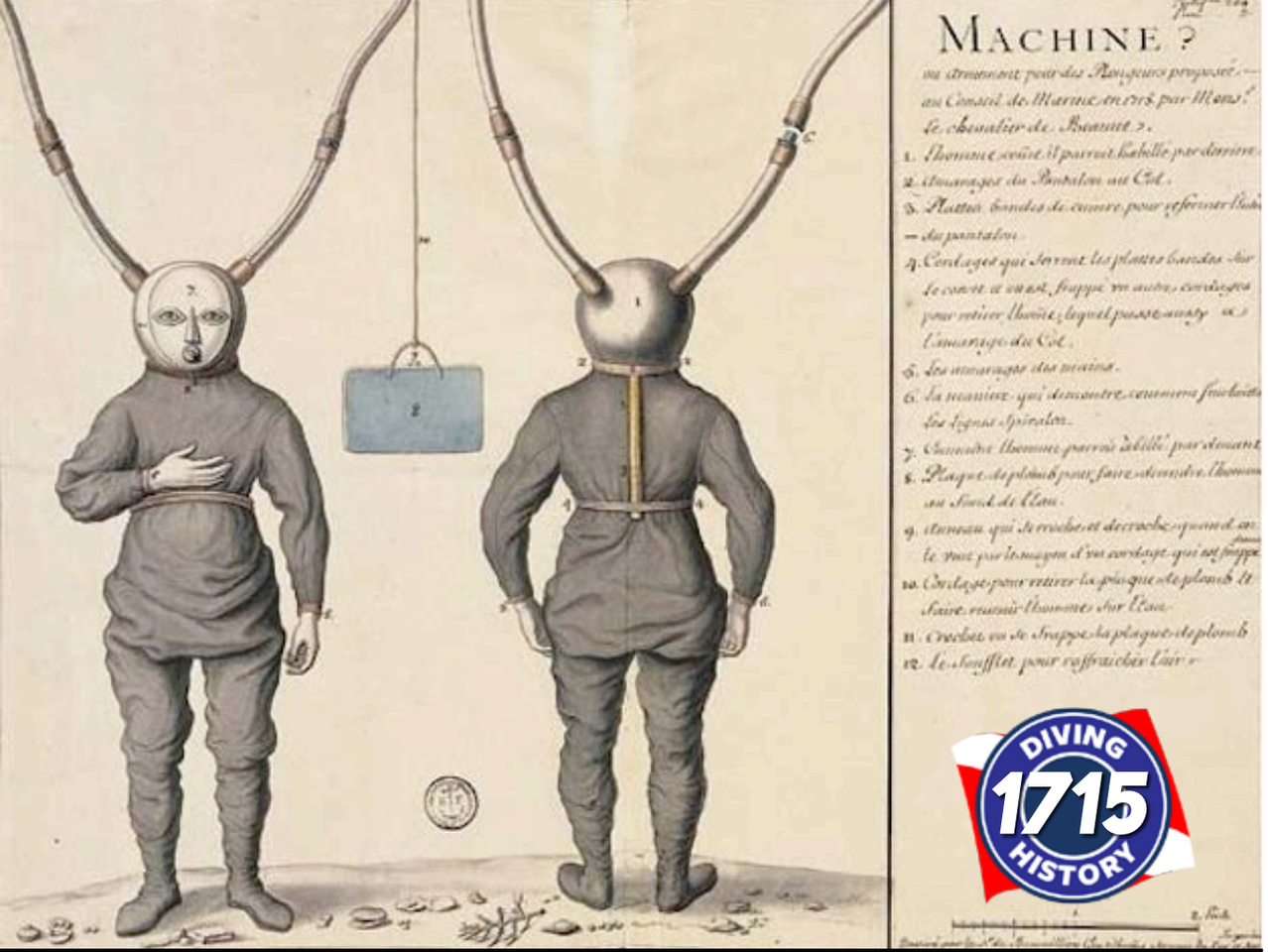
1720

Jacob Rowe designs a diving barrel that is successfully used to salvage a wreck off the Cape Verdes.

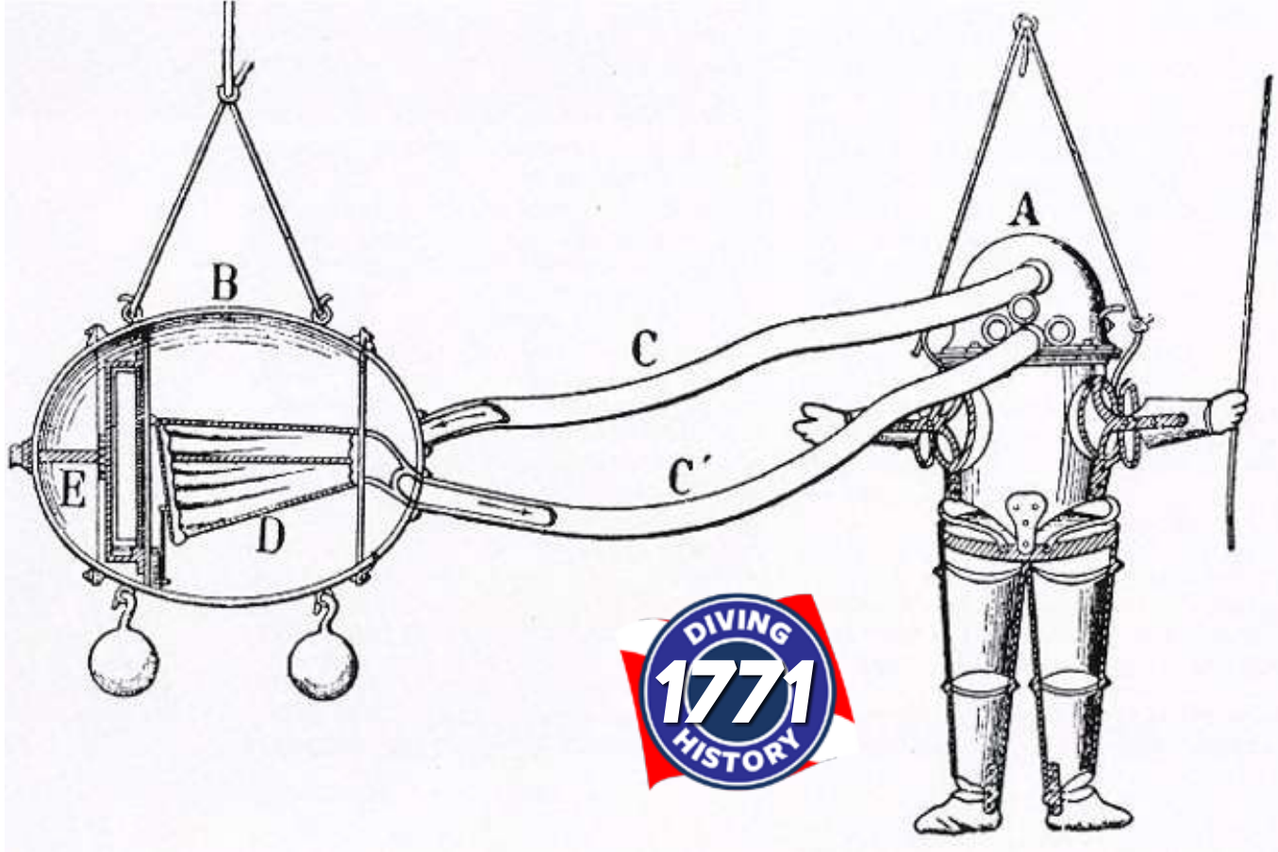
1771

French inventor Fréminet makes a helmet out of brass. Air is pumped into the helmet from the surface. He dies in 1772 after breathing untreated exhaled air.

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Scaphandre du Chevalier de Beauve, 1715 (Original plan)



Scaphandre de Sieur Fréminet, 1771 (Original plan)

1773

American Benjamin Franklin makes a pair of wooden swim fins at the age of 11.

"When I was a boy, I made two oval palettes, each about ten inches long and six broad, with a hole for the thumb, in order to retain it fast in the palm of my hand. They much resembled a painter's palette. In swimming, I pushed the edges of these forward, and I struck the water with their flat surfaces as I drew them back. I remember I swam faster by means of these palettes, but they fatigued my wrists. I also fitted to the soles of my feet a kind of sandals; but I was not satisfied with them, because I observed that the stroke is partly given by the inside of the feet and the ankles, and not entirely by the soles."

1775

• **S**cottish inventor Charles Spalding builds a wooden bell that can be maneuvered by its occupants. The air supply is based on Halley's barrel system.

• **A**merican David Bushnell builds the first submarine ever used in combat. The *Turtle* is used unsuccessfully against British ships blockading New York Harbor.

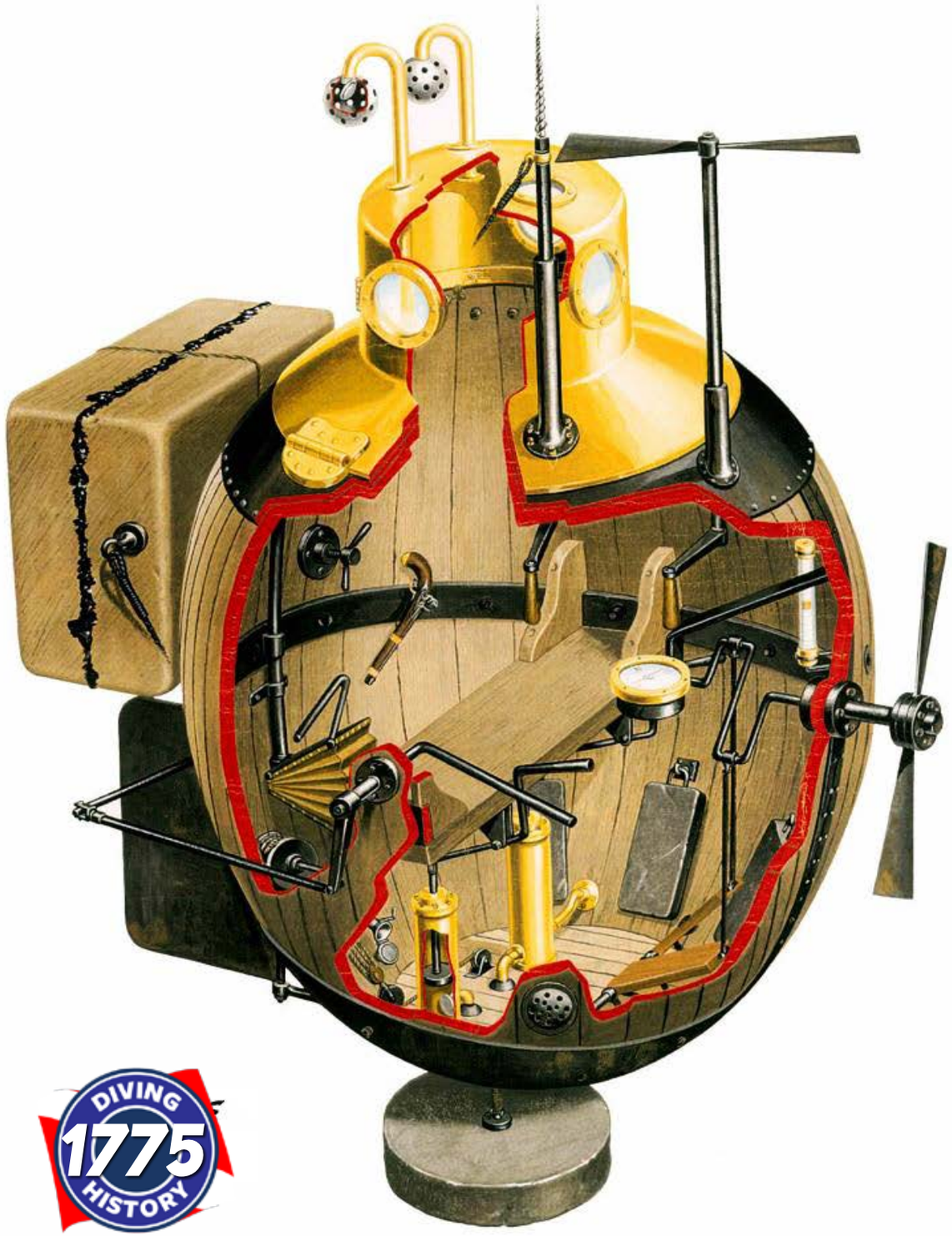
1787

Karl Heinrich Klingert demonstrates his diving apparatus in the Oder River.

1788

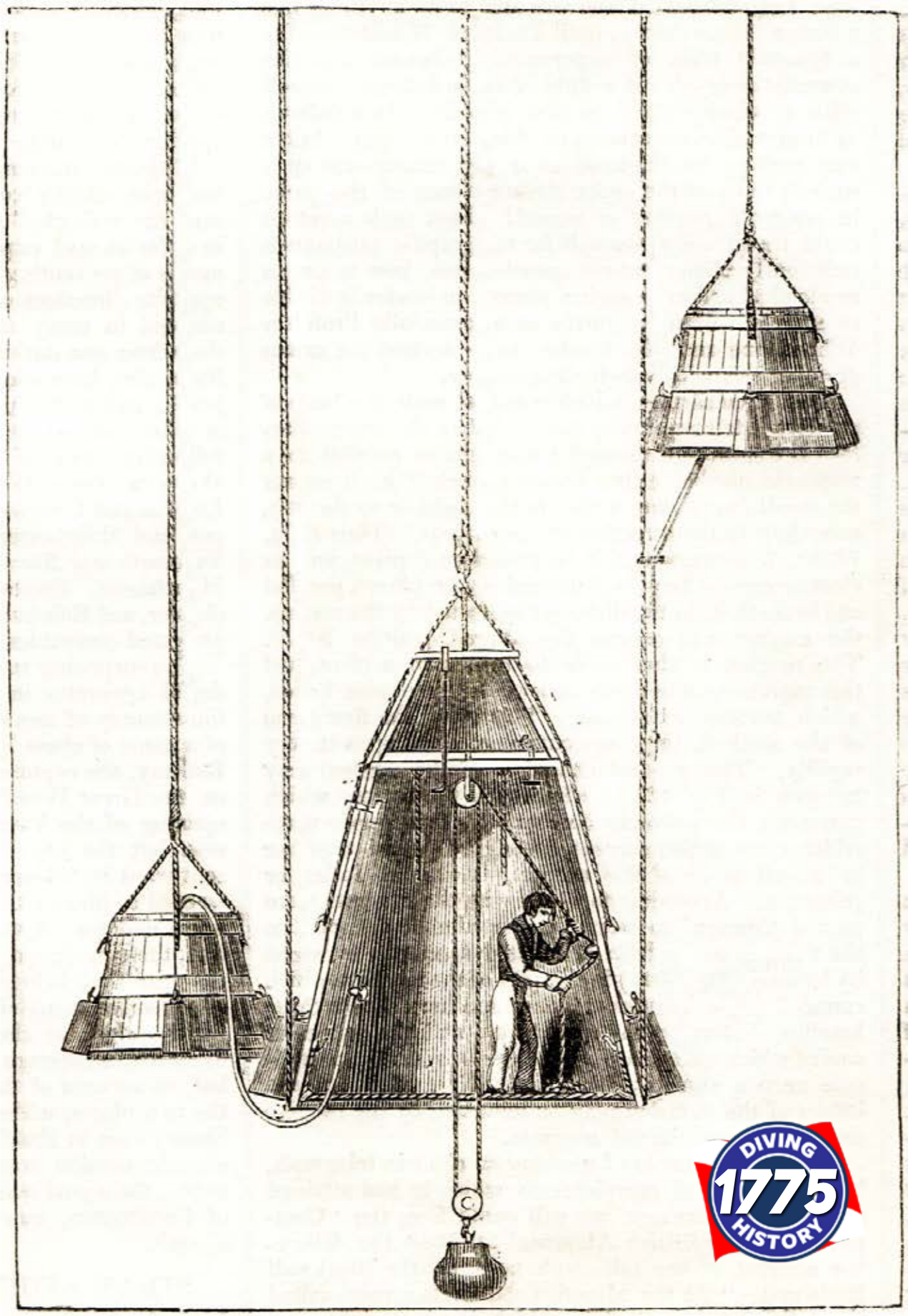
A major improvement to the diving bell is made by Englishman John Smeaton, who provides fresh air to the bell with a double cylinder hand pump. This not only replenishes the air supply continuously, but also keeps the water level in the bell down to the lower edge, where the surplus air escapes. A non-return valve at the air inlet retains the air in the bell.

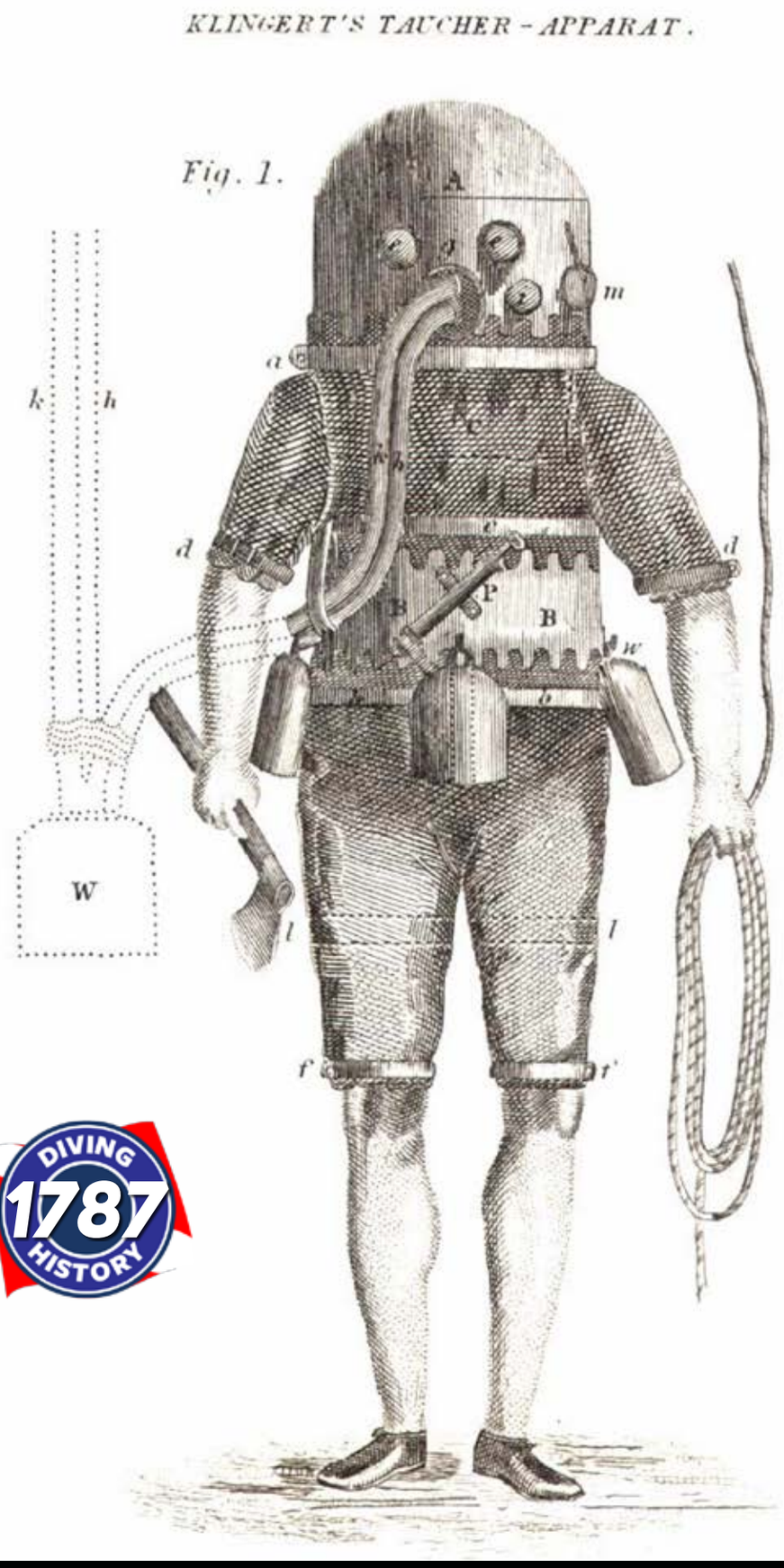
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TOP: Bushnell's *Turtle* used in attempts to bore holes and insert time-delay explosives into British ships in 1776. Image by John Batchelor, U.S. Navy

RIGHT: Charles Spalding's Diving Bell (1775).
Image: The Pictorial Gallery of Arts, London Printing and Publishing (1860)





Original plan of the Klingert diving apparatus tested on the Oder River in 1787

EARLY 1800s

Inventors try to find ways to get air to the diver without being connected with a hose to the surface. A device is created by Englishman William James in 1825. His invention consists of a watertight diving suit with a copper helmet fed with air from a reservoir around his waist. American Charles Condert builds a similar device but dies during testing, thus becoming the first documented scuba fatality. Other inventors in the early 1800s include English brothers Charles Anthony and John Deane and Englishman William H. James.

1800

A submarine, the *Nautilus*, is built by Robert Fulton, inventor of the steamboat.

1808

German mathematician Friedrich von Drieberg (1780-1856) proposes the Triton apparatus which consists of an air reservoir worn by the diver. The system is not self-sufficient since the reservoir is supplied by surface hoses. To breathe air from the reservoir, the diver operates a bellows by nodding his head.

1812

British engineer James Rennie designs a surface-supplied rectangular diving bell made of cast-iron equipped with 12 glass ports. The air hose feeding the bell is equipped with a leather non-return valve to prevent the air from escaping and water from entering the bell should the hose rupture.

1823

Englishmen Charles and John Deane modify a fire-fighting helmet and air supply system for use underwater. The helmet is held in place with weights and air is supplied from the surface. The invention is meant to be used in salvage work but it limits the diver's movements as it is not connected to the suit. Should the diver not remain in an upright position, he is at risk of drowning. In time, the helmet is sealed to the suit by German-born British inventor Augustus Siebe. The Deanes run a successful salvage operation and later publish the first practical diving manual.

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1825
A successful self-contained underwater breathing apparatus is designed by Englishman William James. The limited supply of compressed air is worn around the waist in a cast-iron belt.

1828
Frenchman Paul Lemaire d'Augerville designs a swimming belt that enables divers to control their buoyancy.

1829
Russian E.K. Gauzen, designs a surface-supplied helmet strapped to a full-body leather suit. Gauzen's design and later modifications are used by the Russian Navy for more than 50 years.

1831
A self-contained system consisting of an air-filled copper pipe worn around the body is developed by American engineer, Charles Condert. He is drowned in the East River (Brooklyn, New York) in August 1832.

1836
John and Charles Deane publish the world's first diving manual, *Method of Using Deanes Patent Diving Apparatus*, in Gosport, England.

1837
The Morse Diving Equipment Company of Boston, Massachusetts, is founded. Originally a manufacturer of brass goods, they later turn to diving gear and begin producing helmets by the 1860s. The Morse Diving Equipment Company, as it is known today, is the oldest manufacturer of diving equipment in the United States.

1838
Colonel William Pasley of the Royal Engineers establishes a military helmet diving unit to clear the wreck of the barge William from the River Thames.

1839
• **C**olonel Pasley commences the salvage of the HMS *Royal George* using his diving unit from the Royal Sappers and Miners.

• **S**ymptoms of decompression sickness are recorded for the first time during the salvage operation of HMS *Royal George*.

1840
August Siebe succeeds in getting his closed diving dress used by Colonel Pasley on the salvage of the HMS *Royal George*. The dress incorporates elements of design from the Deane brothers and George Edwards (1838) and becomes the basic design that launches the diver trade. Practically all diving dresses and space suits trace their origins to Siebe's 1840 system.

1843
The first diving school is established by the Royal Navy.

1844
The Schrader Company is established in New York by August Schrader and begins manufacturing diving equipment.

1856
• **W**ilhelm Bauer successfully dives aboard his second submarine, the *Seeteufel*, not to be confused with a tracked two-man amphibian midget submarine of the same name developed for the Kriegsmarine in 1944. He also attempts to take photos through a porthole.

• **T**he first underwater picture is taken by William Thompson and underwater photography is born.

1860s
English physicist, Robert Boyle, studies compression and de-compression in animals. A gas bubble is observed in the eye of a snake after decompression. This observation is the beginning of studies in decompression sickness.

1864
• **F**rench mining engineer Benoit Rouquayrol and naval lieutenant Auguste Denayrouze develop a diving apparatus which incorporates the first practical demand valve. A reservoir on the diver's back contains a supply of compressed air which is fed by the demand valve to a mouthpiece when the diver inhales. This device is the true ancestor of the Aqua-Lung and can be used as a self-contained apparatus though in practice, it is almost invariably used with a surface hand-pump to main-

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tain pressure in the reservoir, which can only contain about ten minutes supply of air.

1866

• **F**rench engineer Ernest Bazin develops the first underwater electric lights which he uses to take photos from his underwater observatory. None of the photos have survived to this day.

1867

Auguste Denayrouze replaces the uncomfortable and impractical Groin (pig snout) face-piece with a more conventional helmet attached to the suit with an external corselet and three-bolt fastening, a design which was to become the standard pattern for all European diving suits.

1869-1883

Several divers working on the Brooklyn Bridge in New York are crippled by 'caisson disease' which reporters dub as 'the bends' due to the signs of the illness.

1869

French writer Jules Verne publishes *Twenty Thousand Leagues Under the Sea* (*Vingt mille lieues sous les mers*). The novel that tells the story of Captain Nemo and his submarine *Nautilus* popularizes the idea of underwater exploration by humans using scuba. An illustrated version is published in 1871.

1870

Eadweard Muybridge, whose chronophotography of moving subjects led to the development of motion pictures, takes underwater photos in San Francisco Bay.

1872

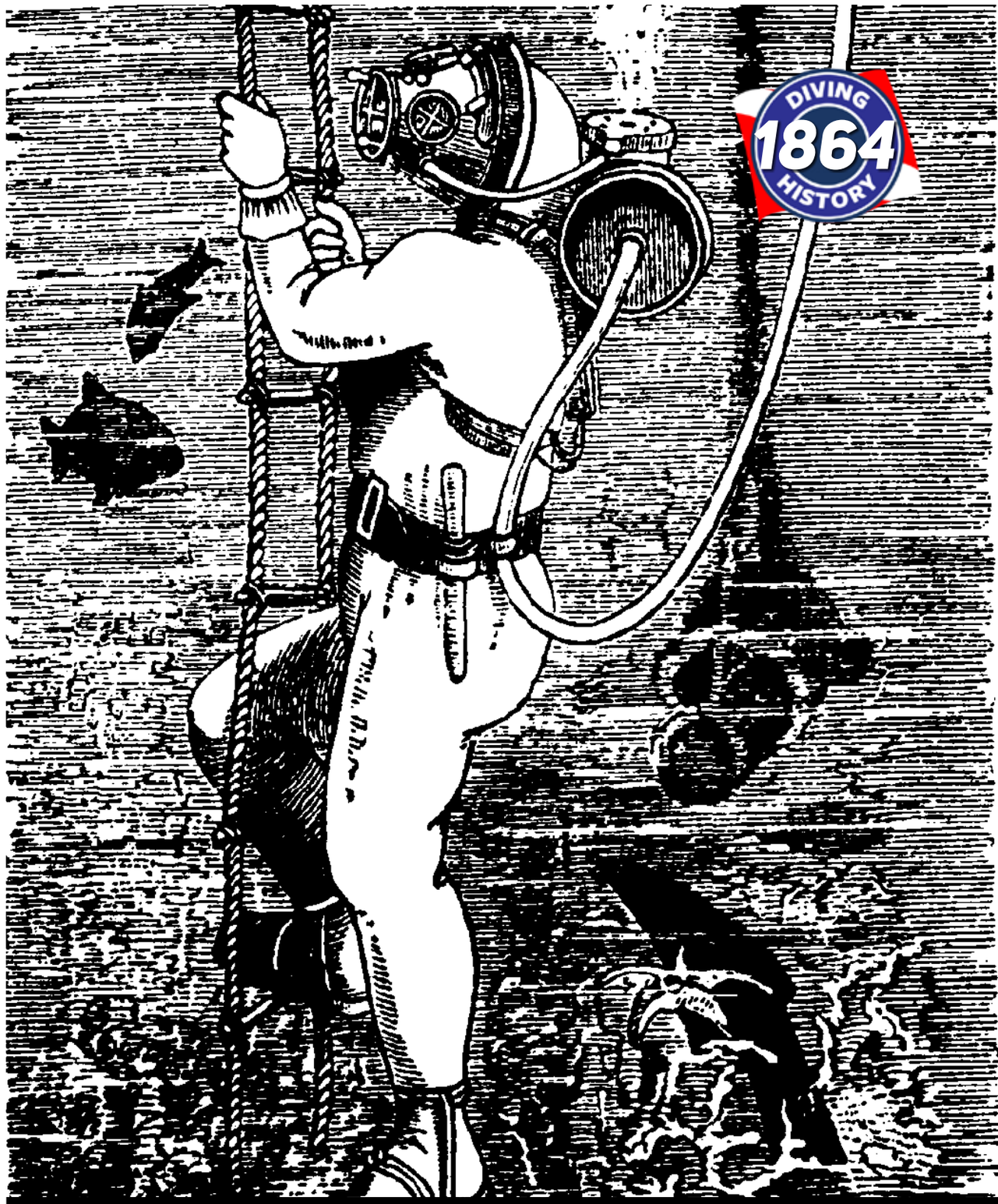
• **F**rench engineer Ernest Bazin develops a closed underwater observatory equipped with electric light. It is used successfully during a salvage operation in Vigo Bay.

• **H**igh-density soundings taken by the Coast Survey steamer Blake in the Gulf of Mexico and Caribbean Sea lead to the creation of the first modern bathymetric maps.

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1873

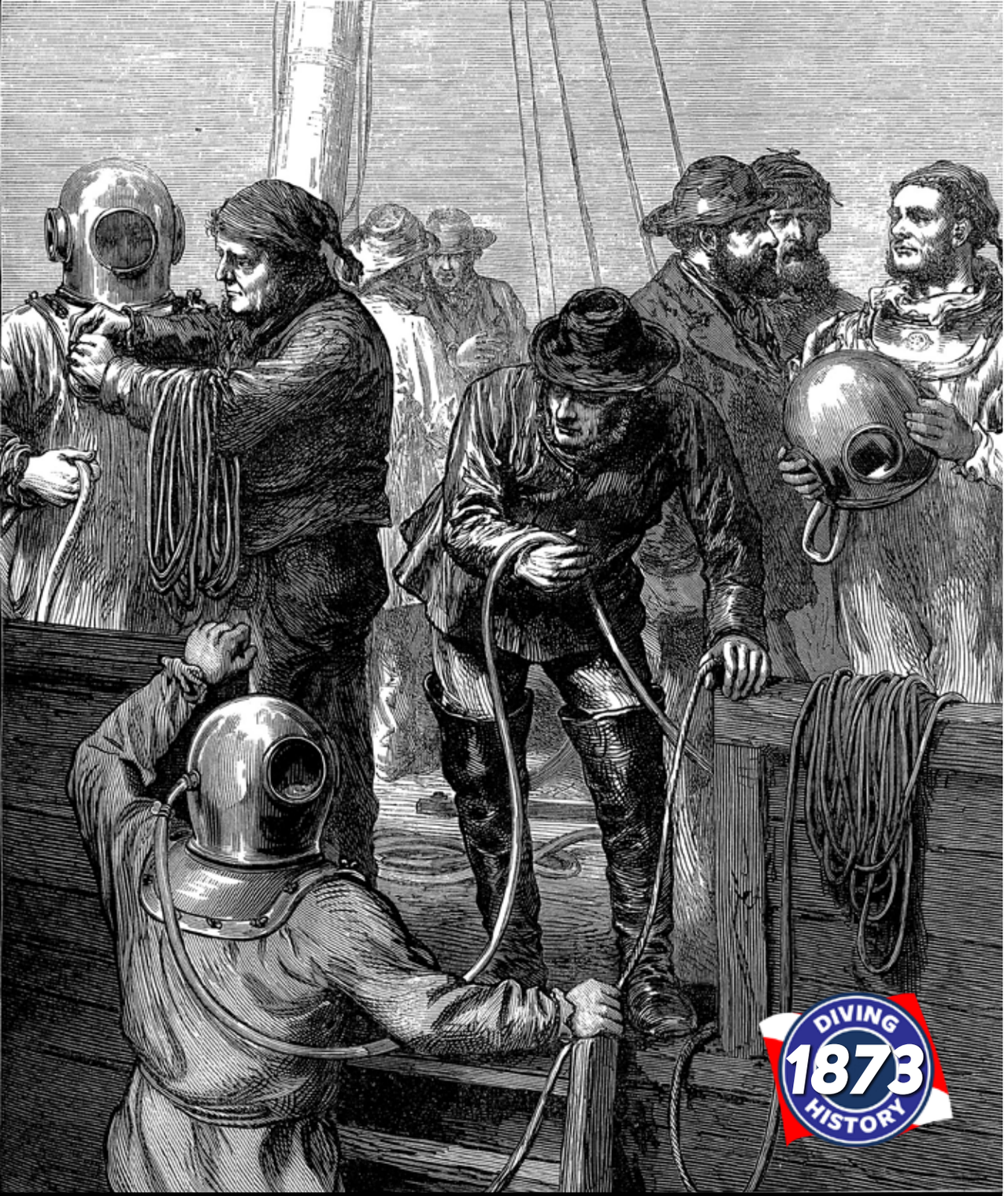
Dr. Andrew H. Smith recommends chamber recompression after workers suffer from the bends while working underwater on the Brooklyn Bridge.



Rouquayrol & Denayrouze Apparatus (1864)



Divers on scuba explore the underwater shoreline of Crespo Island in a drawing from the illustrated version (1871) of Jules Vernes' *Twenty Thousand Leagues Under the Sea.* (PD)



Divers preparing for work. The Illustrated London News front cover illustration for February 6, 1873. The divers were likely recovering bodies from the wreck of the *Northfleet*, a major naval disaster that occured two weeks earlier. (PD)

1878

• **A** study entitled *La Pression Barometrique* is published by Paul Bert. This study on pressure changes details decompression sickness caused by the formation of nitrogen gas bubbles in the body. He suggests gradual ascent to prevent decompression sickness.

• **E**nglishman Henry Fleuss develops a closed circuit, self-contained diving dress that includes a reservoir of oxygen and canisters of alkali soaked sponge to absorb the exhaled carbon dioxide. The apparatus is demonstrated regularly in 1880 and attracts much media attention. Although Fleuss' diving dress is not a success, the lighter and more practical apparatus that he develops for mine rescue work goes on to be used all over the world in various forms, the best known being the Proto, manufactured by Siebe, Gorman.

1882

• **T**he U.S. Navy establishes its first dive school at Newport, RI.

• **T**he U.S. Fisheries Commission steamer *Albatross* is the world's first vessel specifically built as an oceanographic research vessel.

1888

Frenchman Paul Regnard develops the first underwater camera housing, which consists of a motorized casing, with a balloon and a metal frame that allows the camera to settle on the seafloor.

1893

Louis Boutan and his assistant Joseph David create a wooden housing for a small camera known as the *Detective*. The camera does not require manual focusing for objects over 3 m (10 ft) distance.

The first ever flash bulb is designed by Frenchman Chauffour for underwater photographer Louis Boutan. The glass bulb contains pressurized oxygen and magnesium which is ignited by a wire carrying an electrical discharge.

1900

• **L**ouis Boutan writes the first book on underwater photography: *La photographie sous-marine et les progrès de la photographie*.

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• **J**ohn P. Holland designs a submarine for the U.S. Navy.

• **G**reek sponge divers discover the Antikythera Shipwreck and recover artifacts, including the oldest known analog computer (Antikythera Mechanism). The wreck sank to depths between 45 and 70 m (150-230 ft) circa 60 B.C.

1902

Willy Heinrich (Germany) conducts the first dives in Antarctica during the German National Antarctic Expedition (1901-03). Using a surface-supplied Siebe diving helmet, Heinrich conducts repairs on the ship and also dives under ice.

1907

The Royal Navy publishes a diving manual incorporating the results of deep diving tests from 1906-07.

1908

A paper on decompression sickness, *The Prevention of Compressed-Air Illness*, is published by John Haldane, Arthur Boycott, and Guybon Damant. The paper lays the foundation for further studies, and decompression tables from this research are adopted by the British Navy and later the United States Navy.

1909

• **D**raegerwerk in Germany introduces a self-contained diving dress operating on the semi-closed circuit principle and which incorporates an injector to ensure circulation of breathing gas through the helmet and absorbent canister.

• **D**eep Diving and Submarine Operations, by Sir Robert Henry Davis, is published in London by Siebe, Gorman & Company. The most comprehensive diving manual in the English language, it is subsequently updated in 1917/18, 1918/19, 1935, 1951, 1955, 1962, 1981, and 1995.





TOP: Aerial view of the *Gauss* stuck in the ice during the German National Antarctic Expedition. The photo was taken from a balloon. Photo: NOAA

BOTTOM: Draeger rebreather (1909). Photo courtesy **David Dekker**

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1911

• **G**reek fisherman Yorgos Haggi Statti breath-hold dives more than 60.96 m (200 ft) to help salvage the anchor of an Italian ship in the Aegean Sea.

• **A** diving oxygen rebreather is developed by Draeger of Germany. The design is based on a previous model used for mine rescue.

1912

• **T**he U.S. Navy tests decompression tables published by Haldane, Boycott and Damant.

• **S**ir Robert Davis develops the Davis Submersible Decompression Chamber (DSDC).

• **J**ohn-Ernest Williamson uses a tube made of a series of interlocking iron rings and equipped with portholes to take underwater photos off Hampton Roads, Virginia. He names the device the *Williamson Photosphere*.

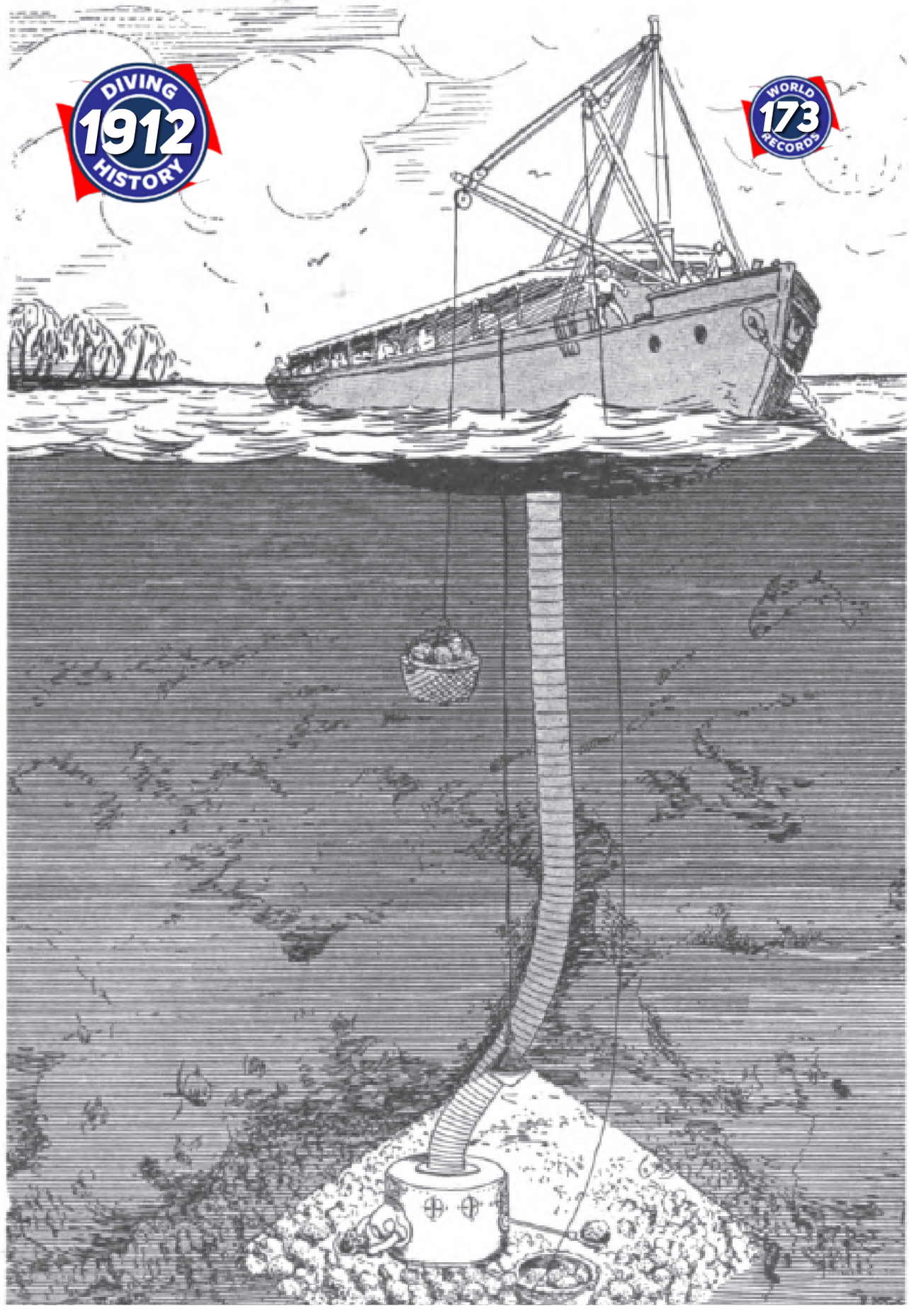
1913

Chief Gunner George Stillson establishes an experimental diving school at the Brooklyn Navy Yard.

1914

• **A**n oxygen rebreather is invented by Sir Robert Davis. This rebreather called the Submarine Escape Apparatus is used to escape from sunken submarines.

• **S**tephen J. Drellishak, a member of a U.S. Navy team under the command of Chief Gunner George D. Stillson which is testing diving equipment and procedures, establishes a depth record of 84 m (274 ft) in the open ocean while diving from the USS *Walke*.



Deepsea tube used by John-Ernest Williamson to take underwater photographs. was originally designed by his father, Charles, for salvage operations (PD)

DIVING ALMANAC RECORD #173

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John-Ernest Williamson in the *Williamson Photoshpere* (PD)

DIVING ALMANAC RECORD #173

• **T**he U.S. Navy diving school is reopened at Newport, RI.

• **J**ohn Ernest Williamson and his brother George use the *Williamson Photosphere* to produce the first underwater movie in which he kills a shark with a knife in the Bahamas. The images are also featured is his film tribute to Jules Verne, *Twenty Thousand Leagues under the Sea*.

• **R**eginald Fessenden of the Submarine Signal Corporation uses a Fessenden Oscillator to reflect an acoustic signal off an iceberg and off the sea floor. The successful test of the new device marks the beginning of the acoustic exploration of the sea.

1915

• **T**he *Report on Deep Diving Tests* is published by the United States Bureau of Construction and Repair, resulting from exhaustive tests to determine safe working practices for diving and to define a standard pattern of diving apparatus for the United States Navy. The ubiquitous Mark V helmet and dress results from these tests, conducted and reported upon by Gunner G.D. Stillson.

• **J**ohn-Ernest Williamson films the underwater images for *Twenty Thousand Leagues under the Sea* from inside a submersible sphere.

• **U**.S. Navy divers George Stillson, Frank Crilley, William Loughman, F.C.L. Nielson, and Stephen Drellishak set new depth records of over 91 m (300 ft) in the open ocean while engaged in the salvage of the submarine *F-4* off of Honolulu, Hawaii.

• **A**mericans William Dunn and William Miller patent the Divinhood, a helmet specially designed to be worn without a diving suit.

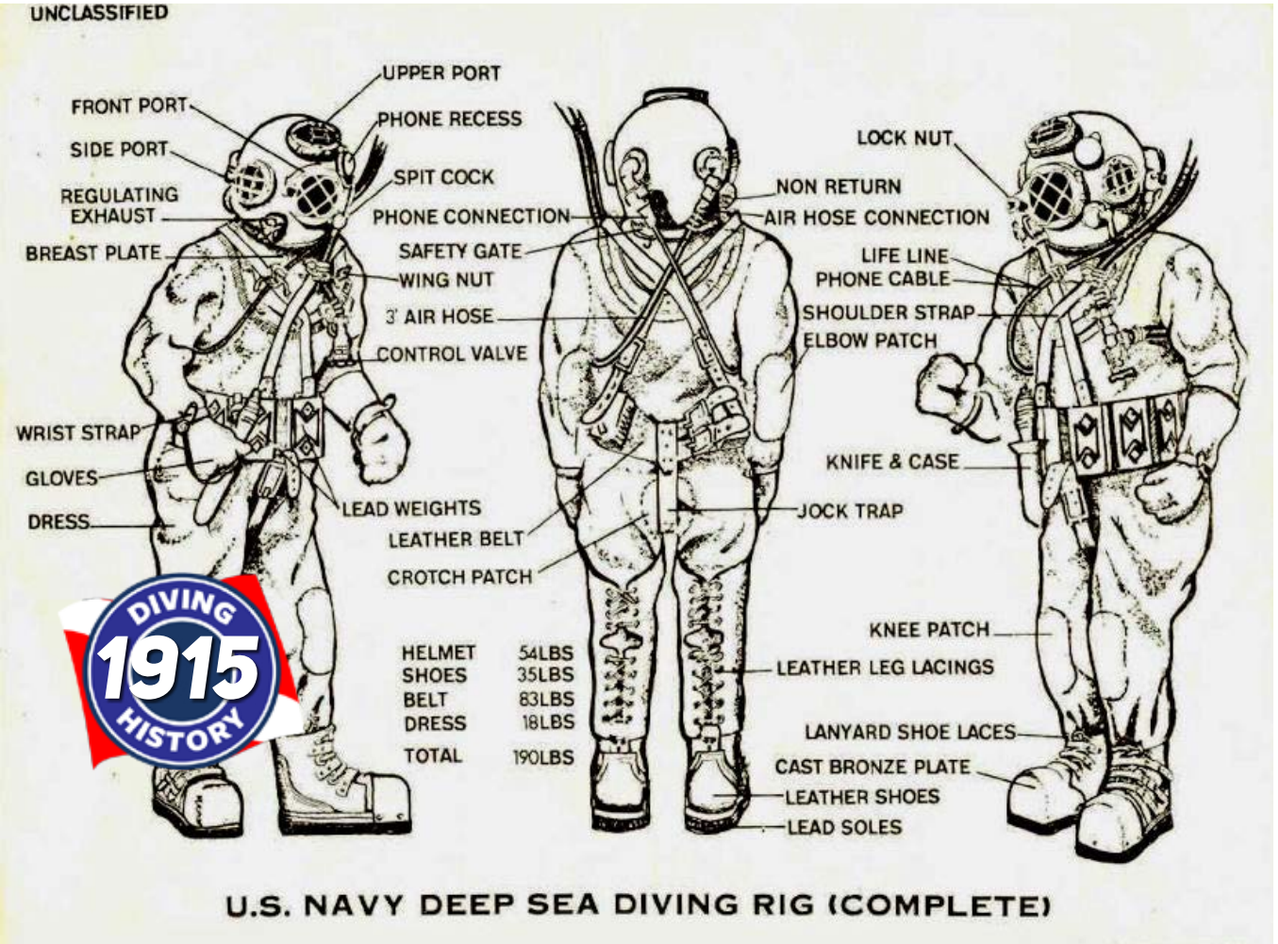
1916

• **T**he first Mark V helmet is manufactured by Morse.

• **T**he film *Twenty Thousand Leagues under the Sea* based on the science fiction novel of the same name by French writer Jules Verne is released. It includes the first underwater cinematography used by the movie industry. Divers use modified Fleuss/Davis rebreathers.

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• **T**he Navy Department publishes the first in a series of comprehensive and detailed diving manuals, embodying the recommendations of the Stillson Report of 1915. The USN Diving Manual establishes the Mark V helmet and system as navy standard.



U.S. Navy deep sea diving rig with Mark V helmet. Image: U.S. Navy

1917

Draeger markets a self-contained system combining tanks and rebreather technology capable of attaining depths up to 40 m (130 ft).

1918

The Ohgushi Peerless Respirator, a device that can be used with a surface air supply or as a self-contained unit with an air cylinder carried on the divers back, is developed by Riichi Watanabe of Tokyo, Japan. Air flow into the face mask is controlled by biting an air valve with the teeth. The device is successfully tested to 99 m (324 ft).

1919

• **C**. J. Cooke develops heliox, a gas mixture of helium and oxygen for use by divers. This invention greatly extends the depth range of divers while reducing the risk of nitrogen narcosis.

• **F**rench scientists run the first line of soundings produced by an acoustic echo sounder.

1924

Experimental dives using helium-oxygen mixtures are jointly sponsored by the U.S. Navy and Bureau of Mines.

1925

The U.S. Navy Air Decompression Tables are developed by EDU and become the accepted world standard.

1926

• **F**renchman Yves Le Prieur develops a lightweight compressed air diving apparatus, in collaboration with manufacturer Maurice Fernez. The Fernez Le Prieur apparatus consists of a back-mounted high pressure air cylinder, from which air is fed, via an adjustable regulator, to a mouthpiece. It is essentially a constant flow device, the surplus air escaping from a duck-beak valve on the mouthpiece. The diver wears Fernez goggles. A later version introduced in 1935, incorporates a chest mounted cylinder surmounted by the adjustable regulator, which feeds air to a circular full-face mask. The Le Prieur Apparatus is quite widely used and enjoys much publicity.

• **W**. H. Longley and Charles Martin take the first underwater colour photographs (Autochromes). They appear in the January 1927 issue of National Geographic.

[NEW] • **Y**asukichi Murakami develops a patent for a suit and breathing apparatus for pearl divers in Australia.

1927

Navy School of Diving & Salvage (a.k.a. Navy Deep Sea Diving School) and the Experimental Diving Unit are relocated to the Washington Navy Yard.

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1929

• **A**n escape lung is developed by submariner and diver, Lieutenant C.B. "Swede" Momsen. The Momsen Lung is tested with success to bring 26 seamen to the surface from a bottomed submarine.

• **E.** R. Fenimore Johnson begins experiments in underwater photography. He becomes the United States' first commercial manufacturer of underwater camera housings. After World War II and into the 1960s, his company, Fenjohn, manufactures still and motion picture camera housings and becomes a full service dive shop carrying a complete line of dive gear and accessories.

[NEW] • **O**n July 22, famed aviator and explorer Amelia Earhart conducts her first of two known dives, wearing the hardhat diving suit of Frank Crilly. On both dives, she and Dorothy Putnam are lowered over the side of the privately owned submarine, *Defender*, as part of a publicity stunt. After experiencing difficulties during her first dive—she signals to end the dive after her helmet goes under—, she successfully conducts a 12-minute dive on the following day.

1930

• **G**uy Gilpatric purchases goggles designed by Fernez and he helps popularize underwater hunting in the Mediterranean Sea off the coast of France. He later publishes a book that begins the popularization of the sport.

• **T**he *Bathysphere*, a round steel craft with several windows that is lowered by cable into the sea is developed by American William Beebe and partner Otis Barton.

1931

T*auchertechnik: Handbuch fur Taucher* (Handbook for Diving), by Hermann Stelzner, is published in Lubeck, Germany. The classic diving text is re-edited in 1943.

1933

• **A** demand valve with a high-pressure air tank is developed by Yves Le Prieur eliminating hose connections to the surface.

• **B**en Stone, Jack Prodanovich, and Glen Orr found the world's first freediving club, The Bottom Scratchers of San Diego.



Famed aviator and explorer Amelia Earhart after a dive off Block Island, Rhode Island.
Photo: U.S. National Archives and Records Administration (NARA)

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1934

• **J**ean Painlevé and Yves Le Prieur establish the world's first scuba diving club : *Les Sous l'eau*. Activities include filming and hunting.

• **G**eorges Beuchat founds the Beuchat Society in Marseilles.

• **W**illiam Beebe and Otis Barton in the Bathysphere successfully reach the record depth of 923 m (3,028 ft) in the Bahamas.

1935

• **B**road-bladed swim fins are patented by Frenchman Louis de Corlieu.

1936

• **T**he Italian navy develops a diver-operated torpedo system.

• **O**n May 16, 33 scuba divers from the scuba club *Les Sous l'eau* perform an underwater nautical show in Paris' Piscine Pontoise. Stunts include underwater races, acting and bicycle riding at a depth of 4 m (13 ft). The divers led by Yves Le Prieur, and Jean Painlevé also dazzle the audience with underwater lights and an underwater musical broadcast.

1937

• **W**hile on vacation, Hans Hass meets Guy Gilpatric at Cap d'Antibes, France, and is inspired to seek a career exploring the underwater world.

• **C**harles B. Momsen and Karl R. Wheland of the U.S. Navy's Experimental Diving Unit (NEDU) make a simulated dive to 152 m (500 ft) breathing a helium-oxygen mixture.

• **T**he American Diving Equipment and Salvage Company (DESCO) is founded in Milwaukee, Wisconsin, by Edgar End, Max Gene Nohl and Jack Browne, with financial support from businessman Norman Kuehn.

• **A** diving suit with a self-contained mixed-gas helium and oxygen rebreather is developed by The American Diving Equipment and Salvage Company.

• **M**ax Nohl sets world record dive to 128 m (420 ft) using The American Diving Equipment and Salvage Company's system in Lake Michigan.



William Beebe on the *Bathyshpere*
Photo courtesy The Wildlife Conservation Society | NOAA Ocean Explorer

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Italian *Siluro a lenta corsa* (Low Speed Torpedo), also known as *maiale* (pig) used by Italian frogmen during WWII (Public Domain)

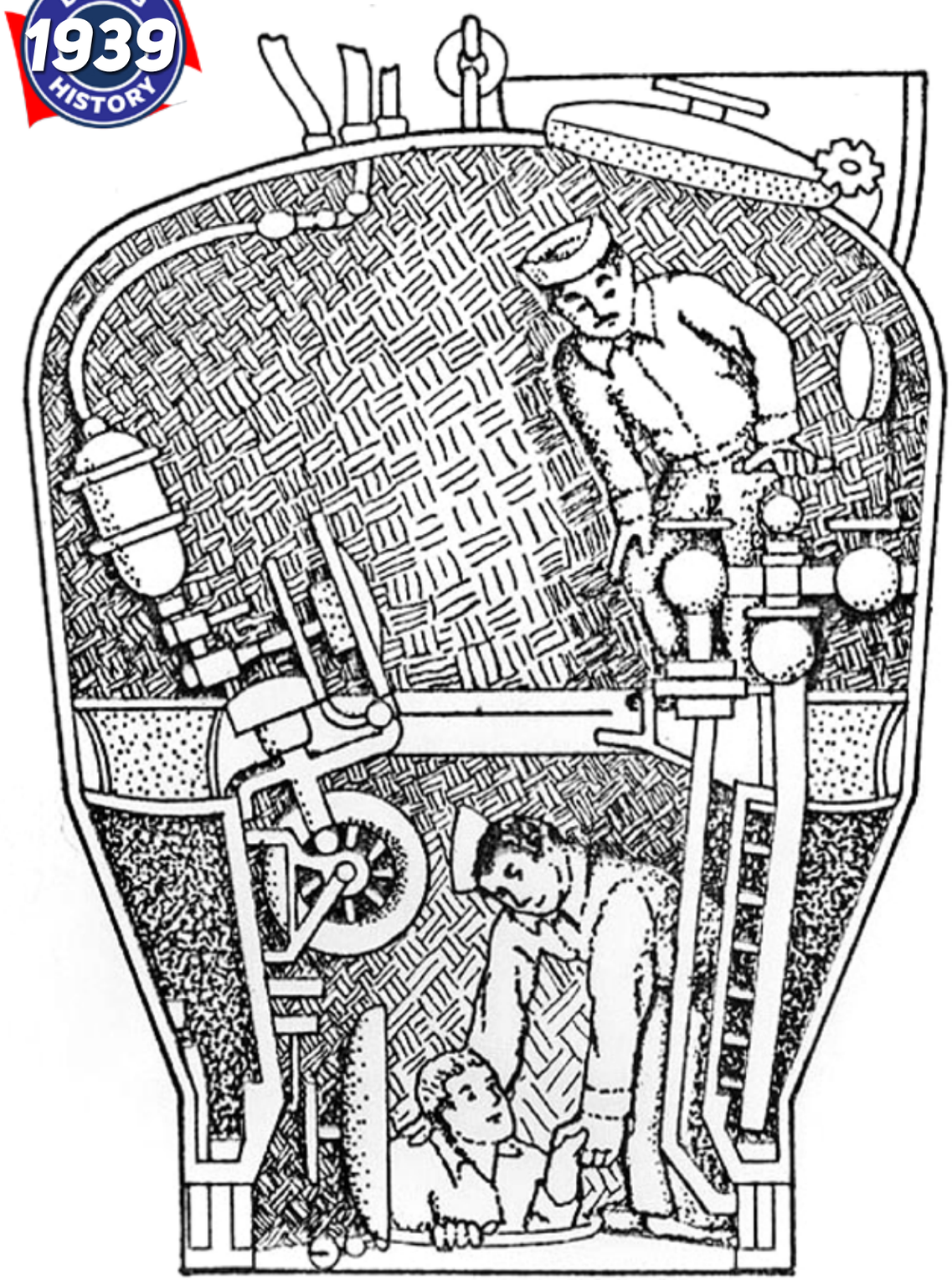
• **A** two-cylinder open-circuit apparatus with demand regulator is developed by Georges Commeinhes for use by the French Navy. WWII impeded its development and Commeinhes dies in 1944. The system is showcased in a pool at the Paris International Exposition.

• **D**anish-American Niels Christensen invents the o-ring to seal hydraulic equipment.

1938

• **E**dgar End and Max Nohl conduct the first intentional saturation dive. They spend a total of 27 hours at a simulated depth of 31 m (101 ft) in a Milwaukee hyperbaric chamber. Nohl subsequently suffers the bends despite a five-hour decompression period.

• **G**uy Gilpatric publishes his now famous and hugely influential book, *The Compleat Goggler*, in which he describes the technique of goggle fishing. Largely a compilation of popular and entertaining articles written by him for the Saturday Evening Post, the book is the first manual on spearfishing. It is republished in 1957 by the original publishers and Skin Diver Magazine. It is rightly regarded as a classic of diving literature.



McCann-Erickson Rescue Chamber cutaway drawing. The device was used to rescue 33 crewmen from the sunken submarine *Squalus* (SS-192) in May 1939.
Image: U.S. Navy

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• ***T**he Mousquemers* (Cousteau, Dumas & Tailliez) begin diving with a single-glass dive mask, the 'monogoggle.' While serving in Indochina in 1951, Tailliez observes Vietnamese divers using a single-glass dive mask with a skirt made of buffalo skin. It is based on an earlier Chinese model used by climbers collecting sparrow nests. Both designs likely precede the 1938 monogoggle.

1939

• **T**he McCann-Erickson Rescue Chamber is used to rescue 33 men from the USS *Squalus* that sinks to a depth of 74 m (243 ft).

• **T**he first rebreathing device to be called SCUBA (Self Contained Underwater Breathing Apparatus) is designed by Dr. Christian Lambertsen in the USA.

• **H**ans Hass produces his first underwater film while in Curaçao and Bonaire, which is also the first underwater film in colour.

• **H**ans Hass publishes his first book, *Jagd unter Wasser mit Harpune und Kamera* (Underwater Hunt with Harpoon and Camera).

OTHER TITLES BY HANS HASS:

1941	Among Corals and Sharks
1942	Photo Hunt at the Sea Bottom
1947	Three Hunters on the Sea Bottom
1949	Humans and Sharks
1952	Manta - Devil in the Red Sea
1954	I Photographed in the Seven Seas
1957	We Come from the Sea
1958	Fish and Corals
1961	Expedition into the Unknown
1968	We Humans. The Secret of our Behavior
1970	Energon: The Hidden Secret
1971	In Unaffected Depth. Conquest of the Tropical Seas
1972	Raid into the Depth
1973	World Underwater
1976	Conquest of the Deeps
1976	The Mediterranean
1977	The Shark. Legend of a Killer)
1978	The Creation Continues. Station of Humans in the River of Life
1979	How Fish Became Humans
1980	In the Red Sea. Return after 30 Years
1985	City and Quality of Life
1986	Adventure Under Water.
1987	The Ball and the Rose
1988	The Shark in Management. Instincts Steer and Control
1991	Push into Unknown Seas
1994	The Hyper-Cellars. The New Human Picture of Evolution
1996	From the Pioneer Time of Diving. Into Untouched Depths
2004	Memories and Adventures

1939-1945

Italian divers use midget submarines and rebreathers to place explosive charges under British warships. The British also use similar devices to try to sink the German battleship *Tirpitz*.

1940

Swim fins made of vulcanized rubber are handmade by Owen Churchill.

1941

Hans Hass founds the tax-exempt society *Expedition für biologische Meereskunde* (Expedition for Biological Oceanography) in Berlin.

1941-43

Navy and civilian hard hat divers clock over 16,000 hours during salvage operations in Pearl Harbor, Hawaii.

1942

• **T**he Naval Training School is established in New York to train salvage divers.

• **E**stablishment of the Admiralty Experimental Diving Unit (AEDU).

• **J**ohn Wayne stars in Cecil B. de Mille's *Reap the Wild Wind*. Wayne is killed by an Academy-Award-winning squid at the end of the movie.

1943

• **T**he first scuba unit incorporating an automatic demand valve to release air as the diver inhales is developed by Jacques Cousteau and Émile Gagnan. The Aqua-Lung is born and it revolutionizes the diving

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world. Initial testing of the equipment in January in the Marne River ends in failure. The system is then modified by Gagnan and successfully used for the first time in a tank several weeks later. Its first use in a natural environment takes place in the Mediterranean Sea during the summer. Frédéric Dumas dives to the depth of 64 m (210 ft) in October, 1943.

• **F**renchman Frédéric Dumas dives to 64 m (210 ft) using the newly-invented Aqua-Lung.

• **N**aval Combat Demolition Units (later known as UDTs) are formed and take part in the Normandy invasion on June 6, 1944. Frogmen clear paths through underwater obstacles for landing craft in the Anglo-Canadian sector.

• **S**imone Melchior Cousteau (1919-1990) becomes the world's first female scuba diver during dives off Marseille (France) with her husband Jacques-Yves. Her sons Jean-Michel and Philippe also dive the Aqua-Lung prototype thus making the Cousteaus the first scuba diving family.

• **F**renchmen Jacques-Yves Cousteau and Frédéric Dumas produce their first underwater film, *Par dix-huit mètres de fond* (Sixty Feet Down).

FILMS AND TV SERIES BY COUSTEAU:

1943 - Par 18 mètres de fond
1943 - Épaves
1944 - Paysages du silence
1948 - Les phoques du Sahara
1949 - Autour d'un récif
1949 - Une plongée du Rubis
1949 - Carnet de plongée
1951 - La fontaine de Vaucluse
1955 - Station 307
1955 - Récifs de coraux
1955 - Le monde du silence
1956 - The Silent World
1957 - La galère engloutie
1958 - Histoire d'un poisson rouge
1959 - The Golden Fish
1960 - Vitrines sous la mer
1960 - Prince Albert 1er
1963 - Le monde sans soleil
1965 - World Without Sun
1965 - Précontinent III / L'Odyssée sous-marine
1965 - Voyage to the Edge of the World
1966 - The World of Jacques-Yves Cousteau
1967 - La jungle de corail
1967 - Le destin des tortues de mer
1968 - Sharks
1968 - The Savage World of the Coral Jungle
1968 - Search in the Deep
1968 - Whales (1968)
1969 - The Unexpected Voyage of Pepito and Cristobal
1969 - Sunken Treasure
1969 - The Legend of Lake Titicaca
1969 - The Desert Whales
1970 - The Night of the Squid
1970 - The Return of the Sea Elephants
1970 - Those Incredible Diving Machines
1970 - The Water Planet
1970 - The Tragedy of the Red Salmon
1971 - Lagoon of Lost Ships
1971 - Dragons of Galapagos
1971 - Secrets of the Sunken Caves
1971 - The Unsinkable Sea Otter!
1971 - Octopus, Octopus
1972 - The Forgotten Mermaids
1972 - A Sound of Dolphins
1972 - The Smile of the Walrus
1973 - 500 Million Years Beneath the Sea
1973 - Hippo!
1973 - The Singing Whale
1973 - South to Fire and Ice
1974 - The Flight of Penguins
1974 - Beneath the Frozen World
1974 - Blizzard at Hope Bay
1974 - Life at the End of the World
1975 - Beavers of the North Country
1975 - The Coral Divers of Corsica
1975 - The Sleeping Sharks of Yucatan
1975 - The Sea Birds of Isabella
1976 - Mysteries of the Hidden Reefs

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1976 - The Fish That Swallowed Jonah
1976 - The Incredible March of the Spiny Lobsters
1977 - What Price Progress?
1977 - Grain of Conscience
1977 - Troubled Waters
1977 - Population Time Bomb
1977 - The Power Game
1977 - Visions of Tomorrow
1977 - Calypso's Search for the Britannic
1978 - Diving for Roman Plunder
1978 - Calypso's Search for Atlantis, Part I
1978 - Calypso's Search for Atlantis, Part II
1978 - Blind Prophets of Easter Island
1978 - Time Bomb at Fifty Fathoms
1979 - Mediterranean: Cradle or Coffin?
1979 - The Nile, Part I
1979 - The Nile, Part II
1980 - Lost Relics of the Sea
1981 - Clipperton: The Island Time Forgot
1982 - Warm-Blooded Sea: Mammals of the Deep
1982 - Cries from the Deep
1982 - Saint Lawrence: Stairway to the Sea
1982 - Calypso Countdown: Rigging for the Amazon
1984 - Journey to a Thousand Rivers
1984 - The Enchanted River
1984 - River of Gold
1984 - Shadows in the Wilderness
1984 - Blueprints for Amazonia
1984 - Legacy of a Lost World
1985 - The Mississippi - The Reluctant Ally
1985 - Jacques Cousteau: The First 75 Years
1985 - Riders of the Wind
1986 - Haiti: Waters of Sorrow
1986 - Cuba: Waters of Destiny
1986 - Cape Horn: Waters of the Wind
1986 - Sea of Cortez: Legacy of Cortez
1987 - Marquesas Islands: Mountains from the Sea
1988 - Island of Peace
1988 - Tahiti: Fire Waters
1988 - Pacific Northwest: Land of the Living
1988 - New Zealand: The Rose and the Dragon
1988 - New Zealand: The Heron of the Single Flight
1988 - The Land of the Long White Cloud
1988 - Channel Island: Waters of Contention
1988 - Channel Island: Days of Future Past
1989 - Cocos Island: Sharks of Treasure Island
1989 - Australia: The Last Barrier
1989 - Borneo: The Ghost of the Sea Turtle
1989 - Bering Sea: Twilight of the Alaskan Hunter
1989 - New Zealand: The Smoldering Sea
1989 - Papua New Guinea: Into the Time Machine
1989 - Papua New Guinea: River of Crocodile Men
1990 - Papua New Guinea: Center of Fire
1990 - Australia: Out West, Down Under
1990 - Australia: A Continent at Odds
1990 - Thailand: Convicts of the Sea
1990 - Borneo: Forests Without Land
1990 - Andaman Islands: Invisible Islands
1990 - Outrage at Valdez
1990 - Lilliput in Antarctica
1991 - Australia: People of the Dry Sea
1991 - Australia: People of Fire and Water
1991 - Australia: A Continent of Dreams
1991 - Australia: Fortunes in the Sea
1991 - Tasmania: Australia's Awakening Island
1992 - Indonesia I: The Devil's Orchard
1992 - Indonesia II: Sumatra, the Heart of the Sea
1992 - The Great White Shark: Lonely Lord of the Sea
1992 - Nauru: The Island Planet
1992 - Palawan: The Last Refuge
1992 - The Mirage of the Sea
1993 - Streams of Life
1993 - Danube: The Curtain Rises
1993 - Danube: Charlemagne's Dream
1993 - Danube: The Cries of the River
1993 - Danube: Rivalries Overflow
1993 - The Secret Societies of Dolphins and Whales
1994 - Mekong I: The Gift of Water
1994 - Mekong II: Vietnam/Cambodia: Children of Rice & Guns
1995 - My First Eighty-Five Years
1995 - Madagascar: The Island Bleeds
1995 - Madagascar, Island of Spirits
1996 - South Africa: Diamonds of the Desert
1996 - South Africa: Sanctuaries for Life
1996 - Across China with the Yellow River
1997 - Lake Baïkal: Beneath the Mirror

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1944

Jacques-Yves Cousteau builds a fourth Aqua-Lung prototype after his own unit is destroyed by a stray naval artillery shell during *Operation Dragoon*, the Allied invasion of southern France.

1945

• **A**rne Zetterström dives to 160 m (525 ft) in the Baltic Sea breathing a hydrogen mixture. He dies during decompression.

• **P**hilippe Tailliez, Frédéric Dumas and Jacques-Yves Cousteau create the GRS, Groupe de recherches sous-marines (Underwater Research Group), under the auspices of the French Navy in Toulon. Tailliez commands the unit till 1949. The three diving pioneers do most of their early work right under the watchful eyes of occupying German troops.

1946

• **J**acques-Yves Cousteau patents the first constant volume drysuit.

• **E**stablishment of the the British Admiralty Experimental Diving Unit.

• **E**gidio and Nanni Cressi found Cressi-Sub in Genoa, Italy.

1947

• **J**ordan Klein founds Marine Enterprises, a manufacturer of spear guns and lucite (acrylic) underwater housings for a variety of cameras.

• **M**aurice Fargues is the first diver to die using an Aqua-Lung during a GERS record depth attempt near Toulon.

• **G**erman prisoner of war Heinz Sellner claims to have escaped from a prison camp in Murmansk by building a submersible buoyed by gas. During his successful escape, Sellner claims to have reached a depth of 2,400 m (7,874 ft). In 1951, Sellner, Philippe Tailliez, Jacques-Yves Cousteau and Canadian Paul Thuot begin construction of the *Aquarius* based on Sellner's design. The first test of the submersible ends in failure in 1959. The project is never completed until it is finally abandoned in 1971. Sellner dies in 1960 taking with him his unproven record.

1948

• **A** team of divers including Jacques-Yves Cousteau, Frédéric Dumas, Philippe Tailliez, and Jean Alinat conducts the world's first archaeological excavation on scuba when they excavate a Roman galley off Mahdia, Tunisia.

• **F**rédéric Dumas dives to 64 m (307 ft) using the Aqua-Lung.

• **W**ilfred Bollard (Royal Navy) dives to 165 m (540 ft) in Scotland's Loch Fyne breathing a helium-oxygen mixture. He dies during decompression.

• **R**ené Bussoz imports the first Aqua-Lung regulators to the USA. Rene's Sporting Goods becomes U.S. Divers in 1953.

• **C**anadian production of the Aqua-Lung begins in Montréal, Québec after Émile Gagnan emigrates to Canada.

• **C**ommander Doug Fane tests the Aqua-Lung and gets U.S. Navy to approve unit for Underwater Demolition Teams (UDT).

• **J**acques-Yves Cousteau develops the first DPV (Diver Propulsion Vehicle) for combat divers.

• **S**wiss scientist Dr. August Piccard (a record-setting balloonist), completes building of the bathyscaphe *FNRS-II* (started before WWII) and makes dives in the Mediterranean Sea and off Africa.

• **O**tis Barton reaches 1,372 m (4,500 ft) in a modified *Bathysphere*.

• **J**acques-Yves Cousteau and Frédéric Dumas conduct the first cageless dive with a white shark when they unintentionally observe a 7-m (23 ft) white shark off the Cape Verde Islands in the Atlantic Ocean.

• **J**acques-Yves Cousteau conducts the first dive in a shark observation cage built by the GERS during an expedition off the northwest coast of Africa.

• **G**eorges Beuchat introduces the first surface buoy.

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• **T**he U.S. Atlantic Expedition photographs the seafloor at a depth of 360 m (1,180 ft) using a remote controlled magnesium flash.

1949

• **E.** R. Cross designs the Sport Diver, one of the earliest single-hose open-circuit regulators developed in the United States.

• **R**aymondo Bucher (Italy) reaches the depth of 29.87 m (98 ft) in the Bay of Syracuse using a weighted speargun.

• **J**ean Alinat and Guy Morandière create the SISM, *Section d'intervention sous-marine* (Underwater Intervention Section) under the auspices of the French Navy in Saigon. Philippe Tailliez joins the unit in 1951.

• **L**udovico Mares founds Mares in Rapallo, Italy.

• **H**ans Hass and German company Franke & Heidecke develop the Rolleimarin underwater housing.

• **D**imitri Rebikoff develops an underwater electronic strobe flash for still and movie pictures.

EARLY 1950s

Gustav dalla Valle imports diving equipment manufactured by Italian Eduardo Cressi to the United States.

1950

• **T**he first neoprene wetsuit is designed in the United States by Dr. Hugh Bradner of the University of California.

• **E**stablishment of the Home Station Clearance Diving Team (Royal Navy). Clearance Diving Teams are also established to support the Mediterranean Fleet and the Far East Fleet.

• **D**r. August Piccard and his son Jacques design the bathyscaphe *Trieste*.

• **G**eorges Beuchat designs an underwater camera housing.



BYMS *2030*, a wooden minesweeper of the same class as HMS *J-026*, which would later become Jacques-Yves Cousteau's famed vessel, the *Calypso*. Photo: U.S. Navy

DIVING ALMANAC RECORD #552

• **T**he International Underwater Spearfishing Association (IUSA) is founded and holds its first national skin diving competition at Laguna Beach, California.

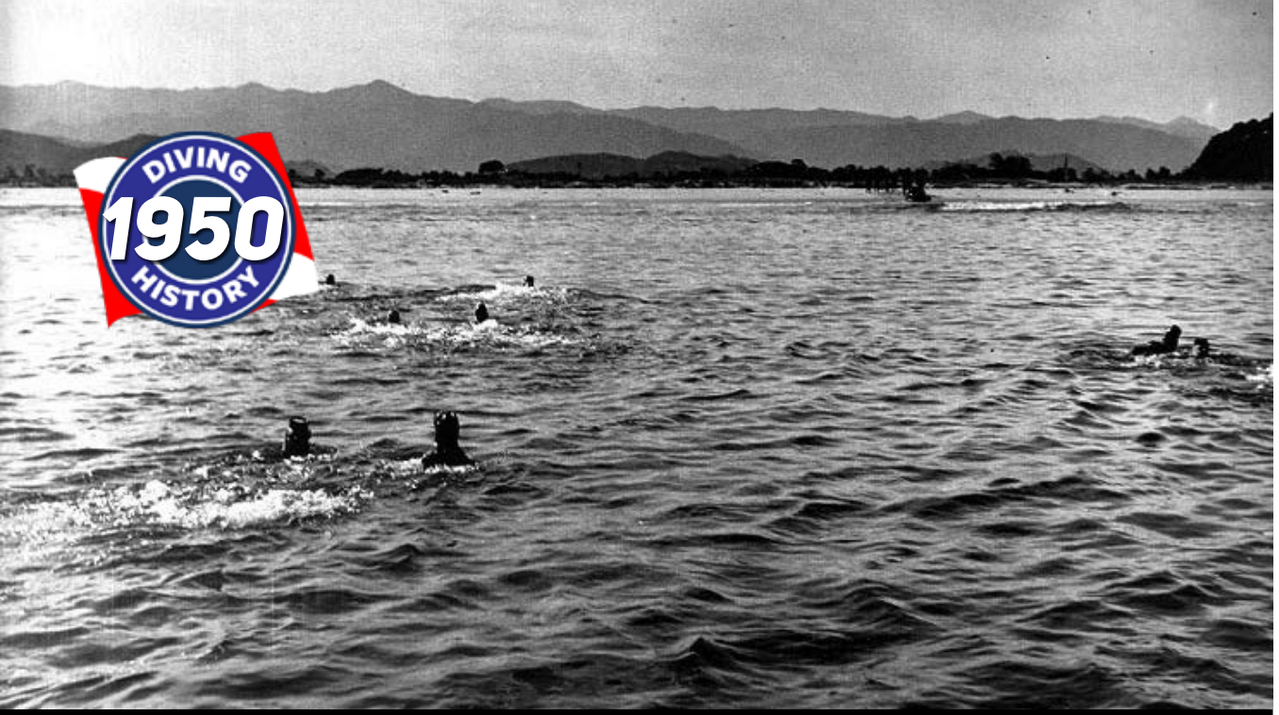
• **D**ick Anderson becomes the first Aqua-Lung instructor at Rene's Sporting Goods (U.S. Divers, 1953).

• **T**he *Calypso*, the ex-Royal Navy minesweeper HMS *J-026*, is converted into an oceanographic research vessel by Jacques-Yves Cousteau.

• **H**ilbert Schenck Jr. and Henry Kendall publish Shallow Water Diving for Pleasure and Profit. This is the first book by American authors to address underwater photography for the recreational diver.

• **J**ordan Klein and Jerry Greenberg designs a simple lucite underwater housing which is marketed with a Kodak Holiday camera. Three thousand are sold through Abercrombie and Fitch department stores.

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Underwater Demolition Team "Frogmen" swim ashore from a LCVP in Wonsan Harbor, while on a mission to destroy a North Korean minefield, on October 26, 1950. Photo: U.S. Navy

• **T**he GRS becomes the GERS (Groupe d'études et de recherches sous-marines).

1950-53

• **U.**S. Navy Underwater Demolition Teams (UDT) are deployed to Korea.

1951

• **T**he reserve valve commonly known as a J-valve is developed. This valve allows the diver access to the last 500 psi of air in his air tank at the end of a dive.

• **E**nnio Falco (Italy) is the first to freedive beyond 100 ft (30.48 m) when he reaches the depth of 115 ft (35.05 m) off Napoli, Italy.

• **H**ans Hass' fourth book, *Diving to Adventure*, published in German in 1947, is the first of Hass' books translated into English.

• **T**he movie *The Frogmen* set in the Pacific Ocean in WWII and starring Richard Widmark and Dana Andrews is released.

• **R**achel Carson publishes *The Sea around Us*.

• **J**ohn Steinbeck publishes *The Log from the Sea of Cortez*. His original report on his expedition was published in 1941 as *The Sea of Cortez: A Leisurely Journal of Travel and Research*.

• **H**ans Hass wins the Biennale Prize

• **T**he Skin Diver (later known as Skin Diver Magazine) is published by Chuck Blakeslee and Jim Auxier. The magazine initially caters to spearfishers but soon switches over to scuba diving.

1952

• **T**he US Navy Emerson-Lambertsen closed-circuit oxygen rebreather is developed.

• **E**stablishment of the Clearance Diving (CD) Branch (Royal Navy).

• **C**ommercial production of the first neoprene wetsuit designed by Dr. Hugh Bradner (University of California) begins.

• **T**he *Comité des Sports Sous-Marins* (Underwater Sports Committee) of the *Confédération Internationale de la Pèche Sportive* (CIPS) (International Confederation of Sport Fishing), is founded. It is replaced by CMAS in 1959.

• **T**he Scuba Training Committee of the Florida Skin Divers Association (FSDA) is founded. It becomes the International Diving Educators Association (IDEA) in 1976.

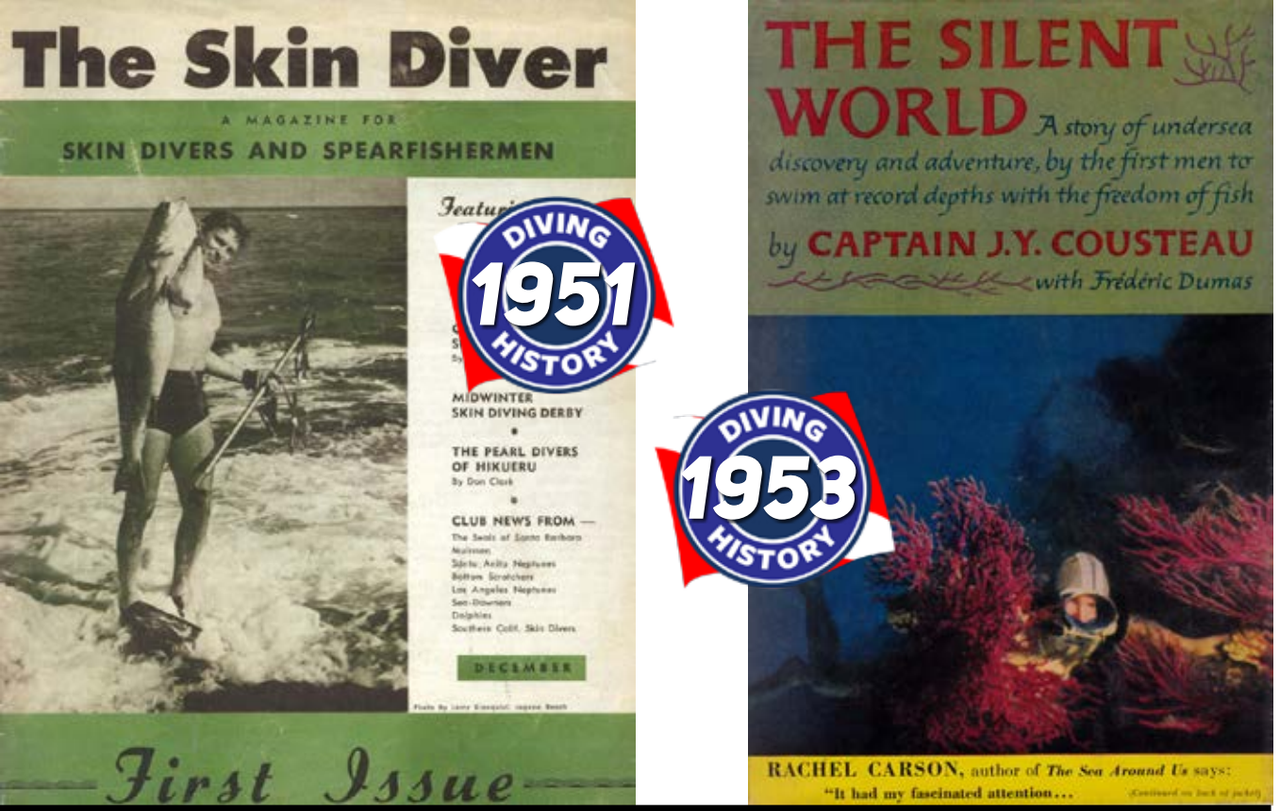
• **T**ed Eldred markets the Porpoise single-hose open-circuit regulator in Melbourne, Australia.

• **D**imitri Rebikoff creates the first diver propulsion vehicle (DPV), the *Torpille*, which later becomes the first ROV, the *Poodle*.

• **C**hristian J. Lambertsen changes the name of the Lambertsen Amphibious Respiratory Unit (LARU) to Self-Contained Underwater Breathing Apparatus, and thus creates the acronym SCUBA.

• **J**acques-Yves Cousteau and André Laban develop the first underwater television equipment.

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LEFT: Inaugural issue of The Skin Diver, 1951 RIGHT: *The Silent World*, 1953

1953

• **C**alifornia-based U.S. Divers is founded by La Spirotechnique, a subsidiary of Air Liquide of France and manufacturer of the Aqua-Lung.

• **T**he British Sub-Aqua Club (BSAC) becomes the world's first scuba training agency. It is founded by Oscar Gugen, Peter Small, Mary Small, and Trevor Hampton.

• **T**he Scottish Sub Aqua Club (SSAC) is founded in Glasgow.

• **G**eorges Beuchat introduces the first isothermic wetsuit.

• **T**he British Underwater Centre at Dartmouth in Devon (England) is founded by Captain Trevor Hampton.

• **D**r. Eugenie Clark publishes *Lady with a Spear*.

• **J**acques-Yves Cousteau broadcasts the first live undersea television images.

• **R**obert Wagner, Gilbert Roland and Peter Graves star in *Beneath the 12 Mile Reef*, a film about sponge diving in the Florida Keys.

• **J**acques-Yves Cousteau, Frédéric Dumas, and James Dugan publish *The Silent World*. The subsequent documentary film wins the top award at the Cannes Film Festival in 1956.

• **J**ordan Klein and engineer Robert Thompson design an amphibious camera based on the Kodak Holiday mechanism. It is introduced to the diving public as the Mako Shark. Fifty five thousand cameras are sold before the design is bought by Nemrod of Spain and sold as the Siluro. Klein also manufactures aluminum housings under the Mako brand name. Marine Enterprises becomes Marineland Inc.

• **J**acques-Yves Cousteau explores the Antikythera Shipwreck in the Aegean Sea with MIT professor Harold "Doc" Edgerton.

• **D**imitri Rebikoff launches the *Pegasus* diver propulsion vehicle (DPV), which is equipped with gyro instruments.

• **J**erry Greenberg starts his own company, Seahawk Products, manufacturing aluminum housings for Leica, Contax, and Argus cameras.

• **O**ther companies build underwater camera equipment in the early 50s although they do not have as much impact on the diving public as those already mentioned. Vern Pederson, of La Jolla, California, and Bill Salmi build custom housings for individual photographers such as Peter Stackpole and Jerry Greenberg. Peter Stackpole also manufactures his own line of custom camera housings. In Lynwood, California, Ace Scientific Laboratories manufactures an aluminum housing, called the U-boat, for the Rolleiflex camera. Homer Lockwood and Lockwood Associates, of Inglewood, California, build acrylic housings for a variety of cameras. The Aqua Cam amphibious still camera is manufactured by E. E. Peterson. Sampson Machine Works and motion picture actor John Hall, manufacture the Self Contained Underwater Motion Picture Apparatus (SCUMPA), a housing for motion picture cameras.

1954

• **T**he French research submersible *FNRS 3* piloted by Georges Houot and Pierre Willm reaches a depth of 4,050 m (13,287 ft) breaking Barton's 1948 record. The new record also marks the beginning of untethered deep descents.

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• **Z**ale Parry makes a record dive to 64 m (209 ft) near Catalina Island, California.

• **T**he prototype Mark V semi-closed circuit mixed-gas rebreather is developed.

• **S**am Davison founds dive equipment manufacturer Dacor.

• **T**he Los Angeles County Department of Parks and Recreation under the direction of Al Tillman and lifeguard Bev Morgan holds the first U.S. scuba certification course.

• **D**r. Harold Edgerton develops an underwater still camera equipped with an electronic strobe.

• **S**chenck and Kendall publish *Underwater Photography*, and E. R. Cross publishes *Underwater Photography and Television*. These are the first books, by American authors, specifically written to provide how-to information to underwater photographers.



FNRS 3 in Toulon, France. Photo by Yves Tennevin (CC)

• **A** textbook for diver education, *The Science of Skin and Scuba Diving*, is published by the Council for National Cooperation in Aquatics. Three more editions are published (1959, 1962 and 1974). Total sales of the book later published as *The New Science of Skin and Scuba Diving* exceed over one million copies.

• **K**irk Douglas, James Mason, Paul Lukas, and Peter Lorre star in the Walt Disney version of *20,000 Leagues Under the Sea*. It wins the Academy Awards for art direction and special effects.

• **P**hilippe Tailliez publishes his first book *Plongée sans câble* (To the Ocean Depths), which tells the story of the *Mousquemers*, the *FNRS II*, of Cousteau's first films in 1943, and Tailliez's experiences in Indochina.

• ***K**ingdom of the Sea*, the first underwater television series, starring Zale Parry is aired on TV.

1955

• **D**acor founder Sam Davison, Jr. designs the Dial-A-Breath, a two-hose, double-diaphragm regulator, that includes a low-pressure reserve and variable breathing resistance.

• **T**he *Fédération Française d'Etudes et de Sports Sous-Marins* (FFESSM) (French Federation of Undersea Studies and Sports) is formed after the successive mergers of several organisations FSPNES (1948), FGRSSM (1952), FFASM (1953), FNESSM (1954). The FFESSM is one of the founding members of CMAS in 1959.

• **D**ottie Frazier becomes the first female scuba diving instructor.

• **T**he first formal instructor certification program is introduced by Al Tillman and Bev Morgan.

• **J**ane Russell, Richard Egan, and Gilbert Roland star in *Underwater*, produced by Howard Hughes.

• **D**imitri Rebikoff and Paul Cherney publish *A Guide to Underwater Photography*.

• **R**ick and Barbara Carrier publish Dive: *The Complete Book of Skin Diving*.

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1956

• **T**he USN Standard Decompression Tables are published by NEDU.

• **A** Royal Navy diver reaches 183 m (600 ft) using a helium-oxygen mix.

• **T**he red and white divers down flag is introduced by Ted Nixon.

• **J**ordan Klein (Marine Enterprises) begins manufacturing compressors under the MAKO name.

• **J**erry Greenberg publishes *Underwater Photography Simplified*.

• **D**r. Harold Edgerton and Jacques-Yves Cousteau take the first photos of the deep ocean floor while anchored off the Romanche Gap off the coast of Africa. The *Calypso* is anchored at a record depth of 7,600 m (24,928 ft) using a 318 kg (700 lb) anchor, 30 m (100 ft) of heavy chain, a 250 kg (550 lb) pig iron, a 61 m (200 ft) steel cable and a quarter-inch braided nylon line 10,000 m (32,800 ft) long.

• ***T**he Silent World* (*Le monde du silence*) co-directed by Jacques-Yves Cousteau and Louis Malle receives an Academy Award for Best Documentary Feature, and also the Palme d'Or at the Cannes Film Festival.

• **P**erry Submarine Builders is founded by John H. Perry Jr.



Diver Down flag by Ted Nixon

1957

• **T**he Foxboro Decomputer Mark I is manufactured by the Foxboro Company and evaluated by the US Navy Experimental Diving Unit.

• **B**ob Soto's Diving is the first full-time dive operation on Grand Cayman. Jacques-Yves Cousteau retires from the French Navy to become Director of the Monaco Oceanographic Museum.

• **T**he first international underwater film festival is organized by Al Tillman and Zale Parry in Los Angeles, California.



Original film poster for *Le monde du silence* (*The Silent World*) produced by Jacques-Yves Cousteau and Louis Malle in 1956.

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1957-62

U.S. Navy Genesis Project sets standards for saturation diving and eventually leads to the SEALAB habitat programs.

1958

• **S**herwood markets the first piston regulator.

• **U**SS *Nautilus* nuclear-powered submarine cruises below the ice at the North Pole.

• **S**am LeCocq of Sportsways designs the Waterlung, the first single-hose regulator widely used in the United States.

• **L**aunch of the television series *Sea Hunt*, starring Lloyd Bridges and Zale Parry. The show introduces scuba diving to television audiences worldwide from 1958 to 1961 (155 episodes) and later through reruns.

• **S**unset House opens on Grand Cayman and soon becomes a popular dive resort.

• **V**oit, U.S. Divers, Healthways, Dacor, and Swimaster create the Organization of Underwater Manufacturers.

• **I**ngvar Elfström founds Swedish dive equipment manufacturer Poseidon and launches one of the first single-hose regulators in serial production.

• **I**van Tors produces *Underwater Warrior*, starring Ross Martin and Dan Daily. The film is about underwater demolition technicians.

• **B**elgian engineer Jean De Wouters and Jacques-Yves Cousteau design the Calypsophot camera (De Wouters started in 1957). Spirotechnique began distribution in 1960.

1959

• **T**he *Confédération Mondiale des Activités Subaquatiques* (CMAS) also known as the World Underwater Federation, is founded in Monaco. One of the founding members and the inaugural president is Jacques-Yves Cousteau. Luigi Ferraro, is appointed as vice-president.



Calypsophot u/w camera. Sales began in 1960. Photo by Jan von Erpecom (WC)
DIVING ALMANAC RECORD #153

• National Association of Underwater Instructors (NAUI) is founded by Albert Tillman and Neal Hess. Its first board of directors consists of Al Tillman (NAUI#1), John C. Jones, Jr. (NAUI#2), Neal Hess (NAUI#3), Garry Howland (NAUI#13), Jim Auxier and James Cahill. Its first board of advisors consists of Captain Albert Behnke, Jr., Commander George Bond, Captain Jacques-Yves Cousteau, and Dr. Andy Rechnitzer.

• **T**he YMCA Scuba Program (a.k.a. Y-SCUBA) is founded. The program is taken over by SEI in 2008.

• **I**talians Victor Aldo de Sanctis and Carlo Alinari introduce the SOS Decompression Metre, the first recreational analog dive computer, which is distributed by SOS (Strumenti Ottici Subacquei) and later by Scubapro and Cressi-Sub. The Decompression Metre consists of a casing with a waterproof bladder filled with gas that bleeds into a smaller chamber through a semi-porous tissue-simulating ceramic cartridge. Chamber pressure is measured by a bourdon tube that indicates decompression status. The device that is nowhere near as efficient as present-day dive computers becomes known to many as the “Bend-O-Matic.”

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• **T**he Underwater Society of America is formed.

• ***D**on't Give up the Ship* stars Jerry Lewis on scuba.

• **H**ans Hass wins the Oscar for underwater photography for the film *Unternehmen Xarifa*.

• **J**ohn Cayford publishes *Underwater Work: A Manual of Scuba Commercial Salvage and Construction*.

• **J**acques-Yves Cousteau launches the *DS-2* (Diving Saucer), also known as *Denise* and *La soucoupe*. The *DS-2* is propelled by two water jets and can carry two passengers to depths reaching 305 m (1,000 ft). Its cruising speed is one knot.

1960s

• **D**ozens of experiments are conducted with people living in underwater habitats from which they can leave for sea exploration using scuba equipment.

• **U.**S. Navy Underwater Demolition Teams (UDT) are used to recover Mercury, Gemini and Apollo Astronauts and their spacecraft after they splash into the ocean.

1960

• **A**merico Santarelli (Brazil) is the first to freedive beyond 150 ft (45.72 m) when he reaches the depth of 46.02 m (151 ft) off Santa Margherita Ligure, Italy.

• **U**SS *Triton* submarine circumnavigates the world entirely underwater.

• **J**acques Piccard and Lieutenant Don Walsh (USN) reach the deepest known point in the ocean 10,916 m (35,814 ft) aboard the bathyscaphe *Trieste*.

• **T**he first Public Training Agency and Underwater Instructor Certification Course (UICC) is formed by NAUI in Houston, Texas.

• **D**ick Birch opens Small Hope Bay Lodge on Andros Cay in the Bahamas. The resort has welcomed thousands of guests for more over 45 years.

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TOP: Cousteau's *DS-2* (a.k.a. *La soucoupe* and *Denise*). Photo: U.S. Navy

DIVING ALMANAC RECORD #246

BOTTOM: U.S. Navy divers securing a space capsule in the Pacific. Photo: NASA





Assisted by U.S. Navy divers, astronauts Neil A. Armstrong and David R. Scott awaiting the arrival of the recovery ship inside their Gemini VIII capsule, after splashdown. Photo: NASA Human Spaceflight Collection.



The bathyscaphe *Trieste* during the record-breaking expedition to the deepest known point in the ocean. ROLEX Media Release

DIVING ALMANAC RECORD #233

1961

• **S**wiss Hannes Keller and Kenneth MacLeish dive to 222 m (728 ft) in Lake Maggiore, Switzerland.

• **E**d Replogle develops an audible alarm that warns a diver of low air pressure.

• **H**enri G. Delauze founds the *Compagnie maritime d'expertises* (COMEX) in Marseille, France. COMEX specializes in engineering, hyperbaric and deep diving operations.

• **P**oseidon launches the Unisuit, the first drysuit with a gas-proof zipper.

• **M**aurice Fenzy patents a flotation device invented by the underwater research group of the French navy. It consists of 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-traveled Americans, are wearing Fenzys.

• **N**ASDS, the National Association of Skin Diving Schools is founded by John Gaffney.

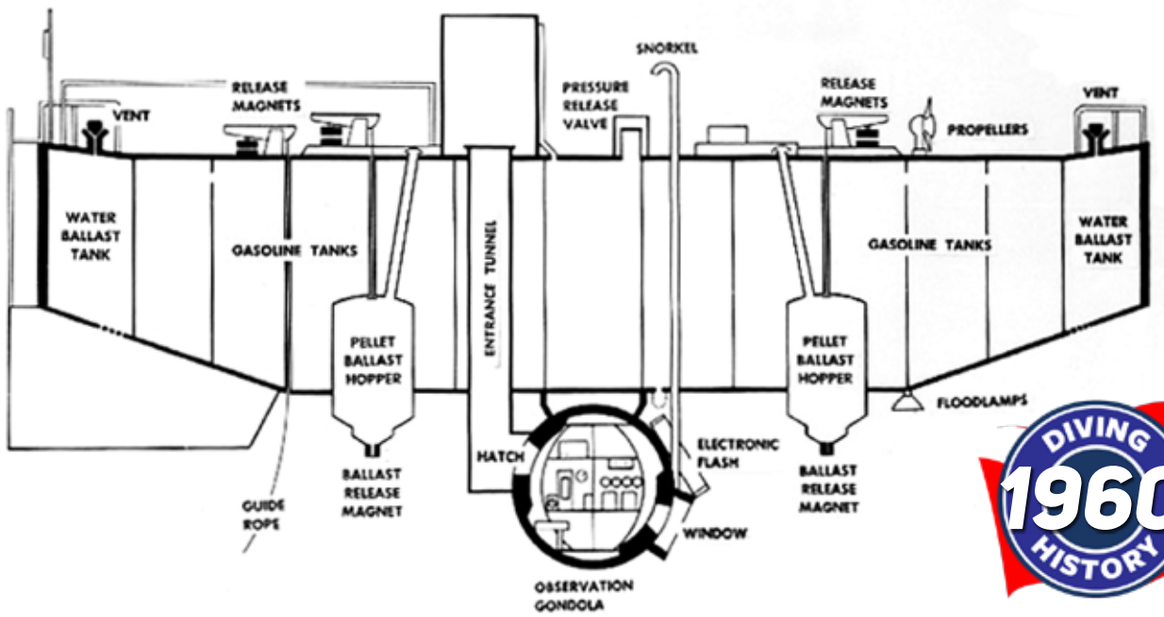
• **T**he San Diego Underwater Photographic Society (SDUPS) is founded by Ron Church and Chuck Nicklin at the Diving Locker.

1962

• **E**dwin A. Link spends eight hours at a depth of 18 m (60 ft) in one of his submersible decompression chambers (SDC) off Villefranche-sur-Mer in the Mediterranean Sea during his Man-in-Sea program.

• **T**he first practical saturation dive takes place during Edward A. Link's Man-in-Sea program. Belgian diver Robert Sténuit becomes the world's first aquanaut after remaining underwater for 24 hours breathing heliox at 61 m (200 ft) in a specially designed submersible decompression chamber.

• **C**onshelf I: Cousteau divers Albert Falco and Claude Wesley become the world's first normal air aquanauts when they spend seven consecutive days at a depth of 10 m (33 ft) in the *Diogènes* ambient pressure



The bathyscaphe *Trieste*. Image Jan von Erpecom (WC)

habitat near Marseilles, France.

• **H**annes Keller and Peter Small dive to 305 m (1,000 ft) in a diving bell off Santa Catalina Island, California. Small dies during decompression.

• **T**he *Nederlandse Onderwatersport Bond* (NOB) (Netherlands Underwater Sports Association) is founded.

• **F**red Baldasare (USA) is the first to cross the English Channel on scuba, covering a total distance of 67.59 km (42 miles) in 19 hours and one minute.

• **M**art Toggweiller publishes How to Build Your Own Underwater Camera Housing.

• **A** plexiglas underwater housing is developed by Life Magazine photographers Elgin Ciampi and Peter Stackpole.

• **U.**S. Navy SEAL Teams 1 and 2 are formed on January 2, 1962 by an act of President John F. Kennedy.

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U.S. Navy SEAL Teams 1 and 2 are formed on January 2, 1962 by an act of President John F. Kennedy. In this photo, President Kennedy speaks with U.S. Navy SEAL team members on the pier at Naval Air Station, Norfolk, Virginia Photo: Robert Knudsen | White House Photographs | John F. Kennedy Presidential Library and Museum (PD)

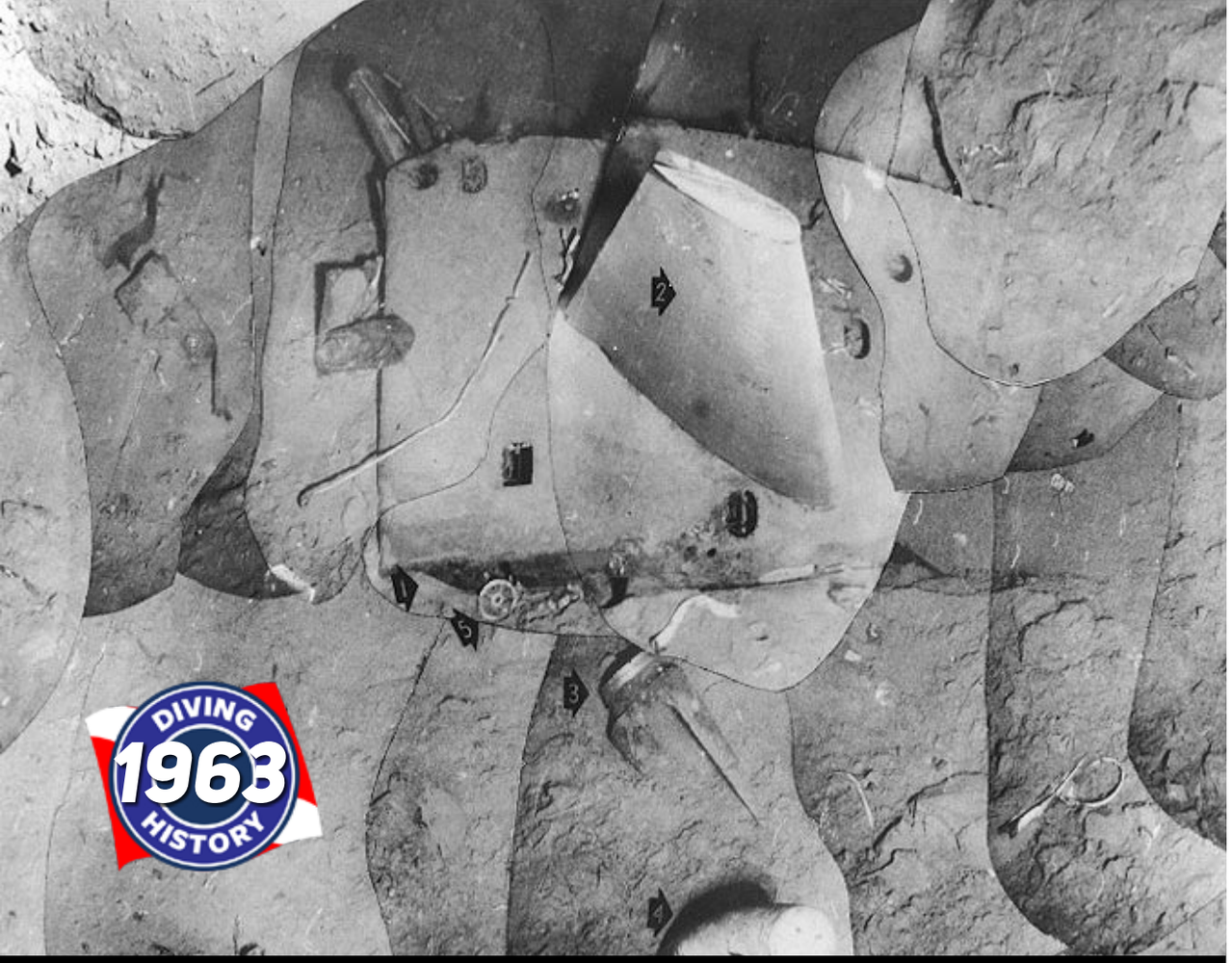


Photo mosaic of sail and other debris from the USS *Thresher* taken by the bathyscaphe *Trieste*. Photo: U.S. Navy

• **R**on Taylor and Ben Cropp produce *The Shark Hunters*.

1963

• **C**onshelf II: Two underwater habitats are lowered into the Red Sea where eight Cousteau aquanauts live for one month. The larger habitat houses six divers at 10 m (33 ft) while the second structure is used by two divers at 25 m (82 ft). Simone Melchior Cousteau becomes the first female aquanaut when she spends four days underwater.

• **T**he USS *Thresher* (SSN-593) nuclear-powered submarine is lost with all hands at a depth of 2,560 m (8,400 ft) about 354 km (220 miles) east of Boston. Photographs taken by the USN bathyscaphes *Trieste* and *Trieste II* prove that Thresher broke up after sinking beyond its crushing point.

• **A**ustralian Rodney Fox survives a now famous attack by a white shark during a spearfishing competition. The story of his survival is quickly known worldwide. He later becomes one of the world's foremost shark conservationists.

• ***C****omhairle Fo-Thuinn* (CFT), also known as the Irish Underwater Council, is founded.

• **S**cubapro is founded by Dick Bonin and Gustav dalla Valle.

• **V**oit, Scubapro, Dacor, U.S. Divers, Healthways form the Diving Equipment Manufacturers Association (DEMA) to promote, foster and advance the common business interests of the members as manufacturers of diving equipment.

• **C**huck Connors, Luke Halpin and a bottlenose dolphin star in *Flipper*. The film later becomes a popular television series.

• **N**ikon markets an improved version of the Calypsophot underwater camera under the name Nikonos.

1964

• ***S****EALAB I*: Four aquanauts live in an underwater habitat off Bermuda for 11 days at the depth of 59 m (193 ft).

• **J**acques-Yves Cousteau launches two *Sea Flea* deep submersibles. Like the *DS-2* Diving Saucer, the *Sea Fleas* are propelled by two water jets and can carry their single passenger to depths reaching 500 m (1,640 ft).

• **E**dward A. Link designs and builds a two-man undersea habitat called the *SPID* (Submersible, Portable Inflatable Dwelling). Two commercial and military divers (Jon Lindbergh and Robert Stenuit) spend two days inside the *SPID* breathing a mixed-gas of 97% helium and 3% oxygen.

• **T**he *Alvin* submersible (Woods Hole Oceanographic Institution) is launched. It ultimately makes over 4,000 scientific dives and it is one of only five deep submersibles of its time that can dive to 6,096 m (20,000 ft).

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• **U**niversal Salvors (later known as Treasure Salvors) Mel and Deo Fisher, Rupert Gates, Demosthenes "Mo" Molinar, Dick Williams, Walt Holzworth, Arnold McLean, and Fay Field work alongside Kip Wagner to salvage treasure from the Spanish fleet of 1715 off the coast of Florida.

• **T**he U.S. Navy adopts the MK 6 UBA semi-closed circuit rebreather.

• **T**he Deep Submergence Systems Project (DSSP) is created.

• **G**eorges Beuchat introduces the Jetfins, the first vented fins.

• **T**he *Floating Instrument Platform* (FLIP), a 108 m (355-ft) long floating oceanographic instrument platform goes on its first assignment. The platform is towed by a ship to the research site in a horizontal position and then its ballast tanks are flooded to make it tilt to an upright position. All but 17 m (55 ft) of its length disappears below the water. *FLIP* is used for research by the Scripps Institution of Oceanography.

• **O**n October 12, a CMAS delegation aboard an improvised fleet of vessels throws a cylinder into the Mediterranean Sea off Genoa. The cylinder contains the declaration of humanity's ownership of the ocean depths. The ceremony is greeted by rough seas and a loud clap of thunder resonates when the cylinder touches the water.

• **R**ichard Adcock launches *Marisla*, the first dedicated diving liveaboard, in La Paz, Mexico.

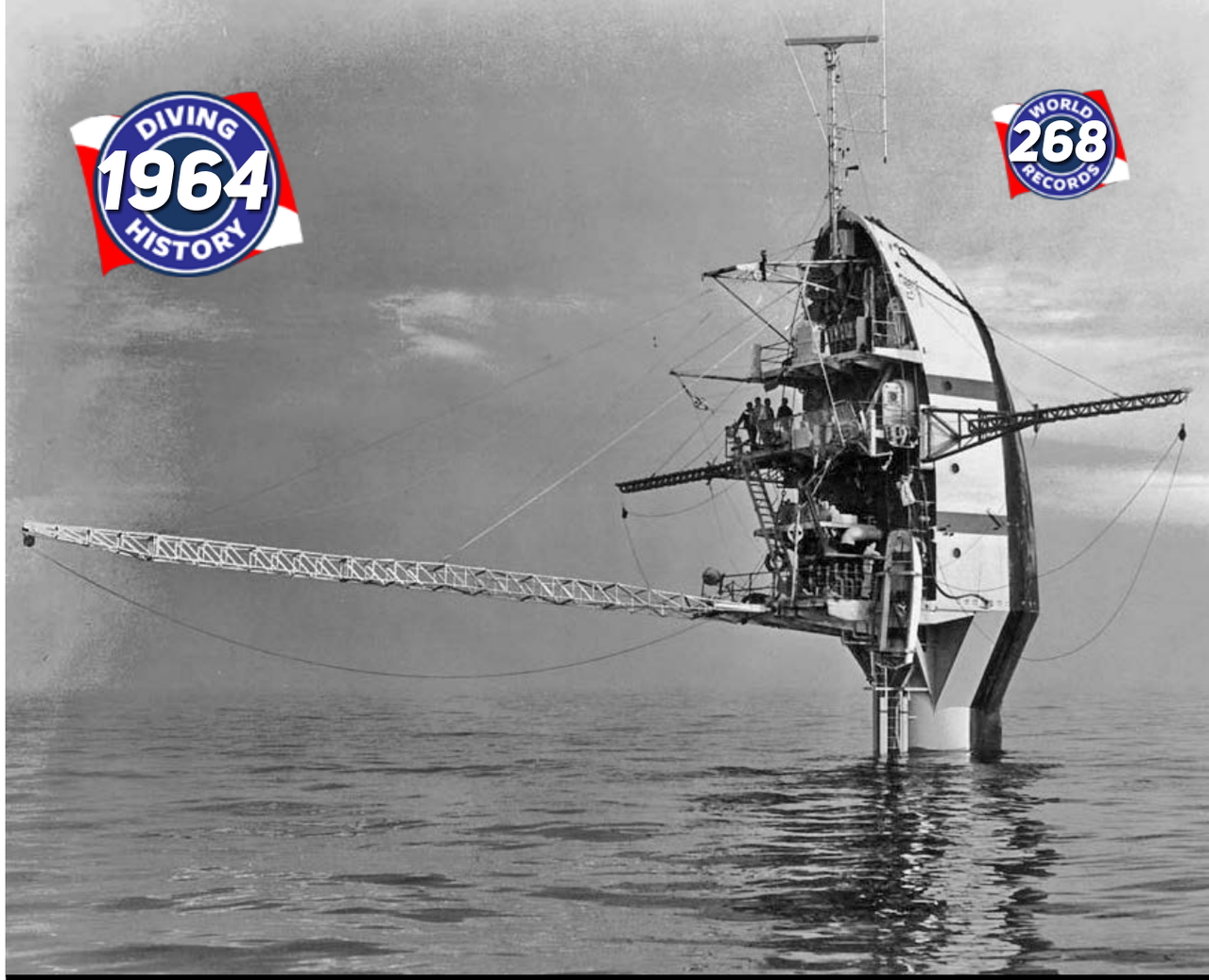
• **R**eynolds Metals Company launches Aluminaut, the world's first aluminum submersible.

1965

• **C**onshelf III: Six Cousteau aquanauts spend 27 days at a depth of 100 m (328 ft) off Nice, France.

• **R**odney Fox, an Australian diver and white shark attack survivor, designs the first white shark observation cage.

• **P**hil Nuytten founds Can-Dive Services Ltd.



The *Floating Instrument Platform* (FLIP). Photo: U.S. Navy
DIVING ALMANAC RECORD #268

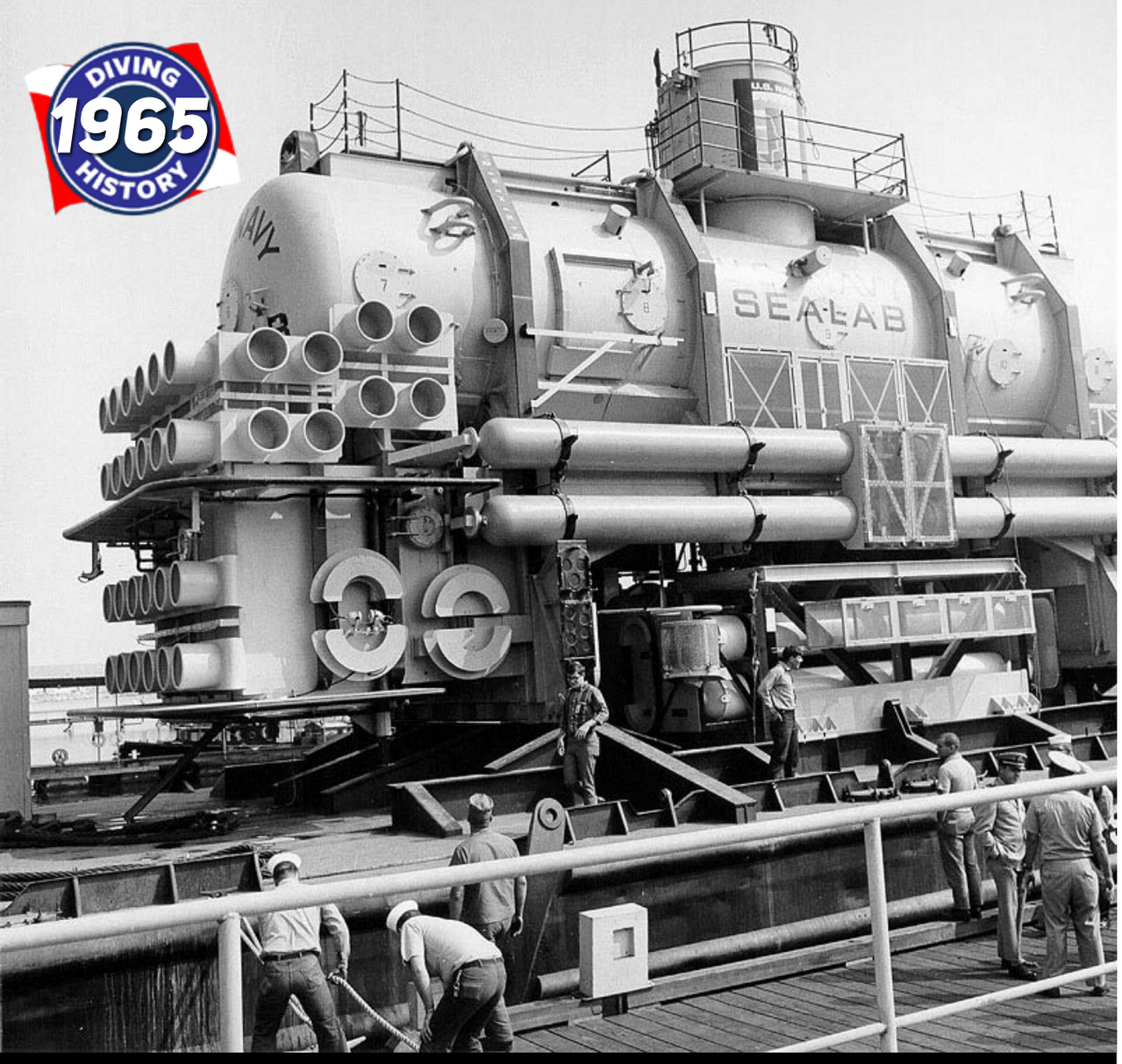
• ***D**eepstar 4000* (Westinghouse) is launched. It is capable of diving to 1,220 m (4,000 ft).

• **U**NEXSO is created by Al Tillman in Freeport, Grand Bahama Island. It becomes a prototype for the complete and environmentally-friendly diving resort.

• **K**irby-Morgan Inc., which later produces the MK 1 and MK 21 for the navy, is formed by Bob Kirby and Bev Morgan.

• **S**ean Connery stars in *Thunderball*, a James Bond spy thriller including several underwater action scenes. The film wins an Academy Award for its underwater special effects.

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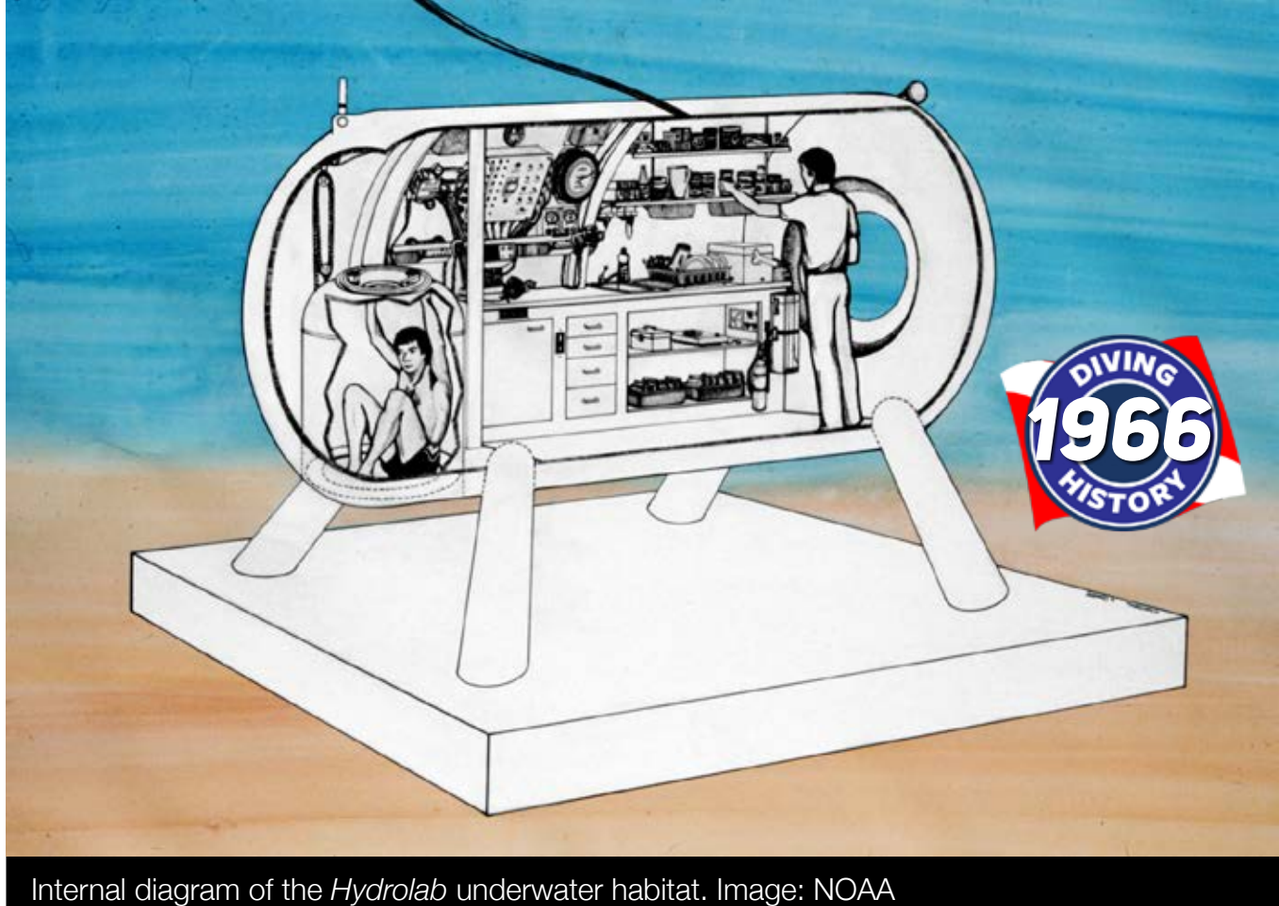


SEALAB II. Photo: U.S. Navy.

• ***S****EALAB II*: Three teams of ten men spend 15 days at a depth of 62 m (205 ft) off La Jolla, California, near Scripps Institution of Oceanography. Cdr. Scott Carpenter remains below for 30 days and makes radio contact with fellow astronaut Gordon Cooper orbiting the earth in a Gemini spacecraft. A dolphin named Tuffy ferries supplies from the surface. Commander Carpenter is the first person to become an astronaut and an aquanaut.

1966

• ***H****ydrolab* is built. It begins its career as an underwater research laboratory in 1970 under the auspices of NOAA. During its 15 years of operation, it becomes the busiest research habitat of its time. Crews of up to four people conduct approximately 100 missions in the Bahamas until the mid 1970s, and then 80 missions at St. Croix, in the United States Virgin Islands from 1977 to 1985. *Hydrolab* is decommissioned in 1985.



Internal diagram of the *Hydrolab* underwater habitat. Image: NOAA

• **T**he Professional Association of Diving Instructors (PADI) is founded by John Cronin and Ralph Erickson.

• **E**nzo Maïorca (Italy) is the first to freedive beyond 200 ft (60.96 m) when he reaches the depth of 61.87 m (203 ft) off Syracuze, Italy.

• ***S****tar II* and ***S****tar III* (General Dynamics) are launched.

• **E**stablishment of the Minewarfare and Clearance Diving (MCD) Branch (Royal Navy).

• **E**stablishment of U.S. Navy Harbor Clearance Unit One (HCU-1).

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Hydrolab is built. It begins its career as an underwater research laboratory in 1970 under the auspices of NOAA. During its 15 years of operation, it becomes the busiest research habitat of its time. Crews of up to four people conduct approximately 100 missions in the Bahamas until the mid 1970s, and then 80 missions at St. Croix, in the United States Virgin Islands from 1977 to 1985. *Hydrolab* is decommissioned in 1985. Photo: OAR/NURP

DIVING ALMANAC RECORD #306

• **T**he Israeli Diving Federation (TIDF) is founded by ex-Navy diving instructors and members of an underwater archaeological society.

• **T**he deep submersibles *DSV-2* (Deep Submergence Vehicle), *Alvin Aluminaut*, and the *PC3B* (Perry Submarine Builders), help recover a 1.45-megaton thermonuclear bomb lost in the Mediterranean Sea after a mid-air crash of a B-52 bomber and its refueling plane over Palomares, Spain. The intact bomb is brought to the surface after being located at a depth of 2,850 ft (869 m) after a 2.5-month search.



U.S. Navy ordnance men check for contamination on an H-bomb on the deck of USS *Petrel* (ASR-14) off Palomares Beach, Spain, 8 April 1966, after the bomb was recovered from the Mediterranean Sea. Photo: U.S. Navy.

1967

• **T**he Undersea Medical Society (now known as the Undersea and Hyperbaric Medical Society, UHMS) is founded in Maryland.

• **T**he *Deep Quest* (Lockheed Missile & Space Company) is launched and conducts several classified dives for the U.S. Navy.

• **T**he *LS-1* Underwater Laboratory is launched in Lake Bicaz, Romania. It is operated by the Salmo Ecological Diver Association (APES) of A.I. Cuza University. It is fixed to a mobile platform and can be positioned at variable depths above or below thermoclines to study captive fish behaviour for aquaculture.



Aquanaut Constantin Mihaï swims by the *LS-1* Underwater Laboratory in Lake Bicaz, Romania. Photo by Jeffrey Gallant | Diving Almanac
DIVING ALMANAC RECORD #299

• **E**dwin A. Link launches the *Deep Diver*, the first submersible designed for lockout diving, which allows divers to enter and exit the vessel through a connecting chamber while underwater.

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• **C**an-Dive is awarded the first Canadian off-shore exploration diving contract from Shell Oil.

• **T**he *Deep Diving System* (DDS) is placed in Fleet Service by the U.S. Navy's Harbor Clearance Unit One.

• **T**he *Federación Española de Pesca y Actividades Subacuáticas* (FEDAS) (Spanish Federation of Underwater Activities) is founded.

1967-71

• **U.**S. SEAL Teams 1 & 2 deploy to Vietnam.

1968

• **A** record dive to 312 m (1,025 ft) is made from a saturation depth of 251 m (825 ft) by NEDU in a joint venture with Duke University.

• **P**roject NESCO conducts the first 600-foot (183 m) ocean bounce dives.

• **D**r. Walter Starck develops the Electrolung, the first rebreather with electronic parts.

• **T**he *Beaver IV* (Rockwell International) is launched. It is a deep submersible capable of diving to 610 m (2,000 ft), locking out divers to 305 m (1,000 ft), and linking with an ocean floor oil completion system or a stranded military submarine to 610 m (2,000 ft).

• **M**el Fisher discovers several wrecks from the 1733 fleet during his search for the *Nuestra Señora de Atocha*.

• **T**he *Federazione Italiana Attività Subacquee* (FIAS) (Italian Underwater Activities Federation) is founded as ENAL-FIAS, then changes to FIAS in 1972.

• **N**ikon launches the Nikonos II

• **T**he National Association for Cave Diving (NACD) is founded.

• **L**aunch of the television series *The Undersea World of Jacques Cousteau*.



Nikonos II by Nikon

1969

• **J**acques Piccard leads an American and Swiss team aboard the *Ben Franklin* (Alcoa Aluminum) as it drifts submerged for 31 days in the Gulf Stream from Florida to Nova Scotia while Apollo 11 astronauts head to the moon and back. The submersible is also known as the *Grumman/Piccard PX-15 Mesoscaphe*.

• ***T**ektite I*: Four Scientists under the direction of the Office of Naval Research spend 60 days at a depth of 15 m (50 ft) in Lameshur Bay, U.S. Virgin Islands.

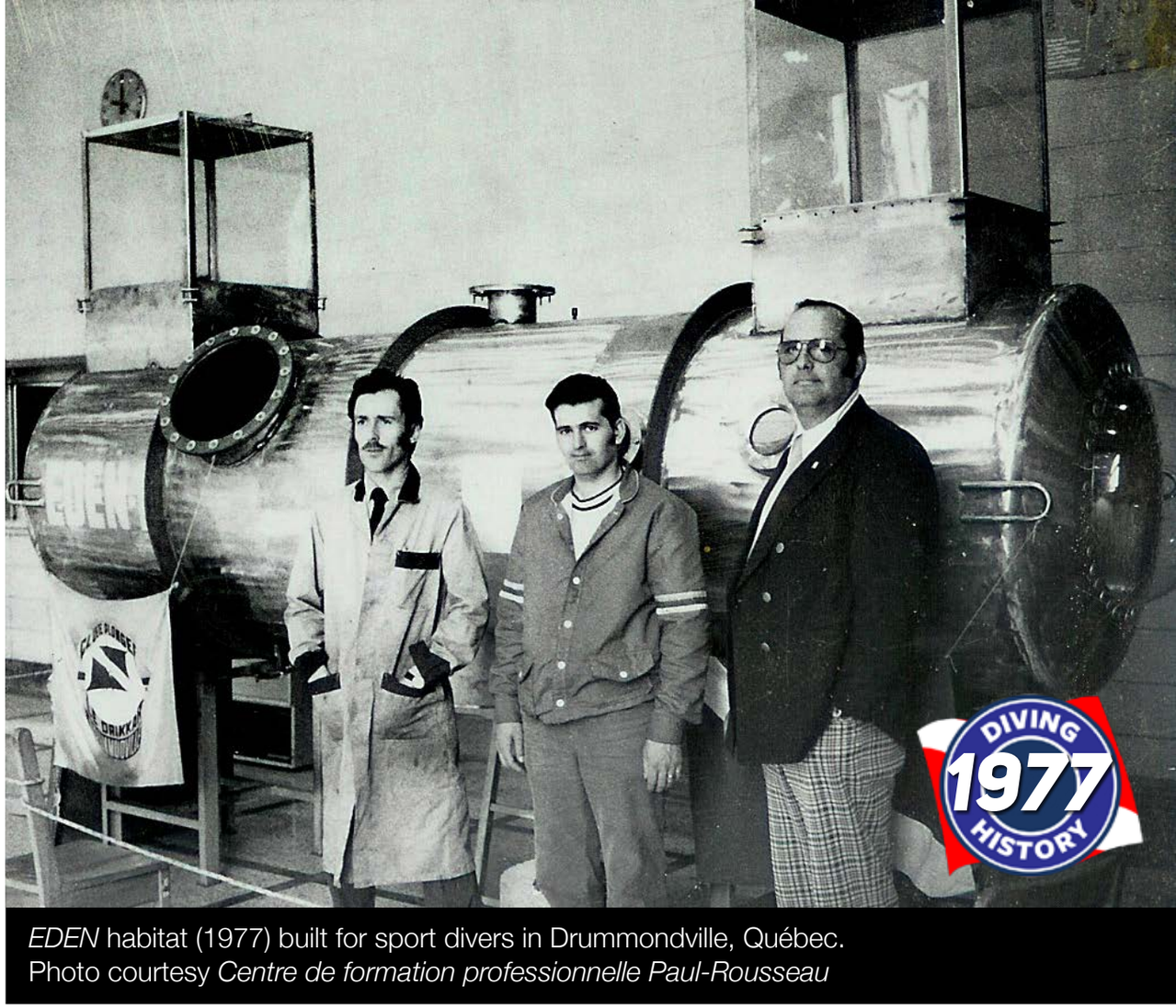
• ***S**EALAB III* ends tragically with the death of aquanaut Berry Cannon at 185 m (610 ft) off San Clemente Island, California. Cannon is killed while making repairs to a leak during an early test dive. No new habitats are built by the U.S. Navy but the saturation diving techniques developed during the SEALAB program continue in several other U.S. Navy programs.

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Aquanauts emerge from *Tektite I* in 1969. Photo: OAR/NURP

DIVING ALMANAC RECORD #304



EDEN habitat (1977) built for sport divers in Drummondville, Québec.
Photo courtesy *Centre de formation professionnelle Paul-Rousseau*

• **P**hil Nuytten co-founds Oceaneering International Inc., the largest publicly traded underwater skills company in the world.

• **P**erry Submarine Builders becomes Perry Oceanographics.

• **T**ravel agent Dewey Bergman founds Sea and Sea Travel in San Francisco. The travel agency for divers offers trips to destinations such as Bonaire, Grand Cayman, and Cozumel.

1970s

• **A** few habitats are built by sport divers for recreational purposes such as the *EDEN* habitat designed by the Paul Rousseau trade school in Drummondville (Québec) for the Drakkar dive club.

• **T**he Office of Naval Research (ONR) conducts experiments simulating dives to depths between 366-488 m (1200-1600 ft). Along with respiratory-circulatory and neurological studies, the mental, visual and auditorr functions of the divers are also measured. World record dive to 259 m (850 ft) is established using the *DDS MK-1 Deep Diving System*.

1970

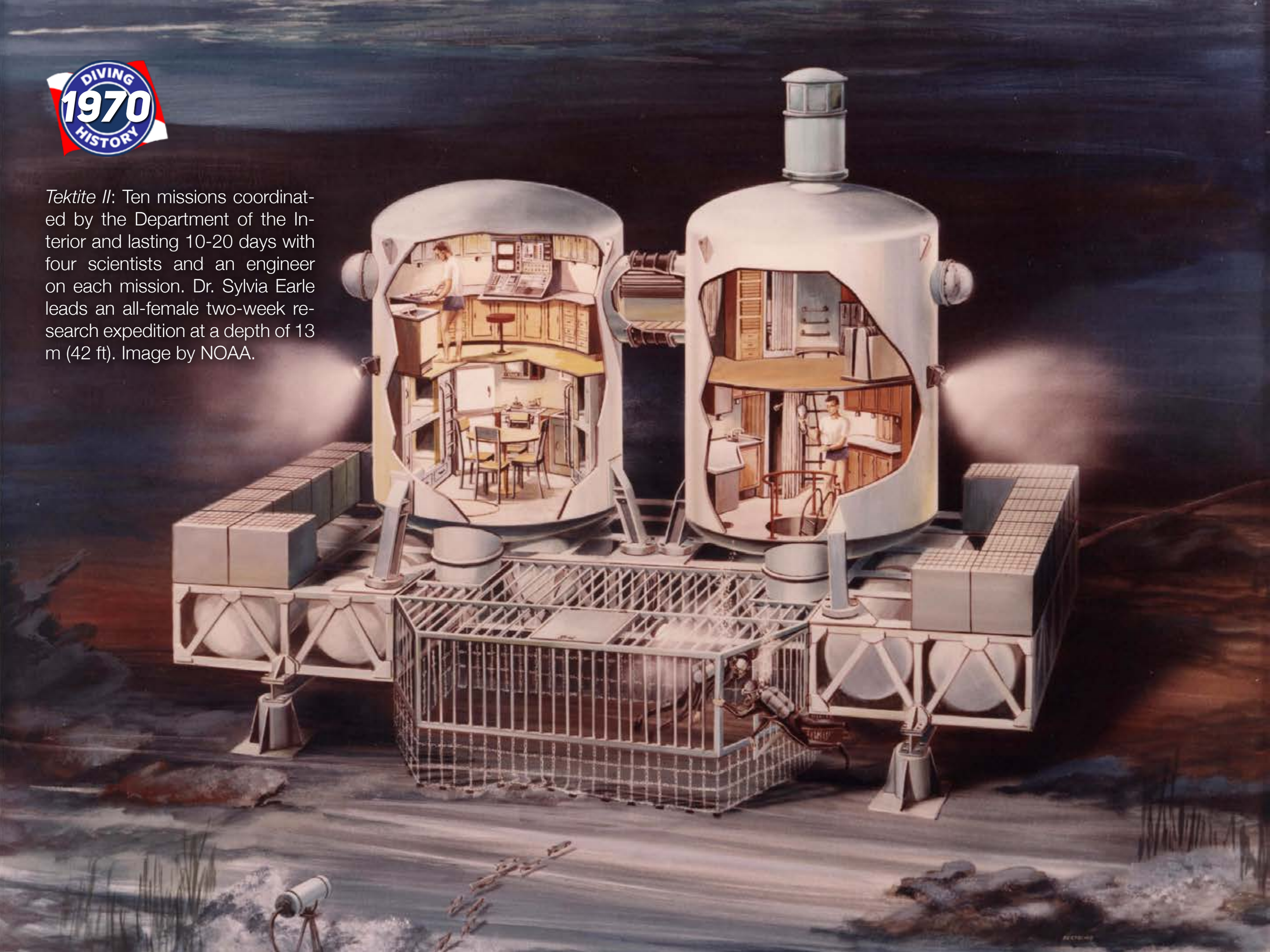
• **C**arl M. Brashear becomes the first African-American Master Diver in the history of the United States Navy.

• ***T**ektite II*: Ten missions coordinated by the Department of the Interior and lasting 10-20 days with four scientists and an engineer on each mission. Dr. Sylvia Earle leads an all-female two-week research expedition at a depth of 13 m (42 ft).

• **K**ip Wagner's salvage of the 1715 fleet off Vero Beach, Florida, reaches an estimated $6,500,000 in coins, jewelry and precious metals.

• **S**cuba Schools International (SSI) is founded by Robert Clark.

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Tektite II: Ten missions coordinated by the Department of the Interior and lasting 10-20 days with four scientists and an engineer on each mission. Dr. Sylvia Earle leads an all-female two-week research expedition at a depth of 13 m (42 ft). Image by NOAA.

Tektite II all-female team led by Sylvia Earle (far right) during rebreather training. Photo by NOAA



First all-female saturation team in training for *Tektite II* in 1970. Photo: OAR/NURP



The deep submergence rescue vehicle Mystic (*DSRV-1*) was designed to rescue the crew of a submarine immobilized on the ocean floor. Photo: U.S. Navy

1971

• **B***lue Water White Death* produced by Peter Gimble introduces the world to the white shark, Ron and Valerie Taylor, and Stan Waterman.

• **T**he recreational stabilization jacket (BCD) is introduced by Scubapro.

• **U.**S. Navy divers using SEALAB techniques successfully retrieve Soviet test missiles. The divers are deployed from a submarine carrying a pressure chamber welded to its deck, the USS *Halibut*, in the Sea of Okhotsk. They also tap several underwater communications cables (Operation Ivy Bells) that run from the Soviet submarine base at Petropavlovsk to Fleet headquarters near Vladivostok.

• **P**eter Hughes welcomes the first divers at a dedicated dive resort on the island of Roatan, Honduras. Now owned by the Galindo family, Anthony's Key Resort has since become one of the best known venues in the Caribbean.

• **J**acques-Yves Cousteau publishes the 20-volume encyclopedia *The Ocean World of Jacques Cousteau*.

• **T**he research habitat *La Chalupa* becomes operational off Puerto Rico. It is operated by the Marine Resources Development Foundation.

1972

• **T**he U.S. Navy sets a world record dive at 308 m (1,010 ft) using the *DDS MK-2 Deep Diving System*.

• **D**eep Work 1000 conducts the first North American 1000-foot saturation dive.

• **C**OMEX divers make a simulated dive to 610 m (2,001 ft).

• **T**he U.S. Navy commissions the first *Deep Submergence Rescue Vehicle* (DSRV).

• **D**ewey Bergman charters a vessel to conduct the first commercial shark-feeding dive on Marion Reef (Action Point), Australia.

1973

• **T**he GERS becomes the GISMER (Groupe d'intervention sous la mer).

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1974

• **D**r. Joseph MacInnis (Canada) conducts the first dives at the North Pole during the Arctic IV Expedition. Ice thickness is over 2 m (6.5 ft).

• **T**he Cousteau Society is founded in the United States as an international, not-for-profit, environmental and educational organization.

• **T**he inaugural Our World-Underwater Scholarship (OWUSS) is awarded to Mark Bensen.

1974-75

Operation Rheostat: The Fleet Clearance Diving Unit (Royal Navy) clears the Suez Canal of ordnance following the Arab-Israeli 6-Day War.

1975

• **U.**S. Naval Experimental Diving Unit (NEDU) relocates from Washington, DC to Panama City, Florida.

• **D**epths of 350 m (1,148 ft) are reached by U.S. Navy divers using the MK 1 Deep Dive System.

• **J**acques Mayol (France) is the first person to freedive beyond 300 ft (91.44 m) when he reaches the depth of 92.05 m (302 ft) off the island of Elba, Italy.

• **T**he Professional Diving Instructors Corporation (PDIC) is founded after separating from the Professional Diving Instructors College.

• **T**he first issue of DIVER Magazine (Canada) is published by Peter Vassilopoulos, owner of Seagraphic Publications.

• **P**eter Benchley's blockbuster film *Jaws* terrifies beachgoers and divers around the world.

• **W**hile celebrating his 70th anniversary, Philippe Tailliez coins the expression *Les mousquemers* (the musketeers of the sea) to refer to the team of divers formed by himself, Jacques-Yves Cousteau, Frédéric Dumas, and mechanical engineer Léon Vêche.

• **N**ikon launches the Nikonos III.



Nikonos III by Nikon

1976

• **C**an-Dive uses an ROV to drill a hole into an iceberg and install an underwater cable to tow the iceberg away from a mobile oil exploration rig.

• **T**he Sub-Aqua Association (SAA) is founded in 1976 to represent clubs not affiliated with BSAC.

• **R**ichard Stewart founds Florida Diver magazine.

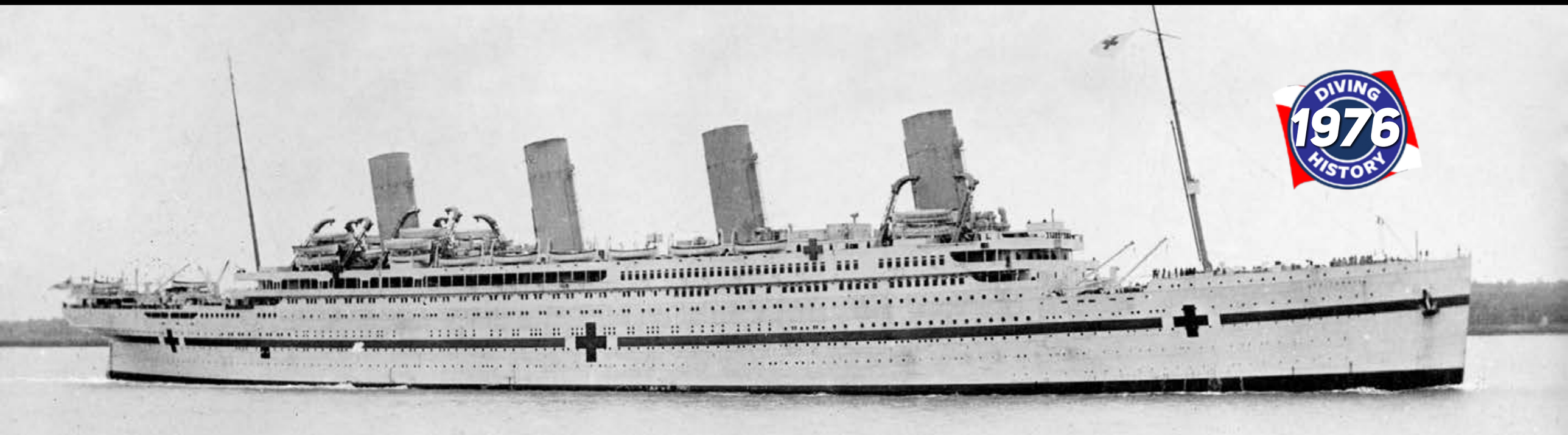
• **T**he Scuba Training Committee of the Florida Skin Divers Association (FSDA) becomes the International Diving Educators Association (IDEA).

• **J**acques-Yves Cousteau leads the first exploratory dives of the wreck of HMHS *Britannic*, one of two sister ships of the RMS *Titanic*. The divers' observations lead the team to conclude that the hospital ship was sunk by a mine off the Greek island of Kea on November 21, 1916.

• **A** mission led by Jacques-Yves Cousteau recovers artifacts from the Antikythera Shipwreck in the Aegean Sea.

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HMHS *Britannic* during WWI. Photo by Allan Green (PD)



• **T**he *Wet Nellie* wet sub is launched by Perry Oceanographics for the James Bond film *The Spy Who Loved Me* (1977). The *Wet Nellie* is designed to look like a Lotus Esprit S1 sportscar.

1977

• **C**OMEX divers make an open-water dive to 501 m (1,644 ft).

• **C**an-Dive and Phil Nuytten set a Canadian saturation diving depth/duration record of 290 m (950 ft) and 31 days off oil rig Sedco 706.

• **T**he American Academy of Underwater Sciences (AAUS) is founded to establish guidelines for scientific diving programs in the US. The AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs are recognized by the Occupational Safety and Health Administration.

• **T**he first DEMA trade show is held in Miami, Florida.

• **R**ichard Stewart founds Sport Diver Magazine.

1978

• **M**arine biologist Jeremiah Sullivan begins development of the the first chain mail shark observation suit. The first Neptunic Sharksuit (a.k.a. Chain Mail Anti-Shark Suit) is delivered in 1980.

1978-79

• **R**oyal Navy clearance divers and Egyptian divers help relocate Egyptian monuments submerged during the construction of the Aswan Dam.

1979

• **D**r. Phil Nuytten begins work on a revolutionary one-atmosphere diving suit that results in a patented breakthrough in rotary joint design, and forms the basis for the world famous *Newtsuit*. The *Newtsuit* is rated to 300 m (1,000 ft) and it completely protects the wearer from outside pressure, and eliminates the need for decompression while maintaining mobility and dexterity. It is now standard equipment in many of the world's navies. The predecessor to the *Newtsuit* is the *JIM* suit, developed and manufactured in England by UMEL, using fluid joint technology pioneered by Peress in the 1920s.

• **N**EDU divers complete a 37-day, 549 m (1,800 ft) dive in the Ocean Simulation Facility.

• **J**ohn Stoneman directs the first underwater IMAX documentary film, *Nomads of the Deep* with underwater scenes by Chuck Nicklin.

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• **T**he Israeli Government passes the Recreational Diving Law to regulate dive training, certification and activities.

• **B**onaire designates its waters as a marine park and requires the use of mooring buoys at all dive sites in order to protect its reefs from anchor damage.

• **A**merican explorer Sylvia Earle walks untethered on the sea floor at the depth of 381 m (1,250 ft) in a *JIM* suit for two-and-a-half hours.



Dr. Sylvia Earle prepares to dive in a *JIM* suit. Photo OAR/NURP

1980

• **O**ptical fiber technology is used by scientist Dr. Robert Ballard to transmit video footage in real time to the surface.

• **D**ivers at Duke University Medical Center make a simulated dive to 650 m (2,132 ft) breathing a helium-oxygen-nitrogen mixture.

• **T**he U.S. Naval Diving & Salvage Training Center (NDSTC) is relocated from Washington DC to Panama City, Florida.

• **D**imitri Rebikoff establishes the not-for-profit Institute of Marine Technology in Fort Lauderdale, Florida.

• **T**he National Diving Accident Network is founded at the Frank G. Hall Hyperbaric Center at Duke University Medical Center. In 1982, its name changes to the Divers Alert Network (DAN).

• **T**he International Diving Museum (known today as the Museum of Man in the Sea) opens in Panama City, Florida.

• **O**cean Realm Television, founded by Richard Stewart, pioneers the design and construction of the television industry's first underwater EFG (electronic field gathering) underwater video camera system for Sony Video Products, and in the mid 80's for Panasonic's RECAM video production system.

• **N**ikon launches the Nikonos IV-A* (*Automatic)



Nikonos IV-A by Nikon

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1981

• **A** British dive team conducts the deepest ever diver-assisted salvage operation by recovering 431 gold ingots from the wreck of HMS *Edinburgh*, which sank at a depth of 245 m (803 ft) off Norway during World War II.

• **T**he Fondation Cousteau is founded in France as a not-for-profit organization.

• **R**ichard Stewart launches the ocean nature magazine Ocean Realm and remains publisher and editor until 1987.

1982

• **T**he *Antarctic Technology Offshore Lagoon Laboratory* (ATOLL) is launched under the direction of Uwe Kils at the Institute of Oceanography (Institut für Meereskunde) of the University of Kiel. The *ATOLL* is a floating oceanographic laboratory used to observe animal behaviour underwater in the Baltic Sea and in the Southern Ocean off Antarctica from 1982 to 1995. The *ATOLL* is the largest fiberglass structure in existence during its years in operation.

• **T**he Draeger LAR V (MK-25) rebreather replaces the MK 6 Emerson-Lambertsen rebreather for U.S. combat swimmers.

• **O**peration Corporate: Royal Navy clearance divers conduct mine disposal operations in the Falkland Islands.

• **P**hil Nuytten patents the *Newtsuit*.

• **T**he National Diving Accident Network, which has started taking non-emergency phone calls from recreational divers, becomes the Divers Alert Network (DAN).

• **T**he National Academy of Scuba Educators (a.k.a. NASE Worldwide) is founded.

• **T**he *Türkiye Sualtı Sporları Federasyonu* (TSSF) (Turkish Underwater Sports Federation) is founded.

• **J**acques-Yves Cousteau, Lucien Malavard and Bertrand Charrier develop and test the Turbosail on the converted catamaran *Moulin à vent* (Windmill). The Turbosail breaks off and is lost in rough weather during the vessel's first Atlantic crossing from France to the U.S.

1983

• **O**peration Urgent Fury: U.S. Navy SEALs are deployed for the invasion of Grenada.

• **D**ivetronic AG introduces the Hans Hass DecoBrain, the first decompression diving computer, which is based on Albert A. Bühlmann's 16 compartment (ZHL-12) tissue model.

• **U**nited Diving Instructors (UDI) is founded in California.

• **D**EMA produces *I'd Rather Be Diving*, a promotional film on recreational diving. It is followed by three sequels: *Treasure Diving* ('84), *The Seven Wonders of the Diving World* ('85) and *Scuba Diving in America* ('86).

1984

• **O**peration Harling: Royal Navy clearance divers conduct mine disposal operations in the Red Sea.

• **O**rca markets its first dive computer (Orca Edge) for recreational divers. The computer developed by Craig Barshinger and Carl Huggins does not display a decompression plan.

• **N**ikon launches the Nikonos V

• **J**acques-Yves Cousteau launches the windship *Alcyone* (a.k.a. the Daughter of the Wind) which is equipped with two Turbosails. *Alcyone* will serve on several Cousteau expeditions around the world and becomes the flagship of the Cousteau Society after the *Calypso* is sunk by a barge in Singapore in 1996.

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Jacques-Yves Cousteau launches the windship *Alcyone* (a.k.a. the *Daughter of the Wind*) which is equipped with two Turbosails. *Alcyone* will serve on several Cousteau expeditions around the world and becomes the flagship of the Cousteau Society after the *Calypso* is sunk by a barge in Singapore in 1996. In this image, *Alcyone* sails past Percé Rock off the Gaspé Peninsula, Québec, in 1999. Photo by Jeffrey Gallant | Diving Almanac



Nikonos V by Nikon

• **T**he *MarineLab* habitat is deployed in John Pennekamp Coral Reef State Park. Previously known as *MEDUSA* (Midshipmen Engineered and Designed Underwater Studies Apparatus), the habitat developed by Dr. Neil Monney is completed in 1980 but it is not put into use until it is donated to the Marine Resources Development Foundation. Under the direction of Chris Olstad, 21 day-long missions are conducted by approximately 80 aquanauts during *MarineLab*'s first summer underwater.

1985

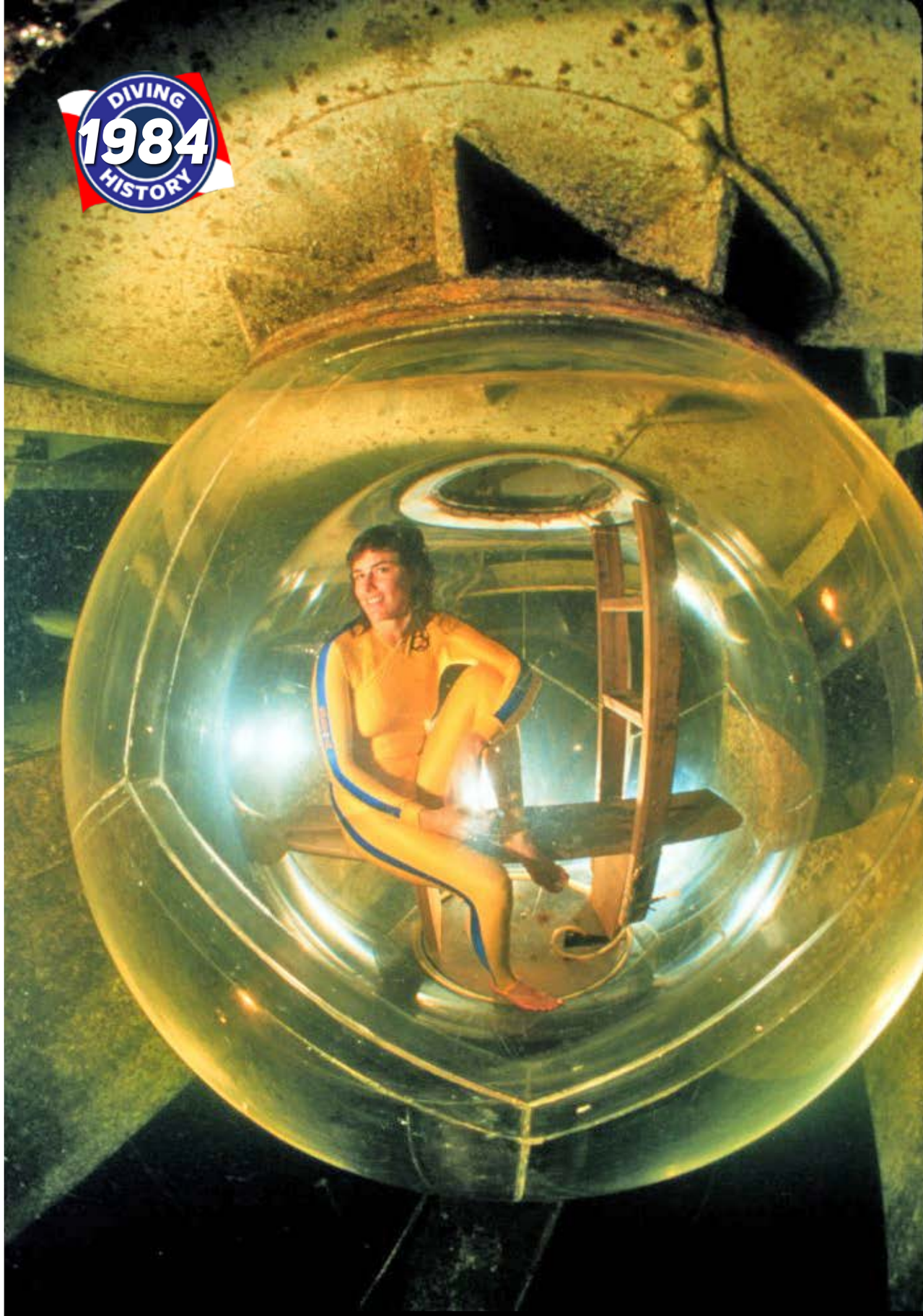
• **D**r. Robert Ballard and his team use a towed underwater vehicle to discover the wreck of the RMS *Titanic* which lies at a depth of 3,798 m (12,460 ft) off the coast of Newfoundland.

• **C**OMEX and IFREMER launch the *Saga*, the world's largest civilian diver lock-out submersible (545 tons), with an operating depth of 600 m (1,968 ft).

• **M**el Fisher finds the cargo of the 1622 wreck *Nuestra Señora de Atocha* which contains an estimated $400 million in gold, silver and emeralds.

• **C**an-Dive and Deep Ocean Engineering build and launch the 3000ft-rated *Deep Rover*, the first acrylic-hulled submersible classed to this depth.

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The Marine Resources Development Foundation Lab entry lock is an acrylic sphere
Photo: OAR/NURP

• **J**acques-Yves Cousteau launches the Rediscovery of the World television series.

• **T**he MK 12 officially replaces the MK V diving helmet (U.S. Navy). The MK V has been in service since 1916.

• **A**ir India Flight 182 (Boeing 747) is located and salvaged by French vessel Léon Thévenin with Scarab ROV from a depth of 2,000 m (6,700 ft) off Cork (Ireland).

• **P**hil Nuytten founds Hard Suits Inc. to produce one atmosphere armoured suits.

• **D**ick Rutkowski founds the International Association of Nitrox Divers (IAND), which becomes IANTD in 1992.

1986

• **T**he US Recreational Scuba Training Council (RSTC) is created to act as a bridge between recreational diving training agencies.

• **T**he research habitat *La Chalupa* is transformed into the first underwater hotel, Jules' Undersea Lodge, in the Key Largo Undersea Park (Florida). The habitat can accommodate six guests at 6.4 m (21 ft).

• **A**merican and Canadian Underwater Certifications (ACUC) is incorporated in Canada by Robert Cronkwright.

• **T**he US Recreational Scuba Training Council (RSTC) is created to act as a bridge between recreational diving training agencies.

• **T**he *Aquarius* underwater habitat becomes operational off St-Croix in the U.S. Virgin Islands. *Aquarius* is used for scientific research and to train NASA astronauts.

1987

• **O**peration Cimnel: Royal Navy clearance divers clear Iranian mines in the Gulf of Oman and the Persian Gulf.

• **J**eremiah Sullivan (USA) conducts the first known intentional cageless dive with a white shark off South Australia.

• **A** high-altitude diving expedition to Lake Titicaca (3,800 metres above

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NEEMO 11 crewmember works near the undersea habitat *Aquarius* during a training session for NASA Extreme Environment Mission Operations (NEEMO) project. Photo: NASA

DIVING ALMANAC RECORD #307

sea level) to test Dr. Albert A. Bühlmann's ZH-L16 algorithm results in no decompression incidents.

1988

• **C**OMEX divers make an open-water dive to 534 m (1,752 ft) off Marseille, France, breathing a helium-oxygen-nitrogen mixture.

• **T**ommy Thompson and the Central America Discovery Group find the wreck of the SS *Central America* at a depth of 2,591 m (8,500 ft) off the Carolina coast. The vessel was carrying 21 tons of gold estimated today at one billion dollars when it sank in a hurricane in 1857.

• **A**merican Nitrox Divers International (ANDI) is founded by Ed Betts and Dick Rutkowski.

• **L**uc Besson's *The Big Blue* is released, introducing the sport of freediving to the public at large. Originally released in France as *Le grand bleu*, it is loosely based on the life and adventures of Jacques Mayol.

• **C**aptain Cousteau is elected to the prestigious Académie française in Paris in honor of his lifetime achievements.

1989

• **A**ngela Bandini (Italy) surpasses even the men's world record when she is the first to freedive beyond 350 ft (91.44 m), reaching a depth of 107 m (351 ft) off the island of Elba, Italy.

• **O**peration Just Cause: U.S. Navy SEALs deployed for the invasion of Panama.

• **J**ames Cameron's *The Abyss* creates much interest in scuba diving.

[NEW] • **P**eter Wallingford founds Friends of the Reef in response to coral reefs being damaged by divers. He creates an underwater obstacle course for buoyancy-control training, which consists of PVC pipe hoops shaped like diamonds. The course is called the Diamond Reef System.

1990

• **O**peration Desert Storm: U.S. Navy SEALs deploy to Kuwait.

• **T**he Historical Diving Society UK is formed based on an idea by Nick Baker.



DIVING HISTORY 1992

Nikonos RS 35 mm by Nikon

1991

[NEW] • **P**eter Wallingford's Diamond Reef System becomes an instructional program offered by Buoyancy Training Systems, Inc. The system is adopted by NOAA and the EPA, and it recognised by NAUI and several university diving programs.

• **T**he US Recreational Scuba Training Council (RSTC) replaces the Diving Equipment Manufacturers Association (DEMA) as the secretariat for the American National Standards Institute (ANSI) committee for Underwater Safety (Z86), later known as the committee for Diving Instructional Standards and Safety (Z375).

• **M**ichael Menduno coins the term *technical diving*.

• **M**ario Cyr conducts the first known dive with walrus near Igloolik in the Canadian Arctic.

1992

• **C**OMEX divers make a simulated dive to 701 m (2,300 ft) breathing a helium-oxygen-nitrogen mixture.

• **E**stablishment of AIDA (International Association for the Development of Freediving), an international body that oversees the recognition of

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records and organizes competitions. AIDA International has since officiated over 165 world records.

• **J**im King (USA) is the first diver to reach the bottom of Dean's Blue Hole on Long Island in the Bahamas. Dean's Blue Hole is the world's deepest known blue hole with an entrance below the sea level. King takes 11 min to descend to the bottom (202 m / 663 ft) on trimix. After spending 3 min on the bottom, his ascent back to the surface requires nearly five hours of decompression.

• **N**ikon launches the Nikonos RS 35mm SLR.

• **T**he Historical Diving Society USA is formed by Leslie Leaney and Skip Dunham in Santa Barbara, California.

• **T**om Mount becomes the first president and CEO of the newly named International Association of Nitrox and Technical Divers (IANTD), previously known as IAND.

• **T**he Women's Scuba Association (WSA) is founded.

• **R**ichard Stewart founds the B2B Dive Travel Association, a networking trade organization for travel agents, resorts and liveaboard charter companies.

• **H**istorical Diver Magazine is founded in Santa Barbara, California by Leslie Leaney, with primary support from Kirby Morgan Diving Systems International.

1993

• **U**mberto Pelizzari (Italy) is the first person to freedive beyond 400 ft (121.92 m), reaching the depth of 123.14 m (404 ft) off Montecristo, Italy.

• **T**he MK 21 Superlite helmet replaces the MK 12 (U.S. Navy)

• **T**he non-profit International Association for Handicapped Divers (IAHD) is founded in the Netherlands.

• **T**echnical Diving International is founded by Bret Gilliam, David Sipperly and Mitch Skaggs.

• **T**he GISMER becomes the COMISMER (Commandement de la plongée et de l'intervention sous la mer).



Romanian aquanauts Liviu Miron and Constantin Mihaï entering the *L.S.-1* Underwater Laboratory in Lake Bicaz, Romania. Photo by Jeffrey Gallant | Diving Almanac

DIVING ALMANAC RECORD #303

1994

• **R**omanian aquanauts Liviu Miron and Constantin Mihaï set the European record for the longest uninterrupted stay in an underwater habitat by living in the *L.S.-1* Underwater Laboratory (Lake Bicaz, Romania) for 36 days.

• **D**EMA opens membership from equipment manufacturers to all stakeholders in sport diving. DEMA changes name to Diving Equipment and Marketing Association, keeping the DEMA acronym.

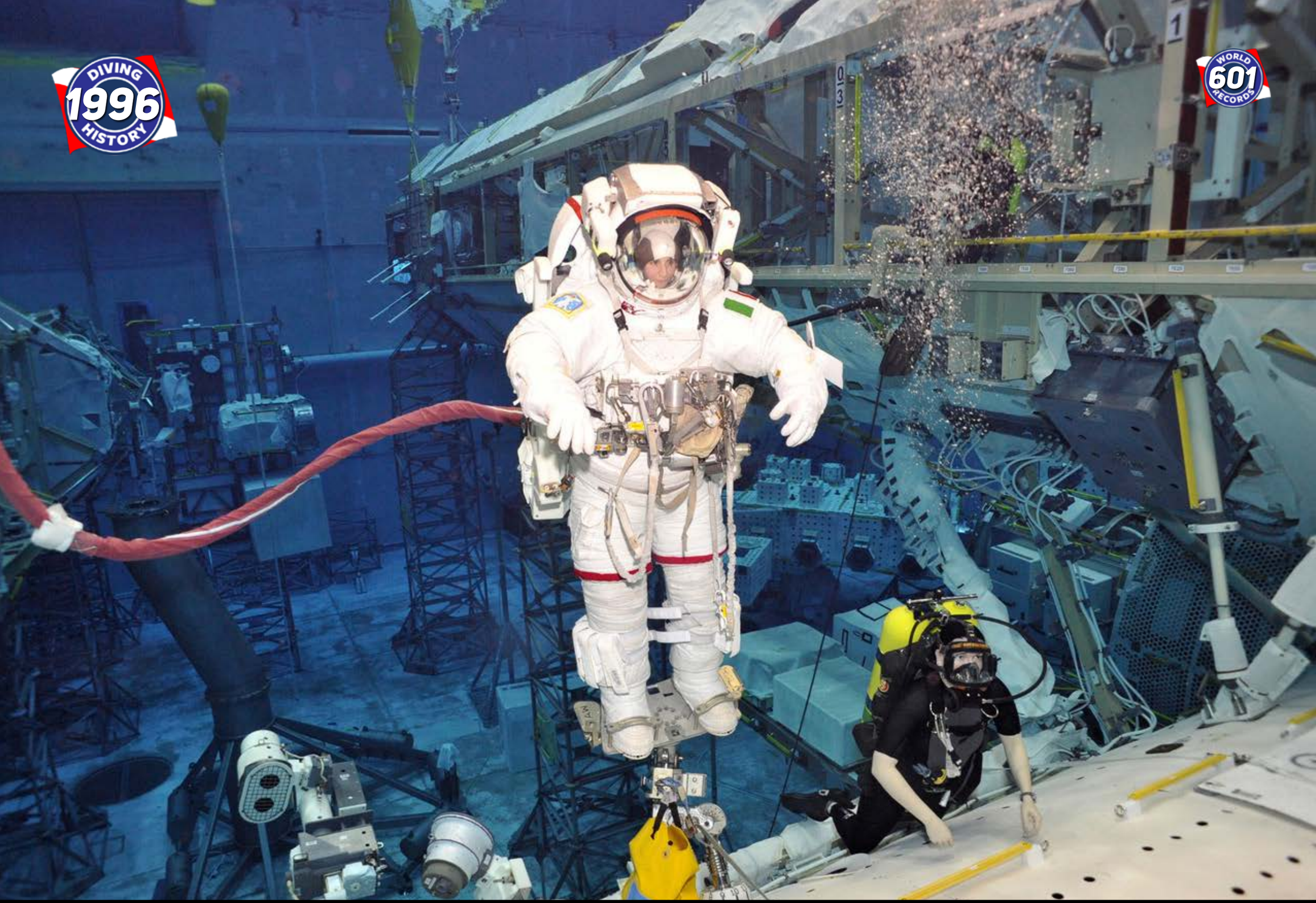
• **M**arc Tremblay discovers the remains of the *Elizabeth & Mary* in the St. Lawrence Gulf, near Rivière-Éternité, at a depth of 3 m (10 ft). The ship was part of William Phips' invasion fleet that failed to take the city of Québec (New France) in 1690.

• **O**cean Futures is formed by Dick Bonin in DEMA. The non-profit organization is later transfered to Jean-Michel Cousteau, which he expands.

1995

• **T**he ADS *Newtsuit* is used to document the sunken cargo vessel *Edmund Fitzgerald* in Lake Superior, thus recording the first high-definition underwater video.

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Italian astronaut Samantha Cristoforetti during spacewalk training in the world's largest enclosed diving tank, NASA's Neutral Buoyancy Laboratory (NBL) in Houston, Texas. Photo by NASA (2014) *Record date 1996 is for the construction of the Neutral Buoyancy Laboratory.

DIVING ALMANAC RECORD #601

• **P**hil Nuytten conceives of and patents the *Remora*, a submarine rescue system, which is subsequently purchased by both the Australian and United States navies.

1996

• **T**he Cousteau Society's flagship *Calypso* is sunk in Singapore harbor after a collision with a barge.

• **C**an-Dive designs and produces the underwater camera propulsion system to film inside the wreck of the RMS *Titanic* for James Cameron's film *Titanic*.

• **T**he world's largest enclosed diving tank is opened for egress training at the Johnson Space Center. The Sonny Carter Training Facility Neutral Buoyancy Laboratory is 8.69 m (28.5 ft) deep, 34.14 m (112 ft) wide, and 65 m (212 ft) long. It took 28 days to fill the tank with water.

• **N**ikon retires the Nikonos RS 35mm SLR due to poor sales.

1997

• **N**ASA builds the *Scott Carpenter Space Analog Station*. It is designed to operate as a seafloor platform to test life support systems.

• **N**uytco produces the *DeepWorker 2000* submersible which is rated to 600 m (2000 ft).

• **D**ive equipment manufacturer U.S. Divers becomes Aqua Lung.

• **J**acques-Yves Cousteau dies from pneumonia on June 25 at the age of 87.

• **C**orsican freediver Éric Charrier reaches the record under-ice depth of 70 m (230 ft) in Lake Témiscouata (Cabano, Québec).

• **U.**S. Navy diving and salvage units assist the recovery of Flight TWA 800 off Long Island, New York.



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1998

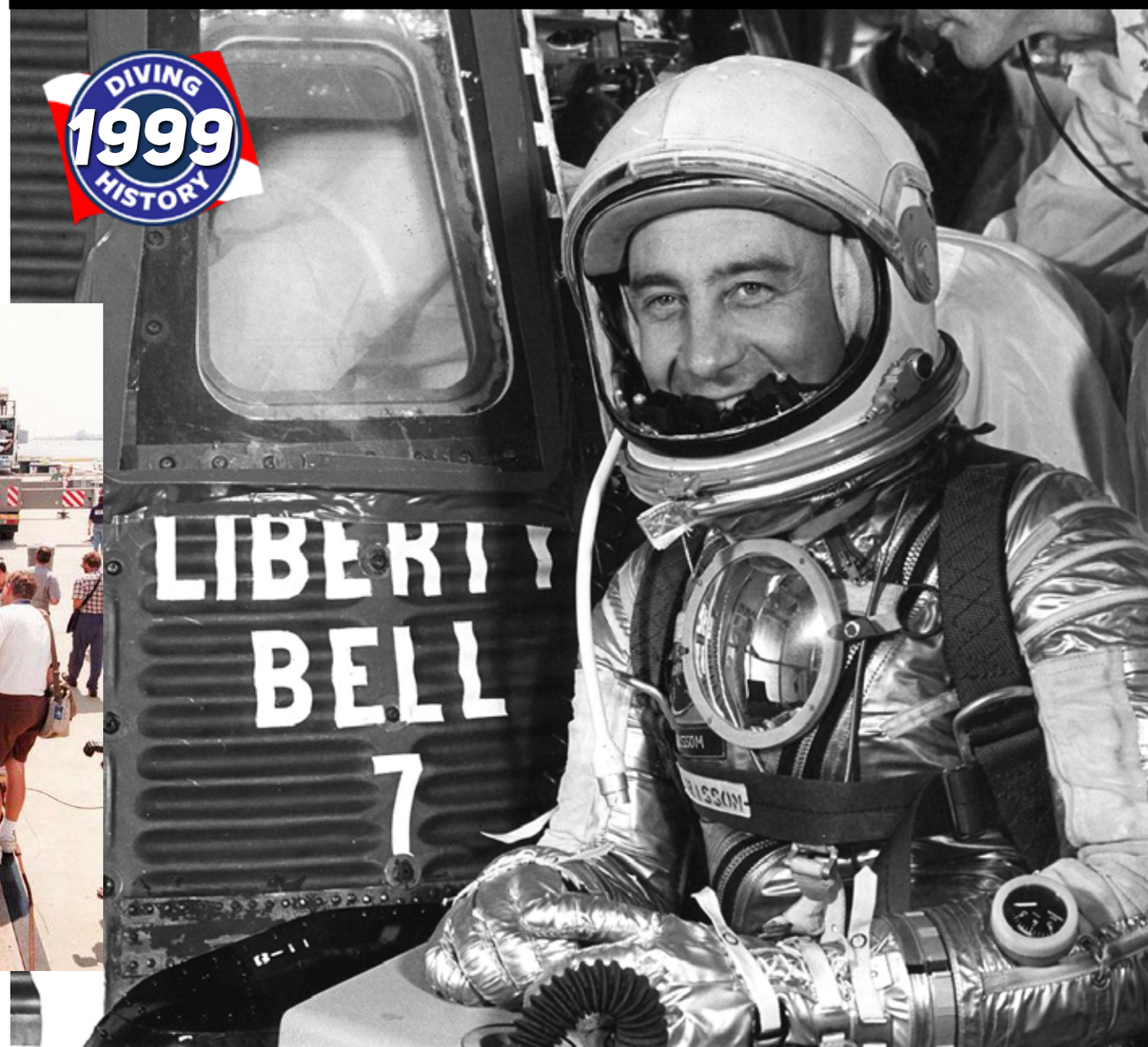
• **F**irst ever live video broadcast from the RMS *Titanic* using the Magellan 725 ROV.

• **C**anadian Navy diver LS Culliford recovers the flight recorder of Swissair Flight 111 off Peggy's Cove, Nova Scotia.

• **G**lobal Underwater Explorers (GUE) is founded by a group of divers led by Jarrod Jablonski.

• **T**he Diving Equipment Manufacturers Association (DEMA) is renamed the Diving Equipment and Marketing Association.

BELOW: Astronaut Virgil "Gus" Grissom and the *Liberty Bell 7* in 1961. Photo: NASA
LEFT: *Liberty Bell 7* after recovery from seafloor in 1999. Photo: NASA



1999

• **S**cuba Diving International (SDI) is founded.

• **T**he *Liberty Bell 7* Mercury spacecraft flown in space for 15 minutes by astronaut Gus Grissom in 1961, is recovered from a depth of 4891 m (16,043 feet), 145 km (90 miles) northeast of Grand Bahama.

• **T**he World Recreational Scuba Training Council (WRSTC) is founded to create minimum recreational diving training standards for scuba diving certification agencies around the world.

• **T**he National Association of Scuba Diving Schools (NASDS) merges with SSI.

• **D**acor is acquired by Mares Diving.

• **T**he Women Divers Hall of Fame is created by six founding sponsors: Beneath the Sea, Inc., the Underwater Society of America, the Women's Scuba Association, Women Underwater, Hillary Viders, Ph.D., and Capt. Kathy A. Weydig.

2000+

• **M**ost dive businesses go online to promote their goods and services to local and world markets. Even dive training becomes available online.

• **M**ass production of housings for consumer digital cameras begins.

2000

• **L**oïc Leferme (France) is the first to freedive beyond 500 ft (152 m) when he reaches 154 m (505.25 ft) off Saint-Jean Cap Ferrat, France.

• **U.**S. Navy divers assist NOAA divers in recovering the turret of the Civil War ironclad USS *Monitor* off Cape Hatteras, North Carolina.

• **P**ieter Venter, Peter Timm, and Etienne Le Roux are the first divers to encounter a living coelacanth. The encounter takes place at a depth of 104 m (340 ft) in Sodwana Bay, South Africa.

• **O**peration Allied Harvest: Royal Navy clearance divers recover allied bombs jettisoned into the Adriatic during Bosnian and Kosovo conflicts.

• **E**mergency Response Diving International (ERDI) is founded.

• **U**.S. Navy tests *Advanced Swimmer Delivery System* (ASDS) dry sub.

• **F**rancisco "Pipin" Ferreras (U.S.A.) freedives (No limits) to the record depth of 161 m (528.22 ft) off Cabo San Lucas, Mexico.

• ***M****en of Honor* showcases the life of Carl Brashear, the first African American and later the first amputee U.S. Navy diver.

• **N**UYTCO Research *DeepWorkers* successfully recover the Space Shuttle booster rockets from a May flight to the International Space Station (ISS).

• **N**UYTCO produces the *Exosuit*, an ultra lightweight swimming hard suit rated to 1000 ft (300 m).

• **T**he COMISMER becomes the CEPHISMER (Cellule de plongée humaine et d'intervention sous la mer).

2001

• **O**peration Cleanex: Royal Navy clearance divers recover wartime ordnance in the Baltic.

• **T**he U.S. Navy approves the use of the Cochran NAVY decompression computer with the Thalmann Algorithm (VVAL 18) decompression model for Special Warfare operations.

• **T**he Our World-Underwater Scholarship is renamed the ROLEX Scholarship, and all scholars dating back to 1974 become ROLEX Scholars.

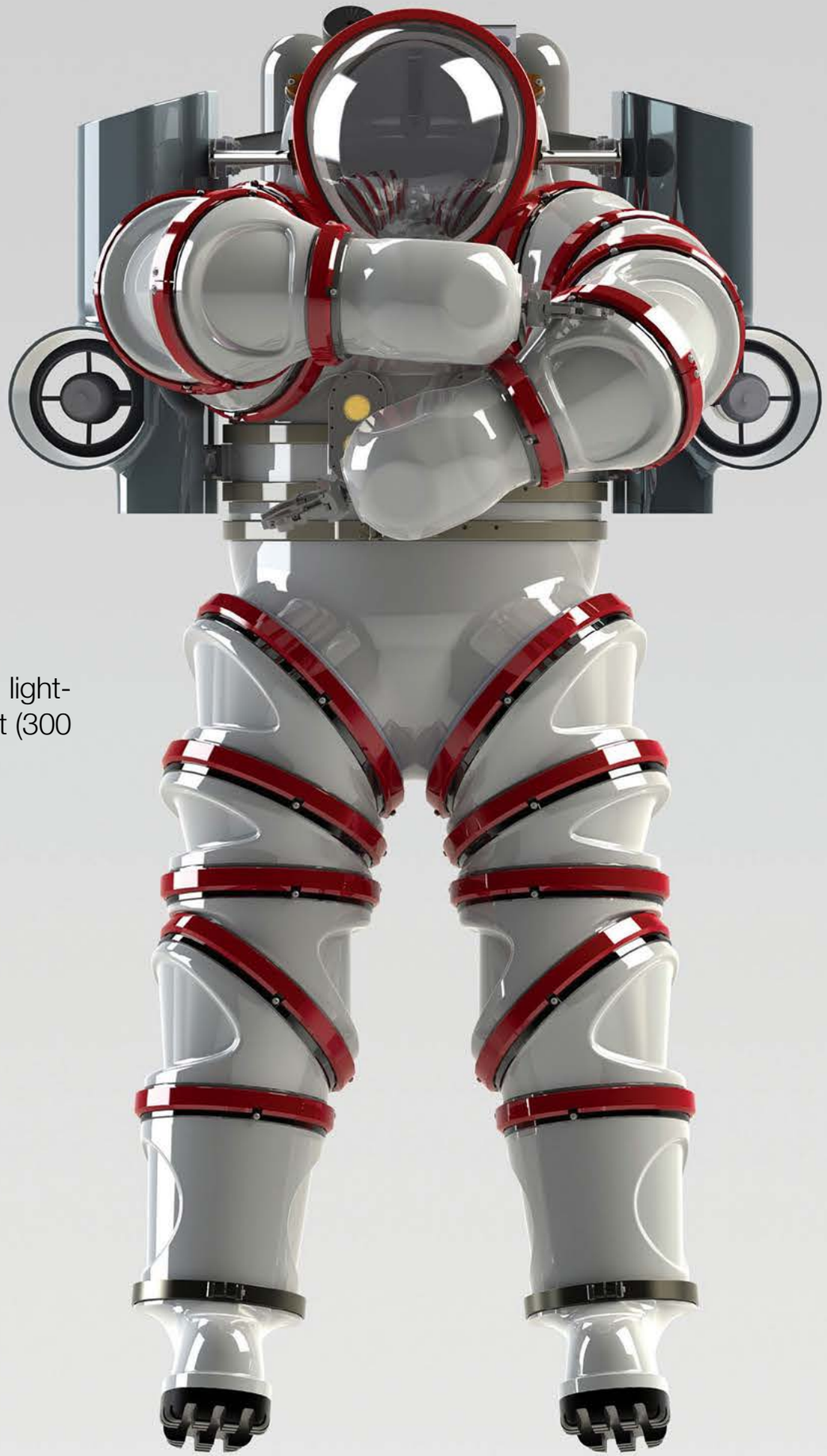
2002

• **T**anya Streeter (USA) beats the women's and men's freediving records (AIDA) by reaching the No limit depth of 160 m (525 ft) off Providenciales, Turks and Caicos.

• **S**kin Diver Magazine ceases publication after 51 years.

• **A**udrey Mestre (France) dies while ascending from a No limits depth of 171 m (561 ft) off La Romana, Dominican Republic.

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NUYTCO produces the *Exosuit*, an ultra lightweight swimming hard suit rated to 1000 ft (300 m). Photo courtesy **Nuytco Research**

• **F**lorida-based Odyssey Marine Exploration identifies the wreck of the HMS *Sussex*, which sank in a storm off the Strait of Gibraltar in 1694. When the 80-gun warship sank, 498 crew and the equivalent of nine tons of gold coins worth $4.54 billion USD (£2.6bn), were lost.

• **N**ikon ends production of the Nikonos V and accessories. From this point onward, film cameras by all manufacturers are progressively phased out and High-Definition (HD) video quickly takes over the dive industry.

• **U.**S. Navy SEALS deploy to Iraq and Afghanistan.

2003

• **F**rancisco “Pipin” Ferreras (U.S.A.) reaches the No limits depth of 170 m (557.74 ft) off Cabo San Lucas, Mexico. (Record not recognized by AIDA)

• **R**ichard Stewart founds Ocean Realm Media to create the Ocean Realm Channel (cable), the Ocean Realm Journal (print/DVD publication), Ocean Realm Broadband (Internet news network) and Ocean Realm Radio (AM and Internet broadcasting).



Nuytco Research *Dual DeepWorker* rated to 600 m (2,000 ft).
Photo courtesy **Nuytco Research**

• **N**uytco Research completes the first side-by-side *Dual DeepWorker*, a 2000 ft-rated (600 m) submersible designed for one pilot and one observer.

2004

• **T**he world’s deepest diving pool (till opens in Brussels, Belgium. With a depth of 33 m (108.27 ft) and a volume of 2,500,000 litres (660,286 gallons) of drinkable, non-chlorinated, spring water, NEMO 33 includes levels at various depths, air pockets, a simulated cave, and 12 portholes at a constant temperature of 33°C (91°F).

• **V**erna van Schaik (South Africa) becomes the deepest diving woman in the world when she reaches the depth of 221 m (725 ft) at Boesmansgat, South Africa. The corrected depth at the altitude of 1,500 m (4,921 ft) is 261 m (856 ft). It takes her 12 minutes to reach bottom followed by a total decompression time of 5 hours and 27 min. The record dive requires 40 decompression stops..

• **P**hil Nuytten and Nuytco Research acquire Seagraphic Publications, publisher of DIVER Magazine.

• **T**he government of Québec passes a law to regulate recreational diving instruction and certification. The FQAS is its enforcing body.

• **J**ean-Yves Forest is the first diver to deploy acoustic and satellite tags on freeswimming (unrestrained) Greenland sharks during a science mission led by **GEERG** off Baie-Comeau, Quebec.

2005

• **P**atrick Musimu (Belgium) is the first to freedive (No limits) beyond 600 ft (182.88 m) when he reaches the depth of 209.6 m (687.66 ft) off the coast of Egypt (Record not recognized by AIDA).

• **F**renchman Pascal Bernabé dives to the record scuba depth of 330 m (1,083 ft) on open-circuit scuba. The time to descend is less than 10 min. However, his total decompression time is 529 minutes. Bernabé completes the open-circuit dive breathing trimix carried in seven cyl-

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inders. Twenty cylinders are placed on three decompression lines at depths of 350 m (1,148 ft), 60 m (197 ft) and 20 m (66 ft). The record requires 12 support divers.

2006

• **T**he U.S. Navy sets a world record by reaching 2000 feet (600 m) in a one-atmosphere hardsuit based on a *Newtsuit* patent by Phil Nuytten.

• **M**atthew Johnson becomes the first ventilator-dependent quadriplegic to scuba dive in open water. Johnston first dives to four feet for 15 minutes and then makes a second dive to four feet for 10 minutes off Tavernier Key, Florida.

2007

• **A**ustrian Herbert Nitsch freedives (No limits) to the depth of 214 m (702 ft) off Spetses, Greece on June 14.

2008

• **S**cuba Educators International (SEI) (a.k.a. SEI Diving) is founded to continue the defunct YMCA Scuba Program.

• **S**SI is acquired by Doug McNeese and Robert Stoss.

• **A**IDA Canada is founded by François Leduc, Doug Sitter, William Winram, Tyler Zetterstrom, Peter Scott, and Roberta Cenedese.

• **EUROTEK** (European Advanced and Technical Diving Conference) is founded by Leigh Bishop, Rosemary E Lunn and the late Carl Spencer.

• **P**oseidon launches the world's first fully automatic recreational rebreather, the Poseidon MKVI.

2009

• **N**AUI approves the first Standard Dress Diving course allowing recreational divers to dive using antique helmets and gear.

• **U**nified Team Diving (UTD) is founded in California.

• **N**uytco Research designs and builds the *Curasub*, a one-atmosphere, four-passenger tourist submersible for operation off of Curacao in the Netherlands Antilles. Based out of Substation Curacao, the *Curasub* dives daily at depths up to 300 m (1000 ft).

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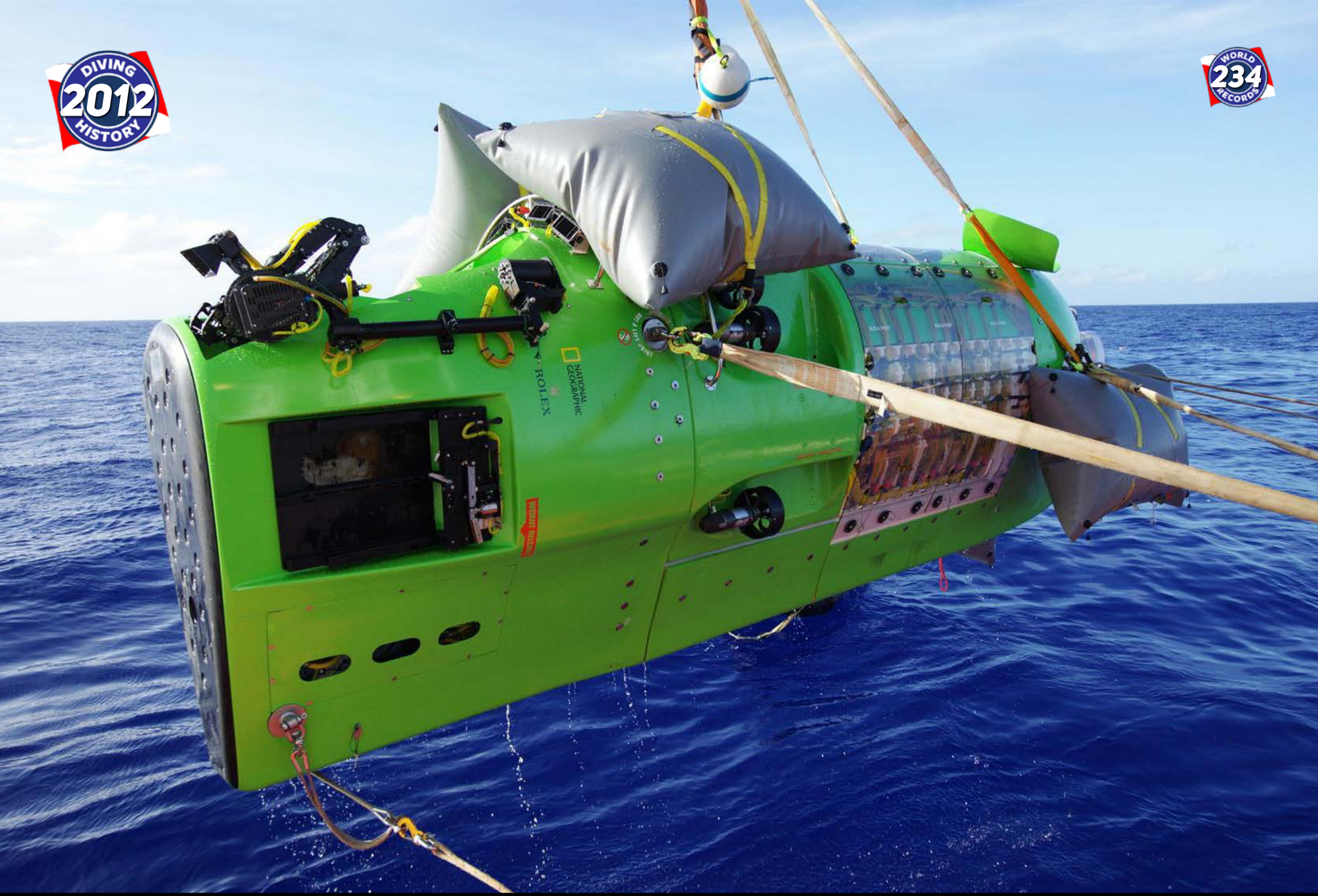
Pascal Bernabé on his way to 1,083 ft (330 m) and the world's deepest dive on scuba. Photo courtesy François Brun

Curasub
www.nuytco.com

Nuytco Research designs and builds the *Curasub*, a one-atmosphere, four-passenger tourist submersible for operation off of Curacao in the Netherlands Antilles. Based out of Substation Curacao, the *Curasub* dives daily at depths up to 300 m (1000 ft). Photo courtesy **Nuytco Research**

Film director James Cameron makes the first solo descent to the bottom of the Challenger Deep, the deepest known point in the Earth's ocean seafloor. Cameron reaches a depth of 10,898.4 m (35,756 ft) aboard the *Deepsea Challenger.* Media release photo by Mark Thiessen | National Geographic

DIVING ALMANAC RECORD #234



The *Deepsea Challenger* is only one-tenth the weight of the the Bathyscaphe *Trieste*, the first and only other manned submersible ever to reach the bottom of the Challenger Deep in 1960. Media release photo by Mark Thiessen | National Geographic

DIVING ALMANAC RECORD #234

2010

• **S**wedish divers recover 168 bottles of champagne from a 170-year-old shipwreck south of the Åland archipelago (Finland). The bottles found at a depth of 50 m (165 ft) are preserved by constant darkness, temperature (4-6°C), and pressure. A single bottle is later sold at auction for €30,000 EUR ($32,625 USD).

• **T**he **ROLEX Deepsea Under the Pole** expedition conducts over 50 dives at the North Pole to document life and gather data under the ice, and to bear witness to the effects of global warming. The team consists of Ghislain Bardout (expedition leader, diver, underwater cameraman), Emmanuelle Périé (diver, communications), Samuel Audrain (diver, mechanic), Benoît Poyelle (diver, photographer), Alban Michon (diver), Vincent Berthet (cameraman), Pascal Rey (medic, tender), Clément Infante (tender, pharmacist), and Kayak (husky, bear detector).

2011

• **N**uytco Research designs the *Orcasub*, a 2000 ft-rated (600 m) flying submersible.



2012

• **C**anadian film director James Cameron makes the first solo descent to the bottom of the Challenger Deep, the deepest known point in the Earth's ocean seafloor. Cameron reaches a depth of 10,898.4 m (35,756 ft) aboard the *Deepsea Challenger*, a 7.3-m (24 ft) deep-diving submersible built in Sydney, Australia. The *Deepsea Challenger* is only one-tenth the weight of the the Bathyscaphe *Trieste*, the first and only other manned submersible ever to reach the bottom of the Challenger Deep in 1960.

• **A** team of divers from the Woods Hole Oceanographic Institution and the Hellenic Ephorate of Underwater Antiquities conducts survey dives on the Antikythera wreck.



TOP: Nuytco Research *Orcasub*, a 600-m (2,000 ft) rated flying submersible.
Photo courtesy **Nuytco Research**
BOTTOM: Don Walsh and James Cameron with their ROLEX watches.
ROLEX Media Release

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The ROLEX Deepsea Under the Pole expedition conducts over 50 dives at the North Pole to document life and gather data under the ice, and to bear witness to the effects of global warming. The team consists of Ghislain Bardout (expedition leader, diver, underwater cameraman), Emmanuelle Périé (diver, communications), Samuel Audrain (diver, mechanic), Benoît Poyelle (diver, photographer), Alban Michon (diver), Vincent Berthet (cameraman), Pascal Rey (medic, tender), Clément Infante (tender, pharmacist), and Kayak (husky, bear detector).
Photo by Benoît Poyelle / **Deepsea Under The Pole by Rolex**

2014

• **S**cuba Schools International (SSI) is acquired by diving equipment manufacturer Mares and Mares parent company Head.

• **A**hmed Gabr (Egypt) dives to the record depth of 332.35 m (1,090 ft) in the Red Sea off the coast of Dahab, Egypt. The time to descend is 12 minutes. Total ascent time including decompression is just under 15 hours.

• **O**n September 7, Parks Canada archeologists from the **2014 Victoria Strait Expedition** discover the wreck of one of the ships from the ill-fated Franklin Expedition, which was lost in 1846. Three weeks later, the ship is identified as HMS *Erebus* following a meticulous review of data and artifacts observed on the Arctic seabed. The remains of Sir John Franklin's ship are found in the eastern stretches of the Queen Maud Gulf off the western coast of the Adelaide Peninsula using Inuit traditional knowledge and modern technology. The underwater archaeologists conduct seven dives to the shipwreck during two days of on-site investigation, taking diagnostic measurements, high-resolution photography, and high-definition video. The ship's bell is identified during the very first dive on the site, and then recovered on the last dive.

2015

• **P**arks Canada and Royal Canadian Navy divers conduct 11 days of ice diving and underwater archaeology during Operation NUNALIVUT which aims to unlock the secrets of HMS *Erebus*, and learn more about the fate of the Franklin expedition.

• **J**ennifer Idol (USA) becomes the first womon to dive all 50 U.S. states.

• **D**awn Watson (UK) discovers the site of a 10,000-year-old prehistoric forest off the shore of Norfolk (United Kingdom) while scuba diving.

• **W**orld champion freediver Natalia Molchanova (Russia) disappears while teaching a freediving course off the coast of Spain.

• **A** team of renowned explorers mounts the **Elysium – Artists for the Arctic** expedition to the High Arctic to produce a feature documentary, a book and a series of exhibitions to report on the threat of global warm-

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ABOVE: Ship's bell of HMS *Erebus*. Photo by **Parks Canada**

ing. Teammembers include Dr. Sylvia Earle, David Doubilet, Jennifer Hayes, Ernie Brooks, Wyland, Michael AW, Göran Ehlmé, Susan R. Eaton, Amos Nachoum, Emory Kristof, Stuart Ireland and Leandro Blanco.

• **A**rchaeologists excavating the Antikythera shipwreck recover more than 50 items including a bronze armrest (possibly part of a throne), remains of a bone flute, fine glassware, luxury ceramics, a pawn from an ancient board game, and several elements of the ship itself. According project co-Director Dr. Brendan Foley of the Woods Hole Oceanographic Institution (WHOI), “Every single dive delivers fabulous finds, and reveals how the ‘1 percent’ lived in the time of Caesar.” The shipwreck dates to circa 65 B.C., and was discovered by Greek sponge fishermen in 1900 off the southwestern Aegean island of Antikythera. They salvaged 36 marble statues of mythological heroes and gods; a life-sized bronze statue of an athlete; pieces of several more bronze sculptures; scores of luxury items; and skeletal remains of crew and passengers. The wreck also relinquished fragments of the world’s first computer: the Antikythera Mechanism, a geared mechanical device that encoded the movements of the planets and stars and predicted eclipses. The 2015 expedition is part of a long-term research program at the site, which began in 2014. It is the first scientific excavation of the wreck, and the first comprehensive study of all of its artifacts. The team expects to recover artifacts and ancient artwork still buried in the seafloor, and recreate the history of the ship’s exquisite cargo and its final voyage. The project also marks the first time that archaeologists are able to join specialist divers in descending to the 55-m (180 ft) deep site. The ten-man dive team, assisted by UK-based instructors Phil Short and Gemma Smith, uses advanced technical diving equipment including closed-circuit rebreathers and trimix breathing gases, performing 61 dives in 10 days of diving on the wreck.

2016

• **F**amed oceanographic vessel *Calypso* is moved to Turkey for a full refit, including new engines.

• **A** wreck excavated by the Oman Ministry of Heritage and Culture and Bluewater Recoveries Ltd. is identified as the *Esmeralda*, which was part of a fleet led by Vasco da Gama in 1502-1503. It is the oldest shipwreck from Europe’s Golden Age of Exploration.

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The 2015 Antikythera expedition marked the first time archaeologists were able to join specialist divers in descending to the 55-meter (180 feet) deep site. The ten-man dive team used advanced technical diving equipment including closed-circuit rebreathers and trimix breathing gases, performing 61 dives in 10 days of diving on the wreck. Photo by Brett Seymour, EUA/ARGO, WHOI

[NEW] • **O**n September 18, 2016, Parks Canada confirms that the wreck discovered by the Arctic Research Foundation is HMS *Terror*. The archaeological validation was based on a side-scan sonar survey and three dives on the wreck. The discovery of HMS *Terror* was made possible thanks to a long-term partnership with northern communities, the Kitikmeot Inuit Association, the Government of Nunavut, Parks Canada, the Canadian Coast Guard, the Royal Canadian Navy, the Canadian Hydrographic Service, Environment and Climate Change Canada, and many other government, private and non-profit partners, including the Arctic Research Foundation. This multi-faceted partnership was also at the heart of the discovery of HMS *Erebus* in 2014. The extraordinary find also underscores the importance of Inuit knowledge. The dives took place during difficult weather conditions and through poor visibility. The wreck's upper deck is heavily covered by silt and marine life. Nevertheless, the divers were able to observe a number of features that were typical or unique to 19th century British polar exploration ships and the wreck has a number of design specifications that were common to both HMS *Erebus* and HMS *Terror*, including three masts, iron bow sheathings and a double-wheeled helm. There are no wrecks other than HMS *Erebus* with these features in the region.



HMS *Terror* trapped in ice (Public Domain)



During this special week at the resort there will be a series of image clinics for underwater photographers hosted by Walt Stearns and Peter Symes (publisher of X-Ray Magazine), along with a photo contest for the best wide-angle & macro subjects taken during the week.

In addition to numerous prizes for wide-angle and macro, one winning image will make the cover of X-ray magazine!

There will be a Post Trip Photo Gallery featured on xray-mag.com of the top images from participating photographers.



$3,950 USD covers 7 nights / 6 days of diving plus:

- Round trip airfare between Bali and Wakatobi Dive Resort
- Accommodations in Palm Bungalow (twin share)
- All inclusive meal plan: breakfast, lunch, dinner, snacks (excluding sodas & alcoholic beverages)
- 3 boat dives per day
- Unlimited shore diving with taxi service on Wakatobi's famous House Reef
- Nitrox on all dives, complements of X-Ray magazine
- All clinics and seminars plus photo contest participation

We are booking space now!

For more information or to reserve your spot contact:
Henrik Rosen: henrik@wakatobi.com
Karen Stearns: karen@wakatobi.com

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Ahmed Gabr (Egypt) dives to the record depth of 332.35 m (1,090 ft) in the Red Sea off the coast of Dahab, Egypt. The time to descend is 12 minutes. Total ascent time including decompression is just under 15 hours. Photo courtesy **Ahmed Gabr**

DIVING ALMANAC RECORD #16

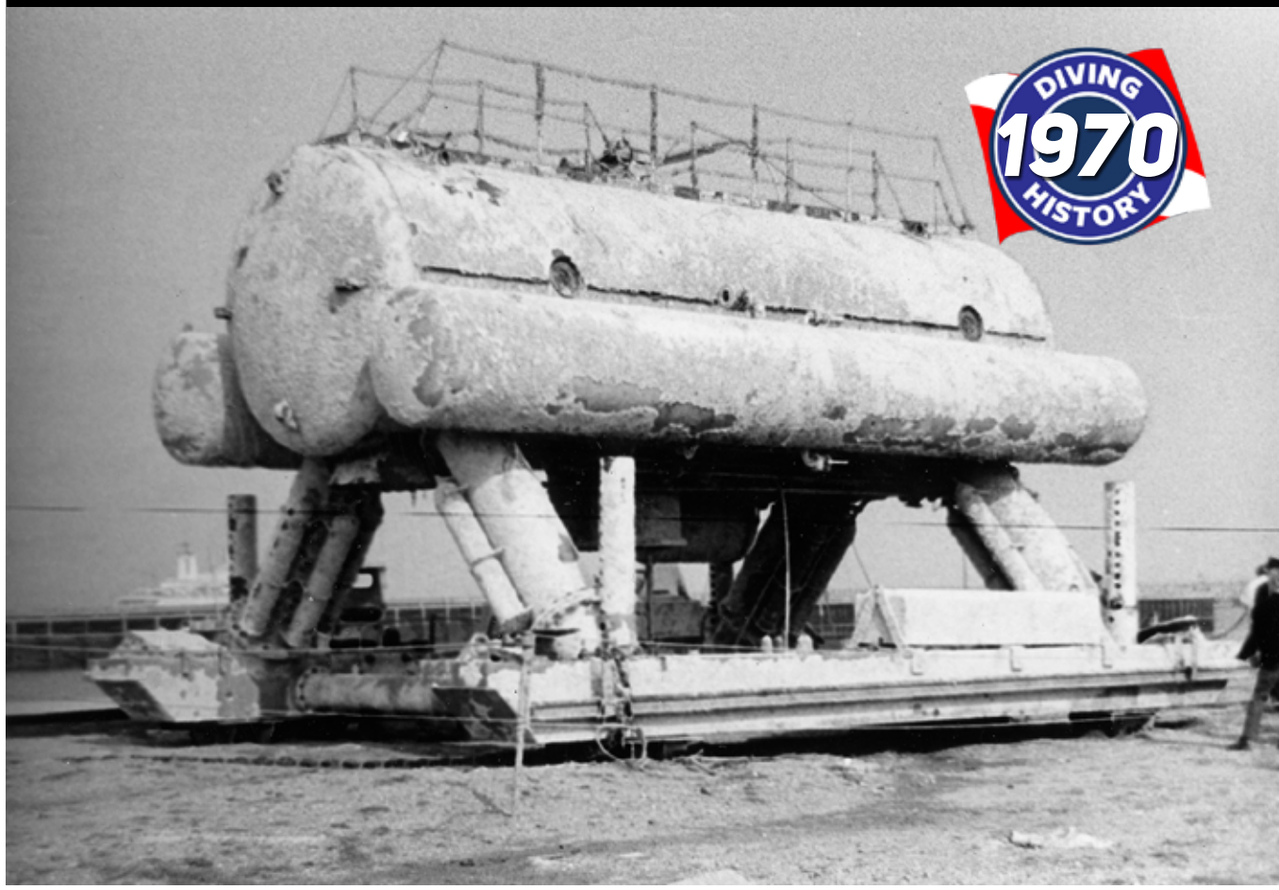
UNDERWATER HABITATS | 1962-2015

★ **STILL OPERATIONAL**

ADELAIDE (Australia) 1967-68
AEGIR (USA, Hawaii) 1969, 147 m
★ **AQUARIUS** (USA, St-Croix, USVI & later Key Largo) 1986, 19 m
AQUATAT I (USA)
AQUATAT II (USA)
ASTERIA (Italy, Lake Gorda) 1971
ATLANTIDA (Italy, Lake Cuvazzo) 1969, 12 m
BACCHUS (Germany, Baltic Sea) 1968, 10 m
BAH I (Germany, Ost Sea) 1970, 10 m
BIOSUB (Australia, Albury) 2007, 5 m
CARIBE I (Cuba) 1966, 15 m
CHERNOMOR I (USSR, Black Sea) 1967-68, 5-14 m
CHERNOMOR II (USSR, Black Sea) 1968-73, 25-35 m
CONSHELF I - DIOGENES (France, Marseille) 1962, 10 m
CONSHELF II (France, Shaab Rumi, Red Sea) 1963, 11-27 m
CONSHELF III (France, Mediterranean Sea) 1965, 100 m
EDALHAB (USA, Alton Bay, New Hampshire) 1970-71, 7.6 m
EDEN (Canada, Lake Sacacomie) 1977, 7 m
GALATHÉE (France, Mediterranean Sea) 1978, 9 m
GLAUCUS (UK) 1965, 9 m
HEBROS I / KHEBROS I (Bulgaria, Bay of Varna) 1967, 10 m
HELGOLAND (Germany, North Sea) 1969-74, 23 m
HIPPOCAMPE (France, Mediterranean Sea) 1981, 10 m
HUNUC (South Africa) 1971
HYDROLAB (USA) 1966-1985, 20 m (Currently @ NOSA, Silver Spring, MD)
ICHTHYANDR 66 (USSR, Crimea) 1966, 11 m
ICHTHYANDR 67 (USSR, Crimea) 1967, 12 m
ICHTHYANDR 68 (USSR, Crimea) 1968, 20 m
ICHTHYANDR 69 (USSR, Crimea) 1969, 20 m (DESIGN ONLY)
ITHAA UNDERSEA RESTAURANT (Maldives) 2005, 4.9 m
★ **JULES' UNDERSEA LODGE** (La Chalupa) (USA, Key Largo) 1986, 6.4 m
KARNOLA (Czechoslovakia) 1968, 8-15 m
KITJESCH (USSR, Crimea) 1968, 15 m
KOCKELBOCKEL (Netherlands, Sloterplas) 1967, 15 m
KRAKEN (UK, Firth of Lorne, Oban Argyle, Scotland) 30 m
LA CHALUPA (USA, PR) 1972-74, 33 m
LAKE LAB (USA, Grand Traverse Bay, MI), 1971, 10 m



TOP: Perry wet sub and mobile habitat (MOHAB). Photo: OAR/NURP
BOTTOM: *Unterwasserlabor Helgoland* circa 1970 (GNU)

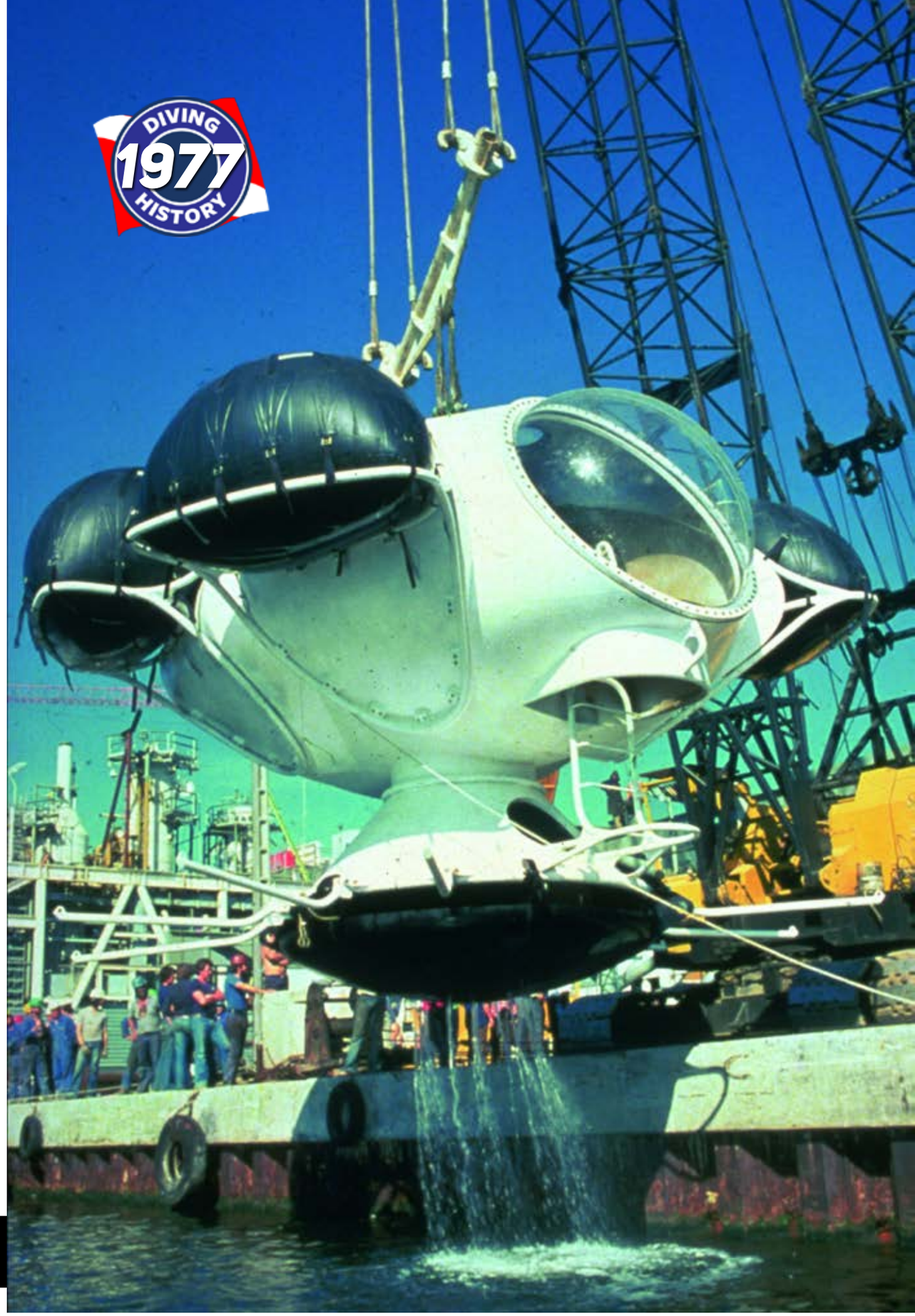


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LORA (Canada, Newfoundland) 1974, 8 m
★ **LS-1** (Romania, Lake Bicaz) 1968, 10 m
MALTHER (East Germany, Malther Dam) 1968, 8 m
MAN-IN-THE-SEA I (USA, Villefranche, Mediterranean) 1962, 61 m
MAN-IN-THE-SEA II (USA, Great Stirrup Cay, Bahamas) 1964, 142 m
MARINELAB UNDERSEA LABORATORY (USA, Key Largo) 1984, 8.23 m
MEDUSA I (Poland, Lake Klodno) 1967, 24 m
MEDUSA II (Poland, Baltic Sea) 1968, 24 m
MINITAT (USA) 1970, 26-50 m
NEKTON (Romania, Lake Bicaz) 1978, 12 m
NERITICA (East Germany, Red Sea) 1977, 10 m
OKTOPUS (USSR, Crimea) 1967, 10 m
PERMON II (Czechoslovakia, Split, Yugoslavia) 1966, 3 m
PERMON III (Czechoslovakia, Czech lake) 1967, 10 m
ROBIN II (Italy, Genoa) 1969, 17 m
ROBINSUB I (Italy, Ustica Island, Mediterranean Sea) 1968, 10 m
SADKO I (USSR, Black Sea) 1966, 25-45 m
SADKO II (USSR, Black Sea) 1967, 25-60 m
SADKO III (USSR, Zukhumy Bay, Black Sea) 1969, 25 m
SCOTT CARPENTER SPACE ANALOG STATION (USA) 1997-98, Var. depth
SD-M/1 (UK, Malta) 1969, 9.1 m
SD-M/2 (UK, Malta) 1970, 6.1 m
SEALAB I (USA, Argus Island, Bermuda) 1964, 59 m
SEALAB II (USA, La Jolla, California) 1965, 60 m
SEALAB III (USA, San Clemente Island, California) 1969, 185 m
SEATOPIA (Japan) 1971, 100 m
SHELF I (Bulgaria, Cape Maslenos) 1970, 20 m
SUBIGLOO (Canada, Canadian Arctic) 1972-74, 13 m
SUBLIMNOS (Canada, Tobermory, Lake Ontario) 1969, 10 m
TEKTITE I (USA, Lameshur Bay, U.S. Virgin Islands) 1969, 12.7 m
TEKTITE II (USA, Lameshur Bay, U.S. Virgin Islands) 1970, 12.7 m

CONNECTED TO SURFACE VIA PASSAGEWAY - NOT TRUE HABITATS

HYDROPOLIS HOTEL (UAE, Dubai) Under development, 20 m
NIYAMA (Maldives) 2012, 6 m
POSEIDON UNDERSEA RESORT (Fiji) Under development, 12.2 m



Galathée underwater laboratory and habitat in 1977
Photo by Jacques Rougerie Architecte (GNU)

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CHAPTER 3

WHO'S WHO

& Halls of Fame

LABAN, André, France (1928-)
Underwater photographer; filmmaker; world's deepest and most prolific underwater painter; musician; longtime crewmember and diver of the Cousteau Society; chemist; engineer; co-designer and first pilot of Cousteau's *Soucoupe* submersible.

Photo: André Laban painting at 40 m (130 ft) in 1971. Photo by Ron Church courtesy of André Laban.
DIVING ALMANAC RECORD #209

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* Based on BRP conducted performance and ICOMIA Fuel Efficiency testing of BRP and competitive engines.

CHAPTER 3

WHO'S WHO

of the World Diving Community

The Diving Almanac's Who's Who is a compilation of hundreds of outstanding individuals, past and present, that have made a significant contribution to the world diving community.

The following people have accomplished much more than what is presented in their short profiles. They may not all have household names but their achievements and exploits add to the historical timeline in the preceding section. Also included in this chapter is a thorough listing of various hall of famers and recipients of annual awards.

EDITOR'S NOTE: The Diving Almanac's Who's Who is not an award or a hall of fame, and we acknowledge that many deserving people have inadvertently been overlooked. The criteria to include personalities is based entirely on exceptional accomplishment. The following list includes pioneers, explorers, scientists, inventors, award-winning photographers and writers, authors, commercial and military divers, conservationists, entrepreneurs, expedition leaders, administrators and entertainers. Many have lead in their respective fields and countries for decades. Although we recognise that dive instructors play a fundamental role in the diving world, there are simply too many to include them in this list based solely on their teaching career.

In order to respect the right to privacy of our Who's Who, all of the information presented in their profiles was obtained from public sources or directly from the personality. We of course welcome and expect requests for modifications to current biographies that may be outdated or contain inaccuracies for which we apologise.

Finally, if you know someone who meets our selection criteria that should be considered for the next edition, please send his/her name and relevant information in short form (maximum 50 words). Thank you.

who@divingalmanac.com

IN ALPHABETICAL ORDER

AISEK, Kimiuo, Micronesia (1927-2001)
Founder of Blue Lagoon Dive Shop in Truk Lagoon (1973); eyewitness to Operation Hailstone, the American aerial attack on the Japanese fleet in Truk Lagoon in February 1944.

AKESON, Ron, USA (1957-2014)
Diving entrepreneur; marine biologist; technical diver and instructor; writer; photographer; founded Adventures Down Under in 1980.

AKINS, Lad, USA **[NEW]**
Marine conservationist; founder of Reef Environmental Education Foundation (REEF); author; aquanaut; DEMA Reaching Out Award (2016).

ALARY, Danielle, Canada (1956-)
Underwater photographer; columnist; public speaker; chairman of the photo jury at the Antibes World Festival of Underwater Images; Diver of the Year (BTS); Palme d'argent (Antibes); Women Divers Hall of Fame (2001); Our World Underwater Award (2007).

ALEXANDER, Steve, USA
Research scientist; oceanographer; writer, author and photographer.

ALI, Yousuf, Pakistan
Marine engineer; instructor; trained Dubai (UAE) police underwater team; scientific diver; founder of Karachi Scuba Diving Center in 1989.

ALINAT, Jean, France (1917-2015)
Officer and diver of the Marine nationale (French Navy); Captain of Cousteau's *Calypso*; Director of the GERS (Groupe d'étude et de recherche sous-marine); President of the Campagnes océaniques françaises (COF); crustacean *Julmarichardia alinati* named in his honour.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

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ALLAN, Doug, United Kingdom (1951-)
Underwater cinematographer (*Life*, *Human Planet*, *Blue Planet*, *Planet Earth*, *Frozen Planet*) and photographer; marine biologist; research diver on the British Antarctic Survey; author; public speaker; Royal Geographical Society's Cherry Kearton Medal; Honorary Fellowship of the Royal Scottish Geographical Society; honorary doctorates and Polar Medals.

ALLEN, Gerald, Ph.D., Australia (1942-)
Former curator of fishes at the Western Australian Museum; Conservation International science team leader (Southeast Asia); author and scientific writer.

ALLEN, Rick, USA
Video producer, director and videographer; co-founder of Nautilus Productions; project videographer on Blackbeard's Queen Anne's Revenge Shipwreck Project.

ANDERSON, Dick, USA (1932-2006)
Underwater photographer and pioneer diver; writer; filmmaker; diving equipment engineer; trained the U.S. Navy underwater demolition team; dive technician for *Twenty Thousand Leagues Under the Sea*; International Scuba Diving Hall of Fame (2004).

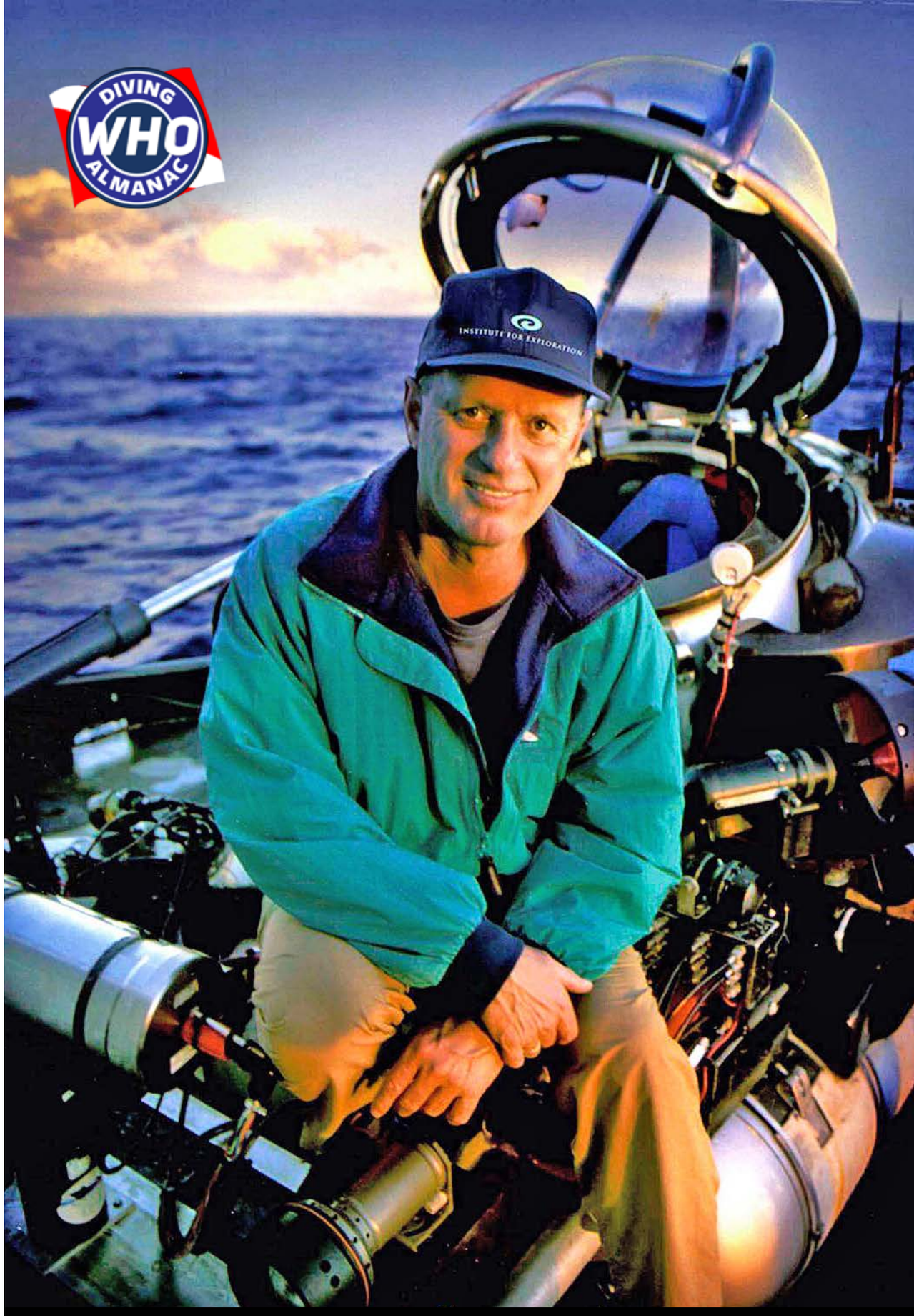
ANGE, Mike, USA
Author and photojournalist; lecturer; instructor trainer; advanced diver medic (International Board of Undersea Medicine); USCG Licensed Master; contributing author and technical editor for Scuba Diving Magazine; author of *Diver Down*; editor of SEAduction.com

ANTONIOU, Alex, Ph.D., USA (1957-)
Shark researcher; Field Director Shark Research Institute.

AUERBACH, Paul, M.D., M.S., USA
Consultant on hazardous marine life to DAN; medical editor for Dive Training Magazine; advisor to numerous medical, recreational and scientific organizations; expert on the clinical management of hazardous marine encounters; NOGI Award (2007).

AUXIER, Jim, USA
Co-founder of Skin Diver Magazine with Chuck Blakeslee.

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Dr. Robert Ballard and a Nuytco *Deepworker*
Photo: NOAA

AW, Michael, Australia
Nature photographer, videographer; writer and author; editor of Ocean Geographic; NOGI (Arts, 2013).

BALDASARE, Fred, USA, (1924-)
First person to cross the English Channel on scuba in 1962; dove from Sicily to the Italian mainland in 1962; a.k.a. *The Human Submarine*.

BALL, Mike, Australia (1948-)
Opened the Dive School in Townsville in 1969; invented the Stinger Suit, later known as Diveskins; pioneer of the diving liveaboard industry; member of the International Scuba Diving Hall of Fame (2004).

BALLARD, Robert, USA (1942-)
Underwater explorer; discoverer of the RMS *Titanic* and many other shipwrecks including German battleship Bismarck, the USS *Yorktown* and JFK's *PT-109*; National Geographic Society explorer-in-residence; President of the Institute for Exploration.

BALLESTA, Laurent, France (1977-)
Underwater photographer; biologist; author of *Planète Mers*.

BANK, Marjorie, USA
Underwater photographer; DAN/ROLEX Diver of the Year (1995).

BANTIN, John, United Kingdom
Professional photographer; writer.

BARADA, Bill, USA (1913-1998)
Underwater photographer; founder of Los Angeles Neptunes (1940); author and script writer; designer of equipment including the first recreational drysuit (Bel-Aqua, 1947), the first rubber snorkel and the first CO2 speargun; founded the California Council of Diving Clubs in 1950.

BARBAROVICH, Peter, United Kingdom
Jeweler and goldsmith; designs artistic sculptures inspired by the sea.

BARDOUT, Ghislain, France (1980-)
Explorer; mechanical engineer; co-leader of Under The Pole expeditions; videographer; public speaker; author.

BARNETTE, Michael, USA
Expert on Florida shipwrecks; author; public speaker.

BARRETTE, Blaise, Canada
Founder of the Aquatic Biodiversity Monitoring Network; videographer.

BARRON, David, Canada
Author of the *Atlantic Diver Guides* & Northern Shipwrecks Database.

BARSKY, Steven, USA
Author; consultant; co-founder of Hammerhead Press with his wife Kristine; photographer; commercial diver.

BARTH, Bob, USA
Author and navy diver; Chief Diver in the SEALAB programs.

BARTON, Jr., Frederick Otis, USA (1899-1992)
Co-creator of the *Bathysphere* with Dr. William Beebe; dove to 923 m (3,028 ft) off the coast of Bermuda in 1932; actor (*Titans of the Deep*, 1938).

BASS, George, Ph.D., USA (1932-)
Professor emeritus and pioneer in marine archaeology; author; directed the first complete archaeological excavation of an ancient wreck off Cape Gelidonya, Turkey (1960); founder of the Institute of Nautical Archaeology; known as the "father of maritime archaeology."

BASSEMAYOUSSE, Frédéric, France (1967-)
Author; underwater photographer.

BATTEN, Viktoria, UK (1971-)
Deep cave explorer; co-founder of EAU2 Technical Diver Training.

BAUER, Joseph, USA (1931-2007)
Retired physician; co-founder of the Florida Keys History of Diving Museum; dive historian; lecturer.

BAUER, Sally, USA
Retired physician; co-founder of the Florida Keys History of Diving Museum; dive historian; lecturer.

BEARD, Bill, USA
First instructor and dive operator in Costa Rica (1970).

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BEAUDRY, Philippe, Canada
Pioneer wreck diver; public speaker; salvaged approximately 500 objects from the RMS *Empress of Ireland* over the course of 600 dives starting in 1970; founded the Empress of Ireland Historical Society.

BEEBE, William, USA (1877-1962)
Explorer; author; co-invented the *Bathysphere* with Otis Barton; made record descent to 923 m (3,028 ft) in 1934.

BEHNKE, Albert R., Ph.D., Capt., USA (1903-1992)
Physician and Captain in the U.S. Navy; conducted research on diving, decompression and diving physiology.

BELLEFEUILLE, Michael G., Canada (1952-)
Métis gemstone sculptor; photographer; philanthropist; donated artwork to numerous charities and non-profit organizations; recipients include Lloyd Bridges and Jacques Y. Cousteau; shipwreck conservationist; public speaker.

BELLEFEUILLE, Monique J., Canada (1952-)
Writer and public speaker; co-founder of the Ottawa chapter of Save Ontario Shipwrecks; member of the Women Divers Hall of Fame (2002).

BEMIS, Gregg, USA (1928-)
Sole owner of the wreck of the Lusitania since 1982; twice ran for Congress; ran three times for the State Legislature (California).

BENCHLEY, Peter, USA (1941-2006)
Author; shark conservationist; credits include *Jaws* (1974).

BENNETT, Dr. Peter, Ph.D., D.Sc., USA (1931-)
Founder and former President and CEO of the Divers Alert Network from 1980 to 2003; formed and headed the Defence and Civil Institute for Environmental Medicine (DCIEM) in Canada; pioneer in diving safety; first described high pressure nervous syndrome (HPNS); DEMA Reaching Out Award (2002).

William Beebe in the *Bathyshpere*
Photo courtesy The Wildlife Conservation Society | NOAA Ocean Explorer

BENNETT, John, United Kingdom (1959-2004)
First man to dive below 1,000 ft (308 m) on open-circuit in 2001; died during a salvage dive in South Korea.

BERGMAN, Dewey, USA (NA-1993)
Underwater photographer, founder of photographic equipment manufacturer Sea & Sea in 1965; successful dive travel operator; member of the International Scuba Diving Hall of Fame (2005).

BERNABÉ, Pascal, France (1965-)
Technical diver and instructor; set world record for deepest dive on scuba (330 m / 1,083 ft) in 2005.

BERT, Paul, France (1833-1886)
French physiologist; research pioneer on decompression sickness; author of La pression barométrique in 1878.

BEUCHAT, Georges, France (1910-1992)
Dive equipment manufacturing pioneer; founded the Beuchat Society in Marseilles in 1934; credited with the invention of the surface buoy (1948), the first underwater camera housing (1950), the first isothermic wetsuit (1953), and the first vented fins (Jetfins, 1964).

BIRD, Jonathan, USA (1968-)
Cinematographer and producer; photographer; author; speaker; President of Oceanic Research Group; host of *Jonathan Bird's Blue World*.

BIRD, Lizzie, UK
BSAC National Instructor; first female British Sub Aqua Club National Diving Officer (1999-2004); author of The Wreck Diving Manual and The Diving Instructor's Manual; winner of the BSAC Jacques Cousteau/Aqualung Award (2004).

BIRKELAND, Charles, Ph.D., USA
Marine biologist; aquanaut (spent three weeks underwater in Tektite II); author; former professor at the University of Guam Marine Laboratory; professor at the University of Hawaii; third President of the International Society for Reef Studies; Outstanding Scientific Advancement of Knowledge Award (U.S. Coral Reef Task Force); Honorary Fellow of the Pacific Science Association; NOGI (Science, 2008).

BISHOP, Leigh, UK (1968-)
Wreck diver and discoverer; underwater photographer; lecturer; writer.

BLAKE, Sir Peter, New Zealand (1948-2001)
Yachtsman; won two successive America's Cup victories; won the Whitbread Round the World Race (1989); won the Jules Verne Trophy (1994) for fastest time around the world; appointed a Knight Commander of the Order of the British Empire (1995); environmentalist; head of Cousteau Society expeditions (2007); murdered by pirates in Brazil on 6 December 2001; Sir Peter Blake Trust established in 2003.

BLAKESLEE, Chuck, USA (1925-2012)
Co-founder of The Skin Diver Magazine.

BLESSINGTON, Mark, USA
Chief Diver for the Cousteau Society for over 15 years.

BODNER, Alon, Israel (1956-)
Israeli inventor and designer of underwater breathing apparatus that extracts dissolved air from water.

BOEHM, LCDR Roy, USA (1924-2008)
U.S. Navy diver; founding commander of the U.S. Navy SEALs in 1962; served in WWII, the Korean War and the Vietnam War; tasked with salvaging bodies and ammunition from the USS *Arizona* after the attack on Pearl Harbor.

BOISSINOT, Paul, Canada (1953-)
DSO of the Quebec Aquarium; Director of GEERG; former president of the Quebec Federation of Underwater Activities (FQAS); former president of CAUS; co-founder of dive suit manufacturer Atlan (1985-1998); diving instructor (1973); commercial diver; public speaker; owner of **DEBDIVE**.

BOND, George F., MD, USA (1915-1983)
Researcher in saturation diving and dive table development; developer of the SEALAB missions.

BONIN, Dick, USA (1930-2015)
Founded equipment manufacturer Scubapro with Gustav Dalla Valle in 1963; U.S. Navy SEAL; founder of the Underwater Manufacturers Asso-

ciation; former executive director of DEMA; founder of Ocean Futures Society in 1964; NOGI Award (1982); DEMA Hall of Fame (1992); Historical Diving Society Diving Pioneer (2010).

BONNICI, Christian, France (1935-)
Longtime member of Équipe Cousteau; chief diver; pioneer in gas blending and saturation diving; COMEX engineer.

BORELLI, Giovanni, Italy (1608-1679)
Physicist; designed a self-contained leather rebreather.

BOREN, Lamar, USA (1917-1986)
Underwater photographer and cinematographer; stuntman; instructor; credits include several James Bond 007 films, *The Old Man and the Sea* (1958), Flipper (1963), and Namu the Killer Whale (1966).

BOUTAN, Louis, France (1859-1934)
Inventor of one of the first underwater cameras in 1893; used the first u/w flash bulb designed by Frenchman Chauffour in 1893; author of *La Photographie Sous-Marine* (1900), a book on u/w photography.

BOWDEN, Jim, USA
Technical diver; set a world record deep dive 282 m (925 ft) in 1994.

BOYD, Ellsworth, Ph.D., USA,
Professor Emeritus, Towson University; writer and photographer specializing in wreck diving; author of *Wreck Facts* column in Sport Diver Magazine; public speaker.

BOZANIC, Jeffrey, Ph.D., USA (1957-)
Technical diving instructor; public speaker; explorer; writer; author of *Mastering Rebreathers*; co-author of *Antarctic Scientific Diving Manual*; former editor of Immersed Magazine; former Board of Directors of several organisations including NAUI, AAUS and TDI, Explorer's Club (1987); recipient of multiple awards including NAUI Lifetime Achievement (2014), NSS-CDS and SSI; DAN/ROLEX Diver of the Year (2007).

BRADNER, Hugh, Ph.D., USA (1916-2008)
Developer of the neoprene wetsuit in 1950; did first dive in a neoprene wetsuit in the winter of 1950 at Lake Tahoe; UC Berkeley physics professor and Manhattan Project scientist.



Master Chief Petty Officer Carl Brashear.
Photo: U.S. Navy

BRASHEAR, Carl Maxie, USA (1931-2006)
First African-American diver in the U.S. Navy in 1953; leg partially amputated during recovery mission of an atomic bomb off Spain in 1966; first amputee to be restored to duty as a diver; became Master Diver

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in 1970; retired from the Navy in 1979 as a Master Chief Petty Officer; subject of the film *Men of Honor* (2000).

BRIDGES, Lloyd, USA (1913-1998)
Star of *Sea Hunt* TV series from 1957 to 1961; member of the International Scuba Diving Hall of Fame.

BRITNELL, Jett, Canada
Photographer; writer; marine journalist; public speaker; marine conservationist.

BROOKS II, Ernest, USA (1935-)
Photographer; educator; member of the International Scuba Diving Hall of Fame (2005).

BROOKS, John, USA
Underwater photographer and cinematographer for the National Oceanic and Atmospheric Administration (NOAA).

BROWN, Wayne, USA
Chairman and CEO of Aggressor Fleet and Dancer Fleet liveaboards.

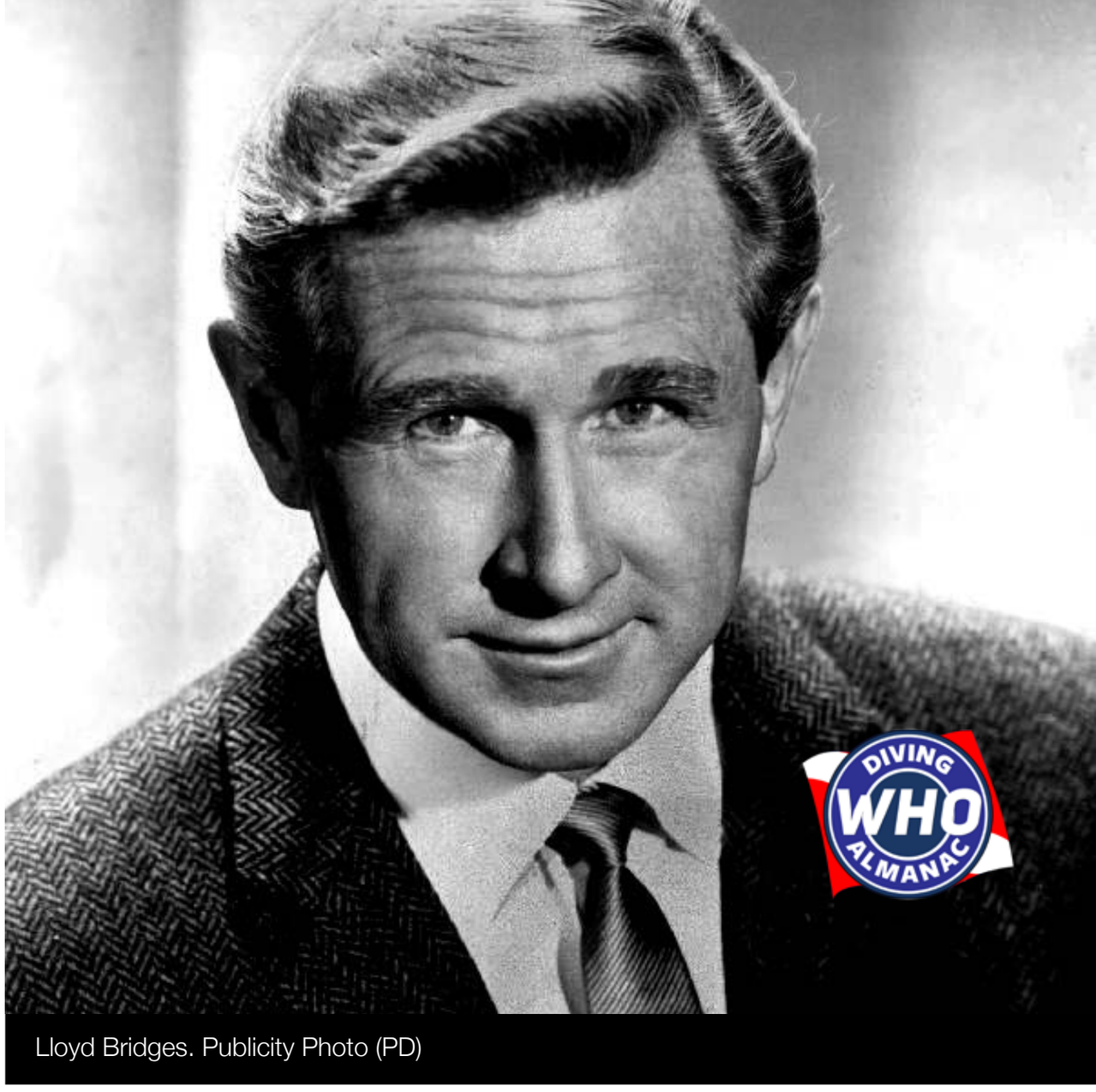
BRYLSKE, Alex, USA
Pioneer and leader in the field of diver education and sustainable marine tourism; public speaker; Vice President for Educational Development (Pro Dive Intl.); Senior Editor of Dive Training Magazine; training consultant for the Coral Reef alliance (CORAL).

BUCHER, Raimondo, Italy (1912-2008)
Set the first freediving world record at 98 ft (30 m) in 1949.

BÜEHLMANN, Albert A., Prof., Switzerland (1923-1994)
Scientist; specialist in lung function and blood circulation.

BULL, Richard, United Kingdom
Technical diver; commercial diver; instructor; writer.

BUSH-ROMERO, Don Pablo, Mexico (1905-1998)
Founder of CEDAM (Conservation, Education, Diving, Awareness and Marine-research) in 1967; President of the Club de Exploraciones Mexico; Mexican Underwater Archeological Society.



Lloyd Bridges. Publicity Photo (PD)

BUSSCHER, Kevin, USA
Competitive freediver; marine biologist; underwater painter.

BUSSOZ, René, USA, FRANCE (1906-1989)
First importer of the Cousteau Aqua-Lung to the U.S. in 1948.

BUYLE, Frédéric, Belgium (1972-)
Competitive freediver; underwater photographer; instructor.

CAHILL, Jim, USA (1926-2008)
Pioneer diver credited with first dives in New England; co-founder of

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NAUI; member of the U.S. Navy Underwater Demolition Team; Navy SEAL; founded New England Divers; consultant for *Sea Hunt*; NOGI (Science, 2003); lead subject of Diary of the Depths.

CALDWELL, Jim, USA
Navy and commercial diver; advocate of diving safety.

CALHOUN, Fred, USA
Instructor, lecturer and author.

CALOYIANIS, Nick, USA
Cinematographer and photographer; marine biologist; Arctic explorer; first person to dive with a Greenland shark.

CALYPSO, The, France (1941-) **[MOD]**
BYMS-1 Class Motor Minesweeper: laid down 12 August 1941 as *BYMS-26* by the Ballard Marine Railway Co., Inc., Seattle, WA; completed and transfered to Great Britain in August 1942 as *J-826*; converted to a car ferry and named *Calypso* in 1947; acquired by Loël Guinness in 1950 and offered to Jacques-Yves Cousteau who transformed it into an oceanographic vessel; struck by a barge and sunk at Singapore (1996); salvaged and towed to Marseille, France; tied up in Larochelle in an advanced stage of decay for a decade; towed to Piriou shipyard in Concarneau for complete refit in 2007 but work not completed; shipyard seeks legal order to sell the historic ship in March 2015; talks held in March 2015 to repair and relocate the *Calypso* to the Oceanographic Museum of Monaco for permanent exhibit; moved to Turkey in 2016 for a full refit, including new engines.

CAMERON, James, Canada (1954-)
Screenwriter; director; producer (*Avatar*, *Titanic*, *Abyss*, *Aliens of the Deep*, *Ghosts of the Abyss*, *Expedition Bismarck*, *Terminator*, *Aliens*); marine conservationist; made first solo descent to the bottom of the Challenger Deep, 10,898.4 m (35,756 ft), the deepest known point in the Earth's ocean seafloor, aboard the *Deepsea Challenger*, a 7.3-m (24 ft) submersible in 2012.

CAMERON, Mike, Canada
Engineer; deep ROV designer.



The *Calypso* awaiting refit in Concarneau in 2007. Photo by Massecot (CC)
DIVING ALMANAC RECORD #552

CAMPBELL, Tom, USA
Underwater cinematographer; former U.S. Navy diver.

CAMPOLI, Bernie, USA
Former member of the U.S. Navy underwater photographic team; photographed the first Man in the Sea Program (SEALAB); commercial diver; photographer for the University of North Carolina Wilmington (NURC) and U.S. Navy Specialized Research Diving Detachment (SRDD) in the *Aquarius* Undersea Laboratory; NOGI (Arts, 2010).

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CANEY, Mark, UK (1957-)
PADI International executive; former president of European Underwater Federation; photographer; writer; UK designated expert for the design of the European and ISO standards for recreational diving.

CANTRELL, Bruce E., M.Sc., USA
Biology professor at Roane State Community College; set world record for longest stay in an underwater habitat (73 days) in 2014.

CARDONE, Bonnie, USA (1942-)
Editor, writer, photographer for Skin Diver Magazine for 22 years; author; Woman Diver of the Year (1999); member of the Women Divers Hall of Fame.

CARGILE, Edward C., USA (1939-)
Engineer; deep submersible pilot; commercial and military diver; writer and author of over 1,645 articles and several books; photographer; magazine editor/publisher; film producer and lecturer; started underwater photography with Ron Church in 1954 when he designed and built most of his own diving and underwater photography equipment; author of Pioneers In Diving; multiple awards including NOGI and SSI 5000.

CARNEY, Brian, USA
President and CEO of TDI/SDI/ERDI; former head diving instructor at the University of Rhode Island.

CARPENTER, Malcolm Scott, USA (1925-2013)
Astronaut; aquanaut; explorer and scientist; participated in *SEALAB II* and *III*; consultant and designer in diving equipment and instruments.

CARTER, Jennifer, USA
Filmmaker; photographer; journalist; expedition leader; public speaker; first woman to explore the wreck of the RMS *Titanic*; Women Divers Hall of Fame (2000).

CARTWRIGHT, Sally, United Kingdom (1969-)
Chairman of the Sub Aqua Association (SAA); SAA Diver Rescue Examiner; safety diver for Mark Threadgold (closed circuit deepest dive by a blind diver, 103 m, 2006); lead female diver for Bluebird Project; SITA committee member; expedition leader for Exploring Celtic Deep - Southern Ireland.



John Chatterton. Photo courtesy John Chatterton

CASTRO, Dr. José, USA (1948-)
Shark scientist; Mote Marine Laboratory Senior Biologist; National Oceanic and Atmospheric Administration scientist; author of *The Sharks of North America* (2011) and *Sharks of North American Waters* (1983).

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CHAPUIS, Claude, France
Competitive freediver; former head of AIDA France; freediving instructor.

CHARRIER, Éric, France (1964-1999)
Competitive freediver known as L'homme otarie (the Human Otter); held three freediving world records including the deepest freedive under ice (-70 m) established at Lake Témiscouata (Québec), in March, 1997.

CHATTERTON, John, USA (1951-)
Technical, deep wreck diver (*Britannic*, *Lusitania*, *Andrea Doria*, *Titanic*); discovered the German submarine *U-869* with Richie Kohler off New Jersey in 1991; co-host for 57 episodes of *Deep Sea Detectives*; subject of bestselling books *Shadow Divers* and *Titanic's Last Secrets*.

CHENG, Eric, H., USA (1975-)
Underwater photographer; author; public speaker; musician; editor of Wetpixel.

CHISHOLM, John Wesley, Canada (1963-)
Cinematographer and television producer (*Oceans of Mystery*, *Sea Hunters*, *Dreamwrecks*, *GO DEEP*); writer; President of Arcadia Entertainment.

CHOROMANSKI, Joe, USA
Marine biologist; former VP of husbandry for Ripley's Aquariums and curator of husbandry operations at the Monterey Bay Aquarium.

CHOWDHURY, Bernie, USA
Technical and wreck diver; writer and author (*The Last Dive*); editor of Historical Diving Magazine; instructor; expedition leader; documentary co-producer; equipment marketing and development consultant; lecturer; Explorers Club Fellow.

CHRISTIANSEN, Jim, USA (1926-1999)
Co-founder of Scubapro

CHURCH, Cathy, USA (1945-)
Underwater photographer; author; NOGI (1985); Women Divers Hall of Fame (2000); DEMA Hall of Fame (2000); ISDHOF (2008).

CHURCH, Jim, USA (1932-2002)
Pioneer underwater photographer; author.

CHURCH, Ron, USA (1934-1973)
Pioneer underwater photographer; author; cinematographer; co-founder of the San Diego Underwater Photographic Society with Chuck Nicklin; founded Underwater Photographers of America.

CLARK, Bob, USA
Founder of SSI (Scuba Schools International) in 1970.

CLARK, Eugenie, Ph.D., USA (1922-2015)
Marine biologist; ichthyologist; author; pioneer in marine conservation and the study of shark behaviour; founding member of the Beebe Project (1983); discovered first effective shark repellent; ISDHOF (2010); WDHOF (2000); NOGI (1965 & 1987); a.k.a. *The Shark Lady.*

CLARK, Russell, Canada (1980-)
Multimedia designer; filmmaker; writer; Co-Director of **Seaproof.TV**, Art Director of **DIVER Magazine**; digital magazine pioneer; dive industry media consultant.

CLARK, Tec, USA
Instructor trainer specialized in college and university dive training (academic diving); Vice President of Program Development (Pro Dive Intl.); freediver; a.k.a. ScubaGuru.

CLARKE, Sir Arthur C., USA (1917-2008)
Pioneer diver; author; science writer; TV host; discovered underwater ruins of the ancient Koneswaram temple in Sri Lanka; UNESCO Kalinga Prize for popularizing science; a.k.a. the *Prophet of the Space Age*.

CLINE, William, USA
Scuba industry consultant; founder and President of Cline Group (marketing, advertising and consulting); DEMA Board Member; PADI course director; pilot.

CLOUGH, Stuart J., UK
Founder of Undersea Technologies; engineer; rebreather designer.

COCHRAN, Mike, USA
Inventor and developer of dive computers; CEO of Cochran Consulting; owner of 57 patents; Cochran computer was used in the first openwater decompression computer-based dive for the U.S. military; NOGI (2016)

COCKS, Michael, UK (-2015)
Commercial diving safety advocate; columnist; Society for Underwater Technology's Houlder Cup for outstanding services to the diving industry (2012).

COKE, Jim, USA
Cave explorer and cartographer.

COLE, Bob, United Kingdom
Sub Aqua Association (SAA) Decompression Officer; CMAS Technical Director; member of the CMAS Rebreather Working Group; expert witness (diving); author; writer; co-founder of the Atlantis Diving Club (1957); SAA Life Time Achievement Award 2007.

COLE, Brandon, USA
Photographer; author.

COLEMAN, Neville, Australia (1938-2012)
Photographer; writer; educational author; public speaker; Honorary Fellow of the Australian Institute of Professional Photography; board member of Project AWARE Asia/Pacific; member of the International Scuba Diving Hall of Fame (2007).

COLL, Raymond, France
Longtime crewmember and diver aboard Cousteau's *Calypso*.

COLLA, Phil, USA (1963-)
Photographer and natural history writer.

COMMAGERE, Skip, USA
Florida diving pioneer; entrepreneur; founded Force-E Scuba.

CONDERT, Charles, USA (NA-1832)
Developed a compressed air reservoir made of copper tube worn around the body in 1832; air was released into a hood over the head; Condert drowned while testing his invention.

CONLAN, Kathy, Canada (1950-)
Marine biologist with the Canadian Museum of Nature; author; public speaker.

CONLIN, Mark, USA (1959-)
Underwater photographer; author.

COOPER, Craig, USA
Florida Operations Director (NOAA Undersea Research Center/Aquarius); aquanaut; DMT (Diving Medical Technician); marine biologist; commercial diver.

COSTE, Carlos, Venezuela (1976-)
Competitive freediver; first human to freedive to 100 m (328 ft).

COTON, Pierre, France
Former manager of the Antibes World Festival of Underwater Pictures.

COTTON, Amanda, USA
Photographer; founder of **Water Women**; Member of the Explorers Club.

COURTEAU, Jean-Louis, Canada (1959-)
Artist; writer; photographer; finds his inspiration while diving; shark conservationist; founder of ***Plongée Aquadélic***; co-discoverer of submerged First Nations artifacts in Québec; artist-in-residence of **GEERG**.

COUSTEAU, Alexandra, USA (1976-)
Environmentalist, founder of Blue Legacy; co-founder of EarthEcho International; author; lecturer; consultant.

COUSTEAU, Anne-Marie, France
Photographer; first wife of Jean-Michel Cousteau.

COUSTEAU, Céline, USA (1972-)
Associate producer, expedition diver and logistics coordinator for Oceans Futures Society; former coordinator for Africa and the Middle East for The Earth Council; daughter of Jean-Michel Cousteau.

COUSTEAU, Fabien, USA (1967-)
Engineer; filmmaker; designed a shark-shaped submersible for great white shark documentary *Mind of a Demon*; spokesperson for Oceans Futures Society; son of Jean-Michel Cousteau.

COUSTEAU, Jacques-Yves, France (1910-1997)
Diving pioneer; oceanographer; prolific author and film-producer; environmentalist; co-inventor of the Aqua-Lung; co-founder of the Groupe d'étude et de recherche sous-marines (GERS) in 1945; founder of the Cousteau Society/Équipe Cousteau; member of the International Scuba Diving Hall of Fame; U.S. National Inventors Hall of Fame (March 2010); one of the *Mousquemers* along with Frédéric Dumas and Philippe Tailliez; inspired thousands to become divers; a.k.a. *Captain Cousteau*, *Captain Planet*, *JYC*.

COUSTEAU, Jean-Michel, USA (1938-)
Explorer, environmentalist, educator, film producer; architect; President of Ocean Futures; former Executive Vice President of The Cousteau Society / Équipe Cousteau; produced over 75 films; multiple award winner (Emmy, Peabody, 7 d'Or, Cable Ace); Executive Producer of *Jean-Michel Cousteau's Ocean Adventures*; first person to represent the Environment in the Opening Ceremony of the Olympic Games (Salt Lake City, 2002); son of Jacques-Yves Cousteau and Simone Melchior; father of Fabien Cousteau and Céline Cousteau; NOGI (1995); Scuba Diving Hall of Fame (2003); Légion d'honneur, Chevalier (2016).

COUSTEAU, Philippe Jr., USA (1980-)
Environmentalist; co-founder of EarthEcho International; President and founder of Thalassa Ventures Corporation; author; public speaker; film producer.

COUSTEAU, Philippe, France (1940-1979)
Environmentalist; explorer; film-producer; pilot; son of Jacques-Yves Cousteau and Simone Melchior.



Jacques-Yves Cousteau at the Hague in 1972. Photo: Archives of the Netherlands (PD)

MULTIPLE DIVING ALMANAC RECORDS

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COUSTEAU, Jacques-Yves, France (1910-1997)
President John F. Kennedy presents the National Geographic Society's Gold Medal to Jacques-Yves Cousteau on April 16, 1961. M. Cousteau is accompanied by his wife, **Simone (Melchior) Cousteau** (1919-1990). Photo: Robert Knudsen | White House Photographs | John F. Kennedy Presidential Library and Museum (PD)

COUSTEAU, Pierre-Yves, France (1982-)
CEO and Founder of Cousteau Divers; son of Jacques-Yves Cousteau and Francine Triplet Cousteau.

COUSTEAU (MELCHIOR), Simone, France (1919-1990)
First woman scuba diver and aquanaut; wife and business partner of Jacques-Yves Cousteau; a.k.a. *La Bergère* (The Shepherdess).

COUSTEAU (TRIPLET), Francine, France
President of the Cousteau Society; second wife of Jacques-Yves Cousteau; mother of Diane and Pierre-Yves.

COVE, Stuart (1959-) & **COVE, Michelle,** (1967-) Bahamas
Dive resort owners; founders of Stuart Cove's Dive Bahamas; pioneers in shark feeding experience; operators of the world's premier underwater cinematographic facilities; developers of artificial reefs; stunt divers.

COZENS, Jacquie, Ireland
Writer; photographer; filmmaker (Discovery Channel, Channel 5, BBC); operates the Dingle Dive centre with her partner Neal Clayton.

CRABB, Lionel, UK (1909-1956)
British Navy diver allegedly killed during covert diving mission under the Soviet cruiser *Ordzhonikidze* in Portsmouth Harbour while investigating a new propeller design.

CRABBE, Buster, USA (1908-1983)
Olympic athlete; actor; NAUI instructor.

CRAIG, John D., USA (1903-1997)
Adventurer; stunt diver; author; wrote *Danger is my Business* in 1938.

CRANSTON, Bob, USA (1956-2016) **[MOD]**
Underwater cinematographer (more than 40 television productions and 13 giant screen films); underwater IMAX film pioneer; consultant to U.S. military special forces; owner of San Diego Shark Diving Expeditions (1985).

CRAWLEY, Annie, USA
Filmmaker; motivational speaker; photographer; author; writer; diving instructor; USCG captain (100GT); founded Dive Into Your Imagination.

CRILLEY, Frank W., USA (1883-1947)
U.S. Navy diver; dove to over 91 m (300 ft) during salvage operations on the sunken submarine *F-4* (SS-23) off Honolulu in 1915; rescued a fellow diver entangled at a depth of 76 m (250 ft) in 1915; Medal of Honor in 1929; multiple deep salvage operations including USS *Squalus* (SS-192) in 1939; USS *Crilley* (YHLC-1) named in his honor.

CROFT, Robert, USA
Former U.S. Navy diver and instructor; first person to freedive beyond 200 ft (61 m), reaching the depth of 212 feet (64 m) in 1967; reached record depth of 240 ft (73 m) in 1968; credited with inventing "air/lung packing" a technique used by freedivers to increase the volume of air in the lungs prior to descent; NOGI (2016).

CRONIN, Brian P., USA (1956-)
Former Chairman and CEO of PADI Worldwide; PADI's third employee in 1967; board member of International PADI Inc. (1991); Senior Vice President, Business Development and International Business (1995).

CRONIN, John, USA (1929-2003)
Sport diving pioneer; co-founder and CEO of PADI (Professional Association of Diving Instructors), the largest dive training and certification organization in the world; member of the International Scuba Diving Hall of Fame (2002).

CRONKWRIGHT, Robert, Canada (1939-2008).
President and founder of ACUC (American Canadian Underwater Certifications).

CROPP, Ben, Australia (1936-)
Filmmaker; champion spearfisher in the 60s; 1964 World Underwater Photographer of the Year; member of the International Scuba Diving Hall of Fame.

CROSS, Ellis R., USA (1913-2000)
Author; commercial diving instructor; owner of Sparling School of Deep Sea Diving; member of the International Scuba Diving Hall of Fame.

CROWELL, Dan, USA
Underwater cinematographer; deep diver and explorer.

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CRUIKSHANK, Mandy-Rae, Canada (1974-)
Competitive freediver; Performance Freediving instructor.

CRUMLEY, Chris, USA
Underwater photographer; advertising, editorial, stock, lifestyle and people photographer.

CURTSINGER, Bill, USA (1946-)
Photographer and writer; NOGI Award (2007).

CUSSLER, Clive, D.Litt., USA (1931-)
Marine archaeologist and wreck expert; founder of the National Underwater and Marine Agency (NUMA); author (fiction and non-fiction) including *The Sea Hunters*; discovered more than sixty shipwreck sites including the *Carpathia*, the *Mary Celeste* and the *Manassas*; fellow of the Explorers Club, the Royal Geographic Society, and the American Society of Oceanographers.

CYR, Mario, Canada (1959-)
Cinematographer from the Magdalen Islands; has contributed to over 130 documentary productions; first person to dive with walrus (1991); one of the five first people to dive with white bears; Chief Diver and underwater videographer of the SEDNA IV expeditions to the Arctic and Antarctica (National Film Board of Canada); owner of Plongée Alpha.

D'AUGERVILLE, Paul Lemaire, France
Inventor of the first self-contained underwater breathing apparatus in 1828; the unit consisted of a low-pressure cylinder and a helmet connected to a valve-operated lung via a tube; the system also included a rudimentary buoyancy compensation device.

DALLA VALLE, Gustav, Italy (NA-1995)
Pioneer manufacturer and diver; founded Scubapro with Dick Bonin in 1963; member of the International Scuba Diving Hall of Fame (2000).

DARKIN, Valeri, Russia (1956-)
Former Chief Diving Officer and marine biologist at the Russian Academy of Sciences; founded the first liveaboard diving company in Russia (1990); first professional member of an American training agency in the former Soviet Union; member of AAUS; opened first PADI Dive Center in Russia (1993); underwater photographer and videographer; writer; first recipient of the Black Pearl award for his pioneer work in the development of the Russian Diving Industry; family operates a dive lodge on the Russian Pacific Coast.

DAVINCI, Leonardo, Italy (1452-1519)
Inventor; devised a leather diving suit and cane hoses fixed together by leather joints for breathing, possibly the world's first snorkel device.

DAVIS, C. Ben, Canada (1925-2014)
Engineer; diving entrepreneur; co-founder of the Underwater Club of Canada; co-founder of the Ontario Underwater Council (1958); founding member of the Underwater Society of America (1959); implemented exact specifications of sport diving flag; founding board member and former president of NAUI; founding president of ACUC (1964); helped found the Adapted Scuba Association; multiple awards including NOGI (1961) and NAUI Lifetime Achievement (2014).

DAVIS, Chuck, USA
Underwater cinematographer; longtime crewmember and diver aboard Jacques-Y. Cousteau's *Calypso* and *Alcyone*.

DAVIS, Dr. Jefferson C. Jr., USA (1932-1989)
Pioneer in the treatment of decompression sickness and air embolism in divers; member of the International Scuba Diving Hall of Fame.

DAVIS, Ralph, USA (1917-2001)
Founded the International Underwater Spearfishing Association in 1950.

DAVIS, Sir Robert H., United Kingdom (1870-1965)
Creator of Davis False Lung (1911) and the first submersible decompression chamber (1912); Davis Submarine Escape Apparatus (DSEA).

DAVISON, Ben, USA
Founder and editor of **Undercurrent** (1975).

DAVISON, Sam, USA (NA-1987)
Founder of DACOR in 1954.

de BOECK, John, Canada (1952-)
Diving and liveaboard pioneer; director of the Dive Industry Association of British Columbia; owner of **Browning Pass Hideaway Resort**.

de CORLIEU, Louis, France (1888-1971)
Inventor of swim fins; received his first European patent for swimming propellers in 1933; designed a broad bladed fin in 1935.

de TAYRAC, Hélène, France (1968-)
Manager of the Paris Dive Show.

DEGIA, Abdulhai, Barbados
Diving pioneer; founded the Dive Shop in 1965; founding member of the Eastern Caribbean Safe Diving Association; Barbados contributor to several diving publications.

DEGRUY, Mike, USA (1951-2012)
Professional underwater photographer and filmmaker; television host; co-owner of The Film Crew, a production company based in Santa Barbara, with his wife Mimi Armstrong deGruy; killed in a helicopter crash while on assignment in Australia.

DELAUZE, Henri-Germain, France (1929-2012)
Engineer; founded the Compagnie maritime d'expertises (COMEX) in 1961; pioneered deep saturation diving using synthetic breathing mixtures; first man to reach 360 m (1,181 ft) on helium mixture.

DELEMOTTE, Bernard, France
Longtime crewmember and diver aboard Jacques-Yves Cousteau's *Calypso* and *Alcyone*.

DELGADO, James, Ph.D., USA (1958-)
Maritime archaeologist; author; director of Maritime Heritage in the Office of National Marine Sanctuaries; former executive director of the Institute of Nautical Archaeology and of the Vancouver Maritime Museum; explored several deep wrecks including RMS *Titanic* and the *Carpathia*; host of *The Sea Hunters* (2001-2006); public speaker; Fellow of the Royal Geographical Society; Fellow of the Explorers Club.

DeLOACH, Ned, USA
Co-author of numerous marine life identification books including the three-volume Caribbean Reef Set; founded New World Productions in 1972; former editor-in-chief of Ocean Realm.

DELOIRE, Michel, France (1935-)
Longtime underwater cameraman for the Cousteau Society.

DENAYROUZE, August, France (1837-1883)
Co-developer of a self-contained breathing apparatus with Benoit Rouquayrol in 1864.

DENNISON, Christine, USA
Co-founder of Mad Dog Expeditions; first woman to dive under Arctic sea ice (1994); first woman to dive in the Rio Negro tributaries of Brazil; Fellow of the Explorers Club and of the Royal Geographical Society.

DESMIER, Xavier, France
Professional diver and underwater photographer; served aboard Cousteau's *Calypso* for three years.



Bernard Delemotte aboard the Cousteau Society's flagship *Alcyone*
Photo by Jeffrey Gallant | Diving Almanac

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Photo by Jeffrey Gallant | **GEERG**

DOUBILET, David, USA (1946-)
Underwater photographer; explorer; author.
(See page 238 for more)

HAYES, Jennifer, Ph.D., USA
Marine biologist; photojournalist; author; co-founder of Undersea Images with David Doubilet

DICKSON, Graham, Canada (1975-)
Expedition leader and owner of **Arctic Kingdom**; led the first sport diving expedition to Nunavut to dive with walrus in 1999; founded University of Pennsylvania Scuba Club in 1994; dive instructor; writer; photographer.

DIOLÉ, Philippe Victor, France (1908-1977)
Explorer; journalist; co-authored several books with Jacques-Yves Cousteau; awarded the Grand Prix Walter (Académie française).

DODI, Alessandro, Italy (1958-2006)
Photographer; died during rebreather training in Lake Como.

DORADO, François, France (1946-)
Photographer and crewmember of the *Calypso*; had to be picked up by helicopter from Woodstock music festival to rejoin departing *Calypso* in August 1969; military diver (Marine nationale).

DOUBILET, David, USA (1946-)
Underwater photographer; resident photographer for National Geographic Magazine; explorer; author; multiple awards include Lowell Thomas Award (Explorers Club) and the Lennart Nilsson Award in Photography; member of the Royal Photographic Society; member of the International Diving Hall of Fame (2002); trustee of the Shark Research Institute; took first underwater photos at age 12 using a Brownie Hawkeye camera in an improvised rubber housing.

DOUGLAS, Eric, USA
Director of Training for Divers Alert Network (DAN); scuba instructor; former assistant editor of The Undersea Journal; author; novelist.

DROGIN, Steve, USA
Underwater photographer; public speaker.

DUMAS, Frédéric, France (1913-1991)
Pioneer of diving and underwater exploration; cinematographer; scientist; one of the *Mousquemers* along with Jacques-Yves Cousteau and Philippe Tailliez; Chief diver of the *Calypso*; co-publisher of Cousteau's *The Silent World*; a.k.a. Didi.

DUNFORD, Richard, USA
Manager of the Center for Hyperbaric Medicine at Virginia Mason Medical Center, Seattle, Washington; DAN/ROLEX Diver of the Year (1998).

DWYER, Terry, Canada (1962-)
Nova Scotia wreck hunter; dive entrepreneur; motion picture diving consultant; videographer; public speaker; Member of the Explorers Club; author of *Wreck Hunter*.

EARHART, Amelia., USA (1897-1937) **[NEW]**
Aviation pioneer; first female aviator to fly solo across the Atlantic Ocean (1928); author; early supporter of the Equal Rights Amendment; disappeared during a circumnavigational flight of the globe in 1937.

EARLE, Sylvia, Ph.D., USA (1935-) **[MOD]**
Scientist; aquanaut; author; multiple record holder; Explorer-in-Residence for the National Geographic Society; founder of the Sylvia Earle Alliance and Mission Blue; NOGI (1976); OW-U (1978); Time Magazine Hero for the Planet (1998); International Scuba Diving Hall of Fame (2000); Women Divers Hall of Fame (2000); BTS Legend of the Sea (2008); HDS (2010); a.k.a. *Her Deepness*.

EATON, Bernard, United Kingdom (1926-2012)
Founding publisher of Diver Magazine (UK) in 1963; co-founder of The Marine Conservation Society (MCS) an organization for the protection of the marine environment and its wildlife; International Scuba Diving Hall of Fame (2002).

EATON, Susan R., Canada (1958-)
Geologist; geophysicist; journalist; conservationist; founder and leader of the Sedna Epic Expedition; Member of the Explorers Club.

EBRO, Thomas C., USA
Aquatic safety specialist; served for 10 years as LA County Medical Examiner's Deputy Coroner and Aquatics Accident Investigator; former general manager of Spanish Bay Reef Resort in the Cayman Islands; chief designer and developer of Rum Cay Club in the Bahamas; developed advanced SCUBA programs and instruction.

EGSTROM, Glen, Ph.D., USA (1928-)
Writer and author on the subject of aquatic sports and scuba diving safety; NOGI (1969, 1982); Oceaneering International Award (Undersea Medical Society); DEMA Reaching Out Award (1989); DEMA Hall of Fame (1989); DAN/ROLEX Diver of the Year (1994); NAUI Lifetime Achievement Award (2002).

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EHLMÉ, Göran, Sweden (1965-)
Co-founder of Waterproof International; expedition leader to the Arctic and Antarctica; videographer; photographer; instructor.

ELFSTRÖM, Ingvar, Sweden (1928-1998)
Swedish diving pioneer; built his first regulator in 1954; founder of diving equipment manufacturer Poseidon in 1958.

ELLIOTT, Jim, USA
Founder and President of Diveheart.

ELLIOTT, Ron, USA
Commercial diver; only person to actively dive for urchins at the Farallon Islands (California); has had over 400 encounters with the white shark without the protection of a cage.

ELLIS, Richard, USA (1938-)
Marine conservationist; painter (multiple exhibits around the world); prolific author (including *The Book of Sharks*); museum adviser; consultant; research associate at the American Museum of Natural History; former member of the U.S. delegation to the International Whaling Commission (1980-1990); Member of the Explorers Club.

EMPLETON, Bernie, USA
Creator of the national YMCA program; author of The New Science of Skin and SCUBA Diving in 1957.

ENGEL, Jim, USA (1960-2007)
Owner of Utila Resort Lodge; built the Utila Chamber & Trauma Center to treat divers, including local lobster fishermen for little or no cost to the patients; conducted eye care clinics for the local population by inviting doctors from the USA to stay on Utila for free in exchange for their services.

ENGLANDER, John, USA
Oceanographer; sea level rise expert; speaker, author; consultant; founder of the Rising Seas Group; former CEO of The Cousteau Society and The International SeaKeepers Society.

ERICKSON, Ralph, USA (1922-2006)
Co-founder of PADI with John Cronin in 1967; ISDHOF (2007).

EVANS, Bob, USA (1950-)
President, Bob Evans Designs, Inc.; inventor holding more than 33 patents on revolutionary fin designs (**Force Fin**); inventor of **GasPods**; fin design part of the permanent collections of the New York Museum of Modern Art and the Metropolitan Museum of Art; underwater and nature photographer; former president of the Academy of Underwater Arts and Sciences (AUAS); awards include NOGI Sports & Education (2005); Beneath the Sea Diver of the Year (Science, 2006).

EVANS, Mark, United Kingdom (1973-)
Editor of Sport Diver (UK Edition); member of record-breaking 'Orchid Cancer Trust - Scuba the English Channel' dive team (August 2006).

EXLEY, Sheck, USA (1949-1994)
Pioneer cave and deep diver; deep diving record holder; first to reach 1000 cave dives; did over 4000 cave dives in 29 years; died while attempting to dive below 305 m (1000 ft) in Zacaton Cave, Mexico.

FALCO, Albert, France (1927- 2012)
Longtime captain of Cousteau's flagship *Calypso*; expedition leader; world's first aquanaut with Claude Wesley (*Diogènes*, 1962); first diver to pilot Cousteau's mini-sub the Soucoupe (*Denise*); a.k.a. *Bébert*.

FALLOWS, Chris, South Africa
Photographer; dive operator.

FANE, Douglas, CDR, USA (1909-2002)
Member of U.S. Navy Underwater Demolition Team (WWII and Korea); led to advances of UDT; developed specialized diving equipment and combat techniques; influenced scientific and sport diving.

FARGUES, Maurice, France (1913-1947)
French Navy diver and a member of GERS; saved the lives of Jacques-Yves Cousteau and Frédéric Dumas during an exploratory dive of the Fontaine-de-Vaucluse, an underground spring; becomes the first diver to die using an Aqua-Lung while attempting a depth record in 1947.

FARR, Martyn, United Kingdom (1951-)
Cave explorer and cave instructor trainer; author (including *Diving in Darkness* and *The Darkness Beckons*); expedition leader; photogra-

pher; public speaker; world record for underwater cave penetration (Bahamas, 1982); member of the British Cave Diving Group.

FARRELL, Emma, United Kingdom
Freediving instructor; writer; author of *One Breath, A Reflection on Freediving*; co-wrote the world's first freediving log book; chaired the British Freediving Association for two years; head of Freediving Education for DeeperBlue.net; film writer and director.

FARROW, Ken, UK (1946-2008)
Scientist and chartered engineer; BSAC First Class Diver and National Instructor; writer; underwater photographer; former BSAC Council member and BSAC Vice Chairman (1996-97); NDC Member; NDC Bulletin editor; former Chairman of SCOTFED.

FEIGELMAN, Kenn, Canada
Founder of Deep/Quest 2 Expeditions (1973); cinematographer; biologist and conservationist; public speaker; writer; explored and documented naval battle sites of Lake Champlain; oversaw the creation of four artificial reefs in Ontario; former police diver; Member Explorers Club.

FEINBERG, Walter, USA
Pioneer scuba instructor; treasure hunter and shipwreck explorer; founding member of the Boston Sea Rovers.

FENZY, Maurice, France
Patented first commercially successful buoyancy compensator in 1961.

FERGUSON, Sherri, Canada
Former president of the Canadian Association for Underwater Sciences; DSO at the University of British Columbia; Director of the Environmental Medicine and Physiology Unit at SFU; commercial diver; instructor trainer; board of directors Canadian UHMS.

FERRARO, Luigi, Italy (1914-2006)
Decorated naval officer and commando; pioneer of the Italian diving industry; trained fire fighters to work underwater; designer of diving equipment for Cressi Sub; founded Technisub in 1962; founding member and first vice-president of CMAS.

FERREIRA, Craig, South Africa
Pioneer in white shark conservation, research, filming and diving; lecturer; helped make the white shark a protected species in South Africa in 1991 (White Shark Research Project).

FERRERAS, Francisco 'Pipin,' USA (1962-)
Competitive freediver; record dive to 170 m (558 ft) in 2003.

FINN, Nicola, United Kingdom
One of the first women to hold a senior position in the rebreather industry; Manager at Ambient Pressure Diving.

FISHER, Bill, USA (1969-)
Photographer; film producer; shark conservationist; co-founder and executive director of 333 Productions with Joe Romeiro; public speaker.

FISHER, Jack W., USA (1941-2015)
Engineer; underwater search equipment pioneer; founder and president of JW Fishers Mfg.

FISHER, Mel, USA (1922-1998)
Famed treasure hunter and discoverer of the Spanish galleon Nuestra Señora de Atocha in 1985.

FISHMAN, David, USA
Freelance writer; former publisher of Fathoms Magazine.

FLEETHAM, David, Canada (1958-)
Underwater photographer.

FLETCHER, Mike, Canada
Underwater cinematographer; wreck diver; commercial diver.

FLEUSS, Henry, United Kingdom (1851-1932)
Inventor of a self-contained oxygen rebreather successfully tested at a depth of 5.5 m (18 ft) in 1879.

FONTAINE, Pierre-Henri, Canada
Marine biologist; whale researcher; teacher; author; museum curator.

FORSBERG, Joan, USA
Historian; author; u/w videographer; public speaker; former president of the Underwater Archaeological Society of Chicago; Women Divers Hall of Fame (2010); WDHOF chairman of the Board (2014); co-owner of **Seawolf Communications**.

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FOX, Rodney, Australia (1940-)
White shark expert; filmmaker; expedition leader; white shark attack survivor (1963); International Scuba Diving Hall of Fame (2007).

FOX, Steve, United Kingdom (1958-)
Owner of **Deep Blue Utila**; whale shark conservationist; host of Utila Whale Shark Research; author; former sportsman.

FRAZIER, Dottie, USA (1922-)
First female scuba instructor; first female commercial diver; first female dive shop owner (Penguin); wetsuit designer and manufacturer; founding member of the Long Beach Neptunes; Women Divers Hall of Fame (2000).

FRINK, Stephen, USA (1949-)
Underwater photographer; director of photography for Scuba Diving magazine; founder of WaterHouse Tours and Reservations dive travel company; inventor and patent-holder of a unique diver safety device known as the Safety Observation Signal (SOS); NOGI (2016).

FUNKHOUSER, Lynn, USA
Photographer; author; lecturer; environmentalist; consultant on Philippines diving; WDHOF (2000); Environmental Awareness Award, SeaSpace/PADI (1994); Society of Woman Geographers (2008).

GABR, Ahmed, Egypt (1972-)
Diving instructor; Egyptian special forces officer; set world record for deepest dive on scuba (332.35 m / 1,090 ft) in 2014.

GAFFNEY, John, USA
Founder of NASDS in 1961; NOGI Award (1997); DEMA Hall of Fame (1998).

GAGNAN, Émile, France, Canada (1900-1984)
Co-inventor of the Aqua-Lung with Jacques-Yves Cousteau in 1943; U.S. National Inventors Hall of Fame (March 2010).

GAGNON, Alex, USA
Marine biologist; expert on deepsea corals at the California Institute of Technology.

GALERNE, André, France (1926-2008)
Founder of SOGETRAM; founder of International Underwater Contractors (IUC) Canada (1959) and USA (1962); founded IUC International (1970) and Deep Sea International (1978); multiple awards including NOGI (1988).

GALLAGHER, Tim, USA
Dive Specialist (NOAA Undersea Research Center); aquanaut; mechanical engineer; Director and DSO for the Cambrian Foundation; coordinated several private and federal projects around the world including the USS Monitor Survey.

GALLANT, Jeffrey J., M.Sc., Canada (1966-)
Shark scientist; author; photographer; aquanaut (Romania *LS-1*); President of the Greenland Shark and Elasmobranch Education and Research Group (**GEERG**); founder of the **Shark Observation Network**; editor and publisher of the Diving Almanac and Book of Records; public speaker; shipmaster; Explorers Club Fellow.

GALLO, David, Ph.D., USA
Oceanographer; explorer; mapped the ocean with submersibles and robots; co-expedition leader RMS *Titanic* and *Bismarck* expeditions; public speaker.

GANNON, Pete, USA
Expert on public safety diving; President of Dive Rescue International.

GARCIA, Roger, USA
Marine Specialist (NOAA Undersea Research Center, *Aquarius*); aquanaut; former marine and Navy Diving Medical Technician.

GATACRE, Jim B., USA (1941-)
Pioneer in diving with disabilities; founded The Handicapped Scuba Association (HSA) in 1981; taught the first scuba course for people with disabilities at the University of California Irvine (UCI) in 1975; DEMA Hall of Fame (2015).

GERHARTZ, Michael, Canada (1974-)
Diving entrepreneur; instructor; novelist; author of *Thin Ice*.

GENONI, Gianluca, Italy (1968-)
Competitive freediver.

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GENTILE, Gary, USA (1946-)
Author of more than 40 books; public speaker; photographer; explorer; expert wreck diver (discovered more than 40 shipwrecks).

GIDDINGS, Al, USA (1937-)
Cinematographer; films include *The Deep*, *For Your Eyes Only*, *The Abyss*, *Titanic*; member of the International Scuba Diving Hall of Fame; dove off a boat in an attempt to save a diver caught in the jaws of a 16-foot white shark off the Farallon Islands in 1962; NOGI (Arts, 1972).

GILBERT, Michel, Canada (1955-)
Underwater photographer; author; public speaker; former president of the FQAS; Diver of the Year (Beneath the Sea), Palme d'argent Award (Antibes); chairman of the photo jury at the Antibes World Festival of Underwater Images; Our World Underwater Award (2007).

GILLIAM, Bret, USA (1951-)
Founder of SDI/TDI, DiveSafe Insurance and Ocean Tech; author of over 800 articles and dozens of books; editor of Scuba Times Advanced Diving Journal, former publisher of Fathoms Magazine; underwater photographer and videographer; Merchant Marine Master; submersible pilot; aircraft pilot; recompression chamber supervisor; dive business entrepreneur; public speaker, legal consultant; former deep dive record holder; has logged more than 15,000 dives; awards include Beneath the Sea Diver of the Year.

GILPATRIC, Guy, USA (1896-1950)
Freediving pioneer; developed the use of rubber goggles with glass lenses off the coast of Southern France; he and his group of friends were known as the Serious Sinkers; author of *The Compleat Goggler* in 1938; was said to have influenced the careers of Jacques-Yves Cousteau and Hans Hass.

GLOVER, Penny, UK (1963-2005)
British Sub Aqua Club National Instructor and First Class Diver; leading rebreather instructor, died while diving off the French island of Porquerolles.

GODDIO, Franck, France (1947-)
Marine archaeologist; founder of l'Institut européen d'archéologie sous-marine (IEASM); discovered ancient shipwrecks including Napoleon Bonaparte's flagship *L'Orient*, and Cleopatra's Royal Quarters in Alexandria; President of Franck Goddio Society.

GODSON, Lloyd, Australia (1978-)
Marine biologist; aquanaut; creator of the *BioSUB*, the world's first self-sustaining underwater habitat; lived for 12 days in the *BioSUB* in 2007; multiple underwater habitat record holder; 2007/08 Australian Geographic Adventurer of the Year; leader of Life Amphibious Project.

GOLDING, Peter, Canada
Writer; editor of Vancouver-based **Diver Magazine**.

GOMEZ, Nuno, South Africa (1951-)
Deep diver; former world record holder for the world's deepest dive; dive leader on 2001 coelacanth expedition off Sodwana.

GORDON, Ethan, USA
Writer; underwater photographer; former editor of Fathoms Magazine.

GOTERA, Gustavo G., Spain
Underwater photographer; author.

GRAVER, Dennis, USA
Author; underwater photographer; instructor; former training director for NAUI and PADI; designed the PADI Modular Scuba Course and original dive tables; developed the Pocket Mask aquatic rescue breathing technique; designed the NAUI Dive Time Calculator.

GRAVES, Grant W., USA (1967-)
Instructor trainer; marine biologist; cinematographer; President of Scuba and Film Enterprises, directed multiple television series (Discovery HD/Animal Planet); VP and judge instructor at AIDA International Association for the Development of Apnea; President of USA Apnea Association; contributor to DSAT's Tec Rec Diver programs.

GREEN, Larry, USA
Technical and cave diver; cave explorer; instructor.

GREENBERG, Jerry, USA
Pioneer of underwater photographer; founder of Seahawk Press; member of the International Scuba Diving Hall of Fame (2004).

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GRENIER, Robert, Canada (1938-)
President of UNESCO's International Scientific Committee on Underwater Cultural Heritage; Manager of Parks Canada's Underwater Archaeology section; Officer of the Order of Canada; discovered North America's oldest heritage wreck off the coast of Labrador.

GRIBBEN, Sean, UK
British Sub Aqua (BSAC) National Diving Officer; BSAC National Instructor.

GRIFFITHS, John, USA
President of Ocean Management Systems (OMS).

GROTH, Lawrence, USA (1964-)
President and founder of Shark Diving International; cage diving operator; commercial diver.

GUGEN, Oscar, United Kingdom (1910-)
Co-founder of British Sub-Aqua Club with Peter Small in 1953.

GUINED, Jamie, M.Ed. USA (1977-)
Exercise scientist; founder of the SeaSpace Exploration & Research Society; NASA and Mars One adviser.

GURR, Kevin, United Kingdom
Inventor; manufacturer; author; co-developer of the VR3 mixed gas computer, the Oxytech Oxygen Analyser, the Ouroboros (CCRB) rebreather and ProPlanner Decompression Software; lead first sport diving expedition to HMHS *Britannic* (1997); Diver of the Year (Diver Mag, 1998).

HADFIELD, Chris, Canada (1959-)
Canadian astronaut; led NASA Undersea Mission as commander of the crew of NEEMO 14 in 2010 to test exploration concepts in an undersea environment.

HALDANE, John Scott, UK, (1860-1936)
Established first dive tables in 1907.

HALL, Howard, USA (1949)
Multiple award-winning underwater filmmaker; writer and author.

HALL, Michele, USA (1951)
Multiple award-winning underwater filmmaker; writer and author.

HALLS, Monty, UK (1966-)
TV presenter and broadcaster; marine biologist; explorer and expedition leader; motivational speaker; former Royal Marine; Bish Medal of the Scientific Exploration Society (2003); Honorary Doctor of Science, Plymouth University (2010).

HALLEY, Edmond, UK (1656-1742)
Invented diving bell with renewable air supply.

HAMILTON, Bill, Ph.D., USA (1930-2011)
Underwater physiologist; defined human performance during first saturation exposures to continental shelf depths; developed commercial bounce and saturation decompression tables; worked on development of rebreather decompression procedures and integrated computers; DAN/ROLEX Diver of the Year (2001).

HAMMER, Patrick, USA (1953-)
Founder of Scuba Emporium in Chicago area; President of Our World-Underwater, one of the largest dive shows in the USA; founder and President of the Tim Early Foundation and the Ralph Erickson Educational Foundation.

HAMPTON, Trevor, UK (1912-2002)
Ex-RAF bomber pilot and test pilot who opened the UK's first dive school in Warfleet Creek, Dartmouth, Devon, in 1953. His first 3-day diving course cost only £5 ($8.60 USD).

HANAUER, Eric, USA
Photojournalist specializing in the underwater world; author; dive instructor.

HANDLEMAN, Lad, USA
Co-founder of Oceaneering International with Phil Nuytten.

HANDON, Norma, USA
Pioneer in commercial diving.

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HANNA, Nick, United Kingdom (1956-)
Author of dive publications including *The Art of Diving*.

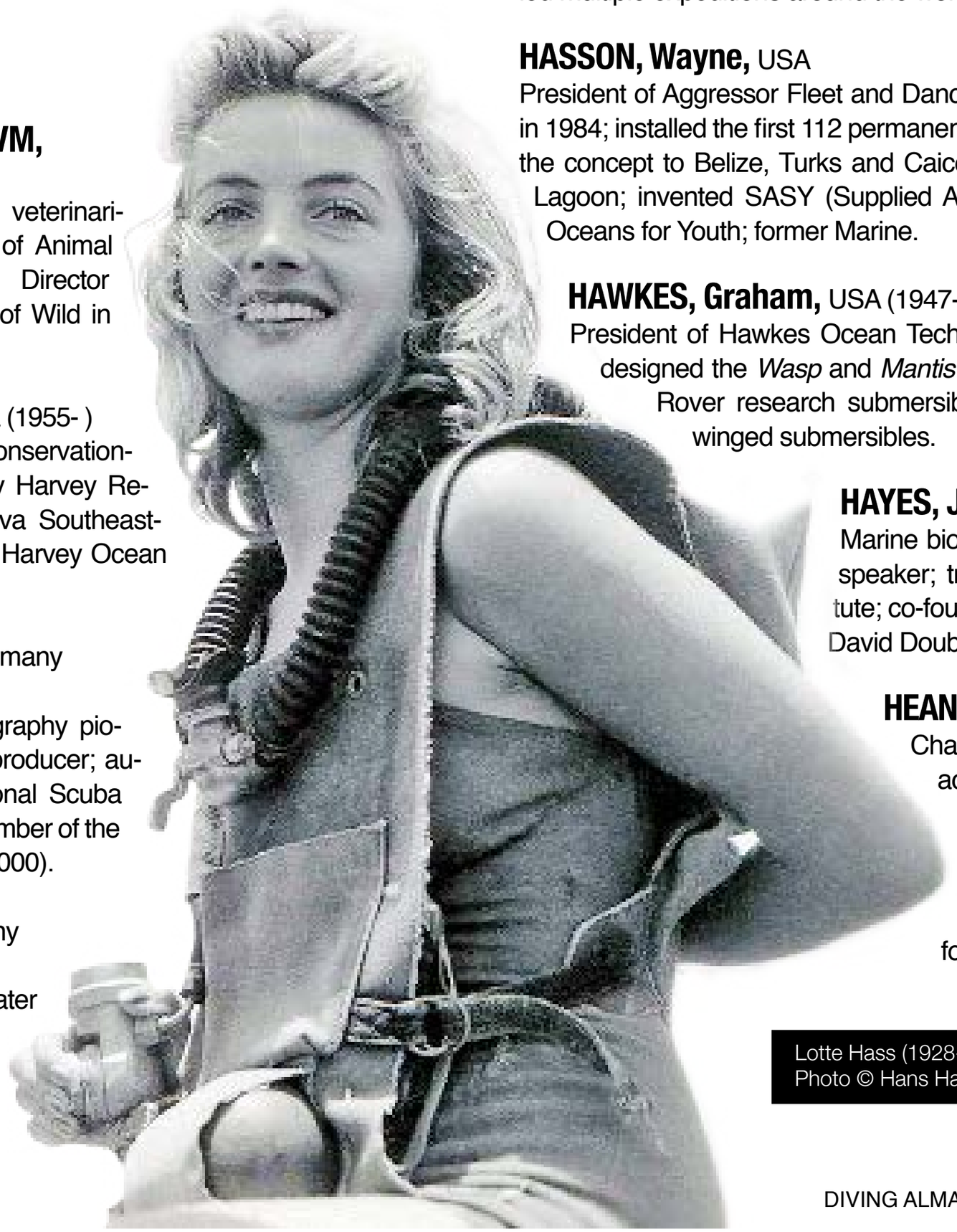
HARDY, Jon, USA
Pioneer instructor, author.

HARVEY-CLARK, Chris, DVM,
Canada (1960-)
Cinematographer; author; veterinarian; marine biologist; Director of Animal Care (Dalhousie University); Director of GEERG; founding Director of Wild in Blue; Explorers Club Fellow.

HARVEY, Guy, Ph.D., Jamaica (1955-)
Wildlife artist; photographer; conservationist; author; founder of the Guy Harvey Research Institute (GHRI) at Nova Southeastern University, and of the Guy Harvey Ocean Foundation.

HASS (BAIERL), Lotte, Germany
(1928-2015)
Diving and underwater photography pioneer; first underwater model; producer; author; member of the International Scuba Diving Hall of Fame (2000); member of the Women Divers Hall of Fame (2000).

HASS, Hans, D.Sc., Germany
(1919-2013)
Scientist; diving and underwater photography pioneer; author first published in 1941 with *Unter Korallen und Haien* (Diving to Adventure); member of the International Scuba Diving Hall of Fame (2000); made his first dive in the Mediterranean Sea in July 1937 where he met American Guy Gilpatric; led multiple expeditions around the world aboard his vessel the Xarifa.



HASSON, Wayne, USA
President of Aggressor Fleet and Dancer Fleet; founder of Aggressor Fleet in 1984; installed the first 112 permanent moorings in the Caymans and took the concept to Belize, Turks and Caicos, the Bay Islands, Kona and Truk Lagoon; invented SASY (Supplied Air Snorkeling for Youth); founder of Oceans for Youth; former Marine.

HAWKES, Graham, USA (1947-)
President of Hawkes Ocean Technologies (HOT), inventor; engineer; designed the *Wasp* and *Mantis* Atmospheric Diving Suits, the Deep Rover research submersibles, and the Deep Flight series of winged submersibles.

HAYES, Jennifer, Ph.D., USA
Marine biologist; photojournalist; author; public speaker; trustee of the Shark Research Institute; co-founder of Undersea Images with David Doubilet.

HEANEY-GRIER, Mehgan, USA (1977-)
Champion freediver; stunt diver; model; actress; conservationist; TV personality; WDHOF (2000).

HEATON, Pauline, Canada
Cinematographer; President and founder of Watervisions.

Lotte Hass (1928-2015)
Photo © Hans Hass Institute

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HEINERTH, Jill, Canada (1965-)
Technical diver and instructor; filmmaker; public speaker; author; expert legal witness (scuba and closed circuit rebreathers); record dive under an iceberg (with Wes Skiles); inaugural member of the Women Divers Hall of Fame; National Speleological Society Fellow; Explorers Club Fellow; Canadian Technical Diver of the Year; Wyland ICON Award (2011); Our World-Underwater Award (2013); Inaugural Sir Christopher Ondaatje Medal for Exploration from the Royal Canadian Geographical Society (2013). Photo courtesy **IntoThePlanet**
DIVING ALMANAC RECORDS #52, #53

HÉBERT, Louis, Canada
Commercial diving instructor at the Quebec Maritime Institute; former Canadian Navy clearance diver.

HEINERTH, Jill, Canada (1965-)
Technical diver and instructor; filmmaker; public speaker; author; expert legal witness (scuba and closed circuit rebreathers); record dive under an iceberg (with Wes Skiles); inaugural member of the Women Divers Hall of Fame; National Speleological Society Fellow; Explorers Club Fellow; Canadian Technical Diver of the Year; Wyland ICON Award (2011); Our World-Underwater Award (2013); Inaugural Sir Christopher Ondaatje Medal for Exploration from the Royal Canadian Geographical Society (2013).

HEINERTH, Paul, USA/Canada
Pioneer in diver education and cave diving; former record holder for deep cave penetration; credited with several cave discoveries; member of the United States Deep Caving Team; writer; public speaker.

HELLER, Jason, USA (1974-)
Underwater photographer; founder of DivePhotoGuide.com (2004); author; public speaker.

HENDRICK, Walt 'Butch', USA
President and founder of Lifeguard Systems; trained many police, fire and rescue dive teams around the world; public speaker; writer; diving entrepreneur; multiple awards include NOGI (2008), DAN/ROLEX Diver of the Year (1989), Boston Sea Rover Lifetime Achievement Award, British Sub-Aqua Club Outstanding Contribution to Diving Safety Award, Beneath the Sea Diver of the Year.

HESS, Neal (NAUI #3), USA (1926-)
Co-founder of NAUI, the first international scuba diving certification agency in 1960.

HIGH, William "Bill", USA
Scientist; commercial diver; aquanaut; spent over 365 days underwater in undersea laboratories and deep submersibles; NOGI (2007); NAUI Lifetime Achievement Award (2004); International Scuba Diving Hall of Fame (2015)

HILDRED, Alex, United Kingdom
Curator of Ordnance for the Mary Rose Trust; author; marine archaeologist; researcher; consultant; university lecturer; member of the Government Advisory Committee on Historic Wreck Sites.

HILLER, Carlos, Costa Rica (1972-)
Painter whose underwater landscapes on oil originate from his own diving experiences; often paints 'live' at shows to come closer to the public.

HIRES, Lamar, USA
President of Dive Rite; former Chairman and Training Chairman of the National Speleological Society Cave Diving; Florida Springs Exploration Award (2000); board of advisors for IANTD; TekDiveUSA Diver of the Conference Award (2014).

HOLLIS, Bob, USA
Founder and CEO of Oceanic (American Underwater Products, 1972) and Hollis Gear (2007); explored and filmed the *Andrea Doria*; pioneer in the development of dive computers; former president of DEMA; International Scuba Diving Hall of Fame (2002); Beneath the Sea Award; DEMA Hall of Fame (2000); NOGI Award (2001).

HOLLIS, Mike, USA
CEO of Oceanic, AERIS, LavaCore & Oceanpro; commercial diver; equipment designer; NOGI Award (2014)

HOLLOWAY, Zena, UK (1973-)
Underwater photographer specializing babies and children; awarded Silver Medal by the Royal Photographic Society in 1998 for Waterbabies; underwater camera assistant (Discovery Channel, BBC).

HORNSBY, Al, USA
Former publisher and editor of Skin Diver Magazine; photographer and writer; PADI executive for 20 years; Vice President, Legal Affairs for

PADI Worldwide; DEMA President; boards of Ocean Futures and the Earth Communications Office.

HOWLAND, Garry, USA
Engineer and dive instructor; sat on NAUI's first board of directors; inventor of long hose octopus for cave diving.

HUGGINS, Carl, USA
Program Manager for the Catalina Hyperbaric Chamber Facility (USC Wrigley Marine Science Center); noted for his work in decompression theory and models (Michigan Sea Grant - HUGI - Tables); participated in the development of the EDGE dive computer; Leonard Greenstone Diving Safety Award (1990); DAN/ROLEX Diver of the Year (1993).

HUGHES, Peter, USA
Founded Peter Hughes Diving (Dancer Fleet) in 1986; President of DivEncounters; Beneath the Sea Award; DEMA Hall of Fame (2011); ISDHF (2015).

HUMANN, Paul, USA, (1937-)
Photographer and writer; author of 14 marine life books, captain/owner of the Caribbean's first liveaboard dive operation, co-founder of REEF (Reef Environmental Education Foundation); multiple awards include NOGI (2009); DEMA Reaching Out Award (2006); member of the International Scuba Diving Hall of Fame (2007).

ICORN, Nick, USA
Instructor; developed training programs and manuals; part of the first formal underwater instructors course; became PADI's first and only Executive Director in 1972, increasing their instructor base from 234 to over 12,000 worldwide; member of the Historical Diving Society; member of the NAUI Hall of Honor, NOGI Award (1974).

INGRAM, Charles, USA
Former Special Forces combat diver; instructor; host of the TV show The Aquanauts.

INGRAM, Tom, USA
Executive Director of DEMA; Wyland ICON Award (2011).

INNOCENTE, Vittorio, Italy (1946-)
Multiple record holder for underwater cycling.

JACKSON, Peter, United Kingdom
Consultant on diving history; member of the Historical Diving Society; writer.

JAMES, William, United Kingdom
Inventor of first practical scuba in 1825; used a belt of compressed air tanks, a complete watertight suit and a copper helmet.

JARRET, Jim, United Kingdom
Located the sunken *Lusitania* wearing the *Iron Man* armored suit in 1935. The subsequent *JIM* suit is named after him.

JEHLE, Charles, USA (1924-2005)
Pioneer in the design and manufacture of buoyancy compensators; co-founder of DEMA; founder of Sea Quest (retired in 1983); served in the U.S. Navy Seabees during World War II.

JENKINS, Jayne, Australia
Underwater photographer; contributor to Scuba Diver Magazine; television researcher; Vice President of The Australasian Our World Underwater Scholarship Society (ROLEX).

JENKINS, Wallace, USA (1935-2007)
Diving pioneer; participated in virtually every aspect of military, scientific, commercial, sport and technical diving; one of the first divers to explore several Florida underwater cave systems; wrote the U.S. Navy Guide to Polar Diving.

JOHNSON, Jim, Canada (1938-2001)
Pioneer of diving in Nova Scotia; underwater photographer and videographer; artist; craftsman; explorer and historian.

JONCHERAY, Anne, France (1969-)
Underwater archaeologist; wreck explorer, specialist in modern wrecks; author.

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JONCHERAY, Jean-Pierre, France
Underwater archaeologist; wreck explorer, specialist in modern wrecks; author.

JONES, José, Ph.D., USA
Professor of marine biology and environmental science; NSF Fellow; former U.S. Army diver; former VP of the Atlantic Skin Diving Council; founder of the Underwater Adventure Seekers (1959); co-founder of the Science & Education Committee of the National Association of Black Scuba Divers (NABS); DAN/ROLEX Diver of the Year Award (2005); Sport Diver Magazine Diver of the Year (2008); International Scuba Diving Hall of Fame (2015).

JONES, Hardy, USA
Dolphin researcher; conservationist; journalist; filmmaker; NOGI (2016).

KAGAN SCHOTT, Becky, USA (1982-)
Underwater videographer; photographer; technical instructor; winner of multiple Emmy Awards; Fellow of the Explorers Club; member of the Women Divers Hall (2013); member of the Karst Underwater Research Team; member of the Phantom Springs Cave Exploration Team; member of The National Academy of Television Arts and Sciences; co-owner of Liquid Productions LLC.

KARKABI, Sami, Lebanon
Pioneer diver; co-founder of Spéléo Club du Liban (1952), one of the oldest caving associations in the Middle East; explored the Jeita Grotto in 1966.

KAYLE, Allan, MD, Ph.D., South Africa
Author of *Safe Diving: A Medical Handbook for Scuba Divers* and *How to Manage Diving Problems*; medical journalist for Divestyle Magazine in South Africa; past President of the Southern African Undersea and Hyperbaric Medical Association.

KAZMERS, Maris, MD, USA
Photographer; owner of SharkSong Photography.

KEERSMAEKERS, Rob, Netherlands
Manager of Duiken Magazine; writer.

KEGELES, Sharon, USA
Assistant-professor and Director of Barry University Sport Management Diving Industry Program (BS); educational and risk management consultant.

KELLER, Hannes,
Switzerland (1934-)
Scientist; tested deep breathing gases with Dr. Albert Buehlmann; emerged from a diving bell at depth of 310 m (1,020 ft) off Catalina Island (California, 1962);



Becky Kagan Schott
Photo © **Liquid Productions**

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advisory board of the Historical Diving Society; publisher of Visipix; artist; NOGI Award (2008).

KELLY, Mike, USA
Co-founder of DEMA.

KHAN, Rosheen, Pakistan (1984-)
First female Pakistani SCUBA instructor in 2009; director of training at the Karachi Scuba Diving Center; graduate of Karachi University; dive guide; has assisted on marine surveys and film projects in the Arabian Sea.

KIERAN, Darcy, Canada (1963-)
Founder of the Business of Diving Institute (BODI), DEMA Board Member; President of Divers Direct; former President of the Quebec Underwater Federation (FQAS); instructor; engineer; public speaker.

KILBRIDE, Herbert "Bert", USA (1914-2008)
Diving pioneer known by many as the Last Pirate of the Caribbean; Receiver of the Wrecks in the British Virgin Islands (1967); founder of Kilbride's Underwater Tours; inventor of the Resort Course for Scuba Diving; built Drake's Anchorage Resort on Virgin Gorda; founded the Saba Rock Pirate's Pub in 1990.

KIM, Seok Chel, Ph.D., South Korea
Leader of the South Korean diving community; chief of the Diving Instructors Training College (Jeju Island) and IDEA Asia.

KIRBY, Bob, USA
Co-developer of commercial diving helmets with Bev Morgan in the 1960s; author.

KLEIN, Jordan, USA (1922-)
Owner/operator of first Miami dive shop; founder of Mako underwater cameras & housings and Mako Air Compressors; film director and cameraman (*Flipper*, *Thunderball*); designer of underwater film props.

KLOSE, Tobias, Germany, Iceland (1972-)
Instructor; entrepreneur; founder and owner of DIVE.IS

KOBEH, Pascal, Lebanon (1960-)
Underwater photographer; writer.

KOHL, Cris, M.Sc., USA (1962-)
Historian; prolific author and underwater photographer; public speaker; Great Lakes wreck expert; former president of the Underwater Archaeological Society of Chicago; The Great Lakes Diving Guide (2008); Our World-Underwater Achievement Award (2013); co-owner of **Seawolf Communications**.

KOHLER, Richie, USA (1962-)
Technical and wreck diver; identified the German submarine *U-869* with John Chatterton (1991); co-host of *Deep Sea Detectives* (History Channel); television producer; subject of numerous TV documentaries and books including *Shadow Divers* and *Titanic's Last Secrets*.

KOZMIK, Jim, Canada **[MOD]**
Photographer and filmmaker; writer; co-founder of Aqua Images; producer of Sport Diver television series; Fellow of the Royal Canadian Geographical Society (2016).

KOZMIK, Lorna Canada **[NEW]**
Photographer and filmmaker; writer; co-founder of Aqua Images

KRACK, Kirk, Canada (1968-)
Professional freediving trainer; President and founder of Performance Freediving; DAN/ROLEX Diver of the Year (2016).

KRISTOFF, Emory, USA (1942-)
National Geographic photographer; explorer; pioneer of deep underwater camera and ROV development; founding member of the Beebe Project (1983).

KULISEK, Gary, Capt., Canada (1954-)
Technical and wreck diving expert; expedition leader and trainer; public speaker; consultant.

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KURN, Werner, USA
President and CEO of Ocean Enterprises; PADI Course Director; former president of DEMA; consultant on the scuba retail industry.

L'HOUR, Michel, France (1954-)
Underwater archaeologist with DRASM (Direction des recherches archéologiques sous-marines).

LABAN, André, France (1928-)
Underwater photographer; filmmaker; world's deepest and most prolific underwater painter; musician; longtime crewmember and diver of the Cousteau Society; chemist; engineer; co-designer and first pilot of Cousteau's Soucoupe submersible. **[WATCH VIDEO]**

LADD, Gary, Canada
Psychologist; former research director of the Abacus Dive Project; former member of the Safety Committee for the Underwater Council of British Columbia; served as consulting psychologist to IANTD Canada and the Canadian Deep Wrecking Crew.



André Laban painting underwater. Photo by Laurent Cadeau (GNU)

LAMB, Andy, Canada
Naturalist and educator; former Chief Collector at the Vancouver Aquarium; former fish culturist with Fisheries and Oceans Canada; writer; co-author of *Coastal Fishes of the Pacific Northwest* (1986) and *Marine Life of the Pacific Northwest* (2005).

LAMAR, Luis, USA
Cameraman; digital imaging technician and photographer specializing in underwater environments, wildlife and natural history.

LAMBERTSEN, Dr. Christian, USA (1917-2011)
Scientist; coined the term SCUBA in 1939 after designing a closed-circuit oxygen rebreather known as the Lambertsen Amphibious Respiratory Unit (LAUR) for the U.S. Navy; Beneath the Sea Lifetime Achievement Award for his many contributions to diving (1999).

LANG, Michael, USA
Founding member and past President of the American Academy of Underwater Sciences; Smithsonian Scientific Diving Officer; DAN/ROLEX Diver of the Year (1991).

LASALLE, Robert, Canada
Underwater photographer; author of aquatic identification guides.

LASSELIN, Nathalie, Canada
Underwater cinematographer and director of photography (Pixnat); cave diver and instructor; public speaker.

LAVANCHY, Jack, Switzerland (1928-2016)
Founder of PADI Europe; pioneer in the development of recreational diving in Europe; former president of Glaukos, the oldest diving club in Switzerland; member of the International Scuba Diving Hall of Fame (2000).

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LAVIGNE, Pierre, Canada (1951-)
Instructor trainer; former president of NAUI Canada (1984) and of the FQAS (2000 to 2006); founder of the Cormoran Dive Club at Royal Military College Saint-Jean (1971); founder of the Old Fort Diving School (1977); co-founder of Aqua Futur with Michel Couture (1986).

LAVOIE, Serge, Canada
Commercial diving instructor at the Quebec Maritime Institute; awarded the Medal of the National Assembly for his work to protect the wreck of the RMS *Empress of Ireland*.

LECH, Jacques A., Canada (1960-)
Underwater photographer; co-discoverer of submerged First Nations artifacts in Québec.

LE GUEN, Francis, France (1956-)
Host of *Carnets de plongée*, a French television series on sport diving; cave diving record holder (1978); founder and editor of Plongeurs International (France) from 1998 to 2001; editor of Plongeur.com.

LE PRIEUR, Yves Paul Gaston, France (1885-1963)
Modified the Rouquayrol-Denayrouse diving apparatus by combining a demand valve and high pressure air tank (1500 psi) thus eliminating all hoses and lines (1933); co-founder of the world's first scuba diving club, Les Sous l'eau, in 1934.

LEANEY, Leslie, USA **[MOD]**
Co-founder and President of the Historical Diving Society USA; founder of Historical Diver Magazine (1993); former diving officer for BSAC Special Branch in Singapore; writer; lecturer; consultant on diving history; director of the Academy of Underwater Arts and Sciences; DEMA Reaching Out Award (2016).

LECOCQ, Pascal, Ph.D., France (1958-)
The Painter of Blue; doctorate in Art (University of Paris); famous for his paintings of divers in surreal situations enveloped in remarkable blue vistas. **[VIEW PAINTINGS]**

LECOCQ, Sam, USA
Inventor of the single hose regulator and first engineer for U.S. Divers.

LEDUC, François, Canada (1961-)
Competitive freediver and official; co-founder and former president of AIDA Canada; AIDA instructor (ApneaCity) and AIDA international judge; shark conservationist; former president of Club d'apnée sportive de Montréal (CASM).

LEE, Clement, Malaysia (1952-)
Pioneer in recreational diving and dive tourism in Borneo and Sipadan; Managing Director and a founding partner of Borneo Divers & Sea Sports (1989); among the first to build a dive resort on Sipadan Island; first ever PADI Course Director in Malaysia; conservationist; numerous awards including DEMA Reaching Out Award (2008).

LEE, Owen, USA
Author of *The Skin Diver's Bible*; crewmember and diver for the Cousteau Society in the 1960s; owner of Las Gatas Beach Club.

LEFERME, Loïc, France (1970-2007)
Competitive freediver; first person to dive to beyond 152.40 m (500 ft) on one breath of air; died while training for a new world record.

LEMASTER, Brett, USA (1964-)
Competitive freediver.

LEONARD, Tristan, Canada
Quebec diving pioneer; longtime editor of La plongée magazine (FQAS); writer; longtime correspondent for DIVER Magazine and l'Escale nautique; CMAS Gold Medal (1985); Canadian Diving Achievement Award (1986); Diver of the Year (Gala Méritas 1992).

LEVER, Mike, Canada
Diving entrepreneur; owner of the *Nautilus Explorer* liveaboard; creator of the Nautilus Lifeline.

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LEVINE, Marie, USA (1945-)
Executive Director of the Shark Research Institute (SRI); former officer of the Natal Sharks Board; re-established the South African Shark Attack File; author of several scientific papers, children's books and magazine articles on sharks.

LEWIS, Steve, Canada
Expert in deep wreck and trimix training; author.

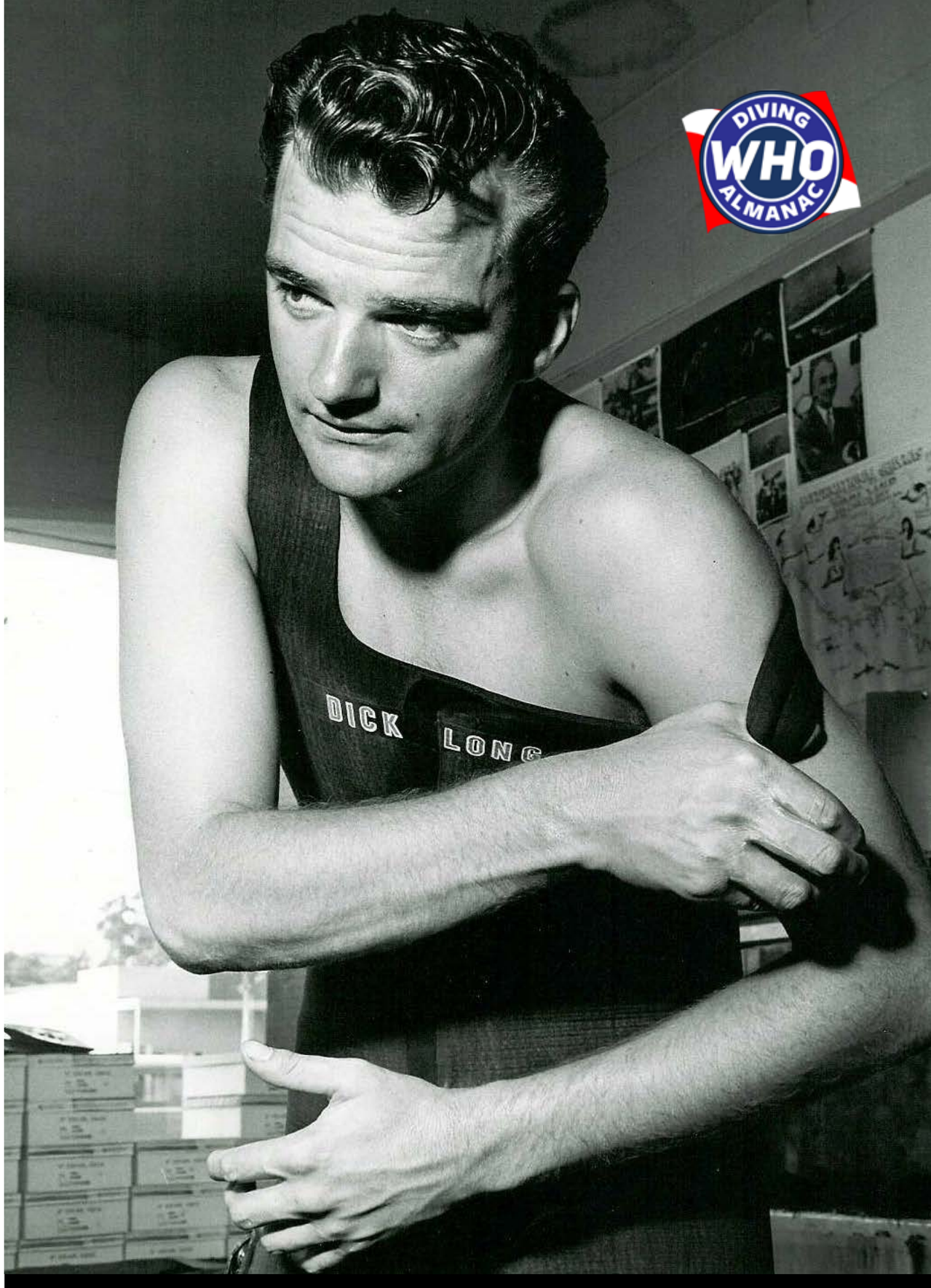
LIDDIARD, John, UK, (1960-)
Photographer and author; Associate of the Royal Photographic Society (ARPS).

LILLIS, Mary Edith 'Mel', USA
Pioneer in spear fishing and skin diving; founder of the Underwater Hunter Safety Corps; founder of the Midwest Diving Council; first female recipient of the NOGI Award (1963); NOGI Awards Director.

LINDEMANN, Klaus, Germany (1939-2001)
Diving environmentalist and strong proponent of Minimum Impact Diving; located and protected wrecks of Truk Lagoon and Palau; writer; author of *Hailstorm over Truk Lagoon*.

LINDHOLM, Peter, MD, Ph.D., Sweden
Scientist with the Swedish Research Defense Agency; researcher in physiology and hyperbaric medicine (Office of Naval Research); former mine clearance diver; competitive freediver; physician for the Swedish national freediving team.

LINK, Edwin, USA (1904-1981)
Engineer; oceanologist; pilot; industrialist; invented flight simulators; led archaeological expeditions in the Mediterranean; designed submersible decompression chambers; designed the first submersible (Deep Diver) with an exit hatch for divers; designed HBOI's *Sea Diver II* submersible which was later renamed RV *Edwin Link* in honour of her builder.



Dick Long. Photo courtesy **DUI**

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LINTON, Steven J., USA
Coined the term Public Safety Diver in the 1970s and founded Dive Rescue International and the International Association of Dive Rescue Specialists; a.k.a. *The Father of Public Safety Diving*.

LIPPMANN, John, Australia (1951-)
Founder and Executive Director and Chairman of DAN Asia-Pacific; author of DAN Emergency Handbook and many other dive safety and first aid books; Editor of Alert Diver Asia-Pacific; awards include the Order of Australia (OAM).

LOHUIS, Holly, USA
Marine biologist; marine educator; field producer and coordinator for Ocean Futures Society.

LONFAT, Michel, Switzerland (1968-)
Underwater photographer; instructor.

LONG, Dick, USA (1937-)
Founder of Diving Unlimited International (DUI); diving instructor (1960, NAUI #49); diving contractor in San Diego (1965-72); developed procedures and equipment for submarine lockouts; equipment designer for *Sea Lab II*; participated in the first dives to over 1,000 ft (305 m); lecturer; multiple awards include NOGI (1991); DAN/ROLEX Diver of the Year (1996); ADCI Commercial Diving Hall of Fame (2006).

LONG, Susan, USA (1964-)
President and CEO of Diving Unlimited International (DUI); Women Divers Hall of Fame (2007); member of CORE (Council on Retail Excellence), DEMA Board of Directors 2005-2007.

LONGLEY, William Harding, USA, Canada (1881-1937)
Ichthyologist; took the first ever underwater autochromes (natural colour photo) of sea life off Florida's Dry Tortugas with Charles Martin for the January 1927 issue of National Geographic Magazine.

LONGMAN, Bruce, USA
Dive industry rep for 31 years (retired); shipwreck research diver; instructor; first PADI Emeritus.

LOW, Stephen, Canada
Widescreen cinematographer specializing in deep sea productions; works include IMAX films *Titanica* and *Volcanoes of the Deep Sea*.

LUNDGREN, Richard Eric, Sweden
Technical diver and instructor; commercial diver; founder of the Baltic Sea Divers and Ocean Discovery diving groups; HMHS *Britannic* project leader (1997, 1999); EUROTEK Diver Award (2012); TekDiveUSA Discover Award (2014).

LUNN, Rosemary E., United Kingdom
Instructor; writer; safety diver; speaker; underwater model; production assistant (History Channel: *Deep Sea Detectives*); member of 'Orchid Cancer Trust Scuba the English Channel' record dive; SITA Board Member (2011); founder of **The Underwater Marketing Company**; co-founder of **EUROTEK**; organiser of Rebreather Forum 3 **TEKDiveUSA**.

MAAS, Dr. Terry, USA
Spearfisher; writer and author; videographer; Fellow of the Explorers Club.

MACFADDEN PARISH, Robin, USA
Biologist; Board of Directors OWUSS; first female OWUSS ROLEX Scholar; Women Divers Hall of Fame (2012).

MACINNIS, Joe, MD, Canada (1937-)
Pioneer in diving medicine; first person to dive at the North Pole (1974); discovered wreck of HMS *Breadalbane*; led the the first manned underwater station in the Arctic Ocean (*Sub-Igloo*, 1972); author; lecturer; dive instructor to Prince Charles, Walter Cronkite and Pierre Elliott Trudeau; founding member of the Beebe Project in 1983; expedition physician for Deepsea Challenge (2012); president of Undersea Research Ltd.

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MACKAY, Greg, USA (1953-2000)
Founded Pro Dive in 1975; DAN/ROLEX Diver of the Year (2000).

MACKEN, Sid, USA
Researcher and speaker on diving history; videographer; member of the Historical Diving Society.

MAÏORCA, Enzo, Italy (1931-)
Competitive freediver; set 13 No-limits records in the 60s and 70s; first man to freedive beyond 50 m (164 ft).

MAÏORCA, Rossana, Italy (1951-2005)
Competitive freediver; daughter or Enzo Maïorca.

MALLENDER, Gary, Canada
British Columbia diving pioneer; diving entrepreneur and equipment manufacturer; founder of Oceaner Sporting Goods.

MAMELONET, Georges, Canada (1954-2015)
Pioneer of diving on the Gaspé Peninsula; former mayor of Percé and Member of the Quebec National Assembly; entrepreneur.

MANGOTICH, Larry, Canada
British Columbia diving pioneer; diving entrepreneur and equipment manufacturer; founder of Oceaner Sporting Goods.

MARDEN, Luis, USA (1913-2003)
Explorer; photographer; writer; filmmaker; pilot; pioneered many underwater colour photography techniques; saw his first coral reef during a dive off Antigua in 1941; discovered the remains of the HMS *Bounty* at Pitcairn Island in the South Pacific in 1957; discovered new species of sea flea parasiting lobsters (*Dolobrotus mardeni*); National Geographic Society resident shipwreck expert.

MARTEL BOURBON, Holly, USA
Scientific diver; curator of fishes and DSO for the National Aquarium (Baltimore); former senior aquarist and DSO at the New England Aquarium; Women Divers Hall of Fame (2007).

MARTIN, Charles, USA
Took the first ever underwater Autochromes (natural colour photo) of sea life off Florida's Dry Tortugas with W.H. Longley for the January 1927 issue of National Geographic Magazine.

MARTIN, R. Aidan, M.Sc., Canada (1965-2007)
Shark scientist; director of ReefQuest Centre for Shark Research; research associate; adjunct professor; prolific author, illustrator; expedition leader; public speaker.

MARTINEZ, Andrew J., USA (1946-)
Photographer; writer and author of natural history field guides; assignment photographer for the National Geographic Society.

MARTINEZ, Eli, USA
Photographer; publisher and editor of Shark Diver Magazine.

MARX, Robert F., USA (1938-)
Pioneer of underwater archaeology; author (800+ scientific articles and 59 books); co-founder of Advisory Council on Underwater Archaeology (1959); discovered a Roman shipwreck off Brazil in 1981.

MATTERA, John, USA
Pioneer deep diver; founded Pirates Cove Dive Center in (Dominican Republic) in 2004; founded Underwater Archaeology & Exploration Corp with John Chatterton to search for new shipwrecks in the Dominican Republic.

MAURO, Danny, Canada
Producer; cinematographer (Sport Diver, Undersea Explorer, Undersea Adventures).

MAYOL, Jacques, France (1927-2001)
Competitive freediver; first freediver to descend to 100 m (330 ft) in

1976; inspiration for Luc Besson's cult film *The Big Blue* (1988); a.k.a. *The Human Dolphin*.

McALLISTER, Jacques, USA (1923-)
Professor of Ocean Engineering (Florida Atlantic U.); geologist; oceanographer; ocean engineer, author; expedition leader.

MCDANIEL, Neil, Canada (1949-)
Writer; photographer; cinematographer (IMAX); Associate Producer of *The Blue Realm*; former Editor of Diver Magazine (Canada); principal of Subsea Enterprises.

MCDONALD, Kendall, United Kingdom
Author; wreck enthusiast; public speaker; scriptwriter and presenter of the first British TV series on diving; former Chairman of the BSAC; BSAC Vice-President; one of the first journalists to dive on the wreck of King Henry VIII's *Mary Rose*; International Scuba Diving Hall of Fame (2004).

MCDONALD, Ron, Canada (1939-)
Pioneer of diving in the St. Lawrence Seaway and the Thousand Islands; discovered several historical shipwrecks; founder of Seaway Valley Divers.

MCKENNEY, Jack, Canada (1938-1988)
Underwater cinematographer; founding member of Freeport Underwater Explorers Society; former editor of Skin Diver Magazine; International Scuba Diving Hall of Fame (2000).

MCNEESE, Doug, USA
President and CEO of Scuba Schools International (SSI); purchased NASDS in 1993 and merged with SSI in 1998.

MEARNS, David, United Kingdom
Explorer; Director of Blue Water Recoveries; lead the search for HMS *Hood* at a depth of 3,000 m (9,845 ft) in the Denmark Strait in 2001.

MEISTRELL, Bill, USA (1928-2006)
Pioneer instructor; commercial diver; inventor; co-founder of Body Glove International with brother Bob; NOGI Award (2007).

MEISTRELL, Bob, USA (1928-2013)
Pioneer instructor; commercial diver; inventor; co-founder of Body Glove International with brother Bill; NOGI Award (2007).

MELIUS, John, USA (1946-)
Expert on using hydrofoils for swimming and diving fins; five patents since 1997.

MELTZOFF, Stanley, USA (1917-2007)
Pioneer underwater painter; writer; first to observe and document sleeping sharks.

MENDUNO, Michael, USA (1952-)
Writer & technologist who coined the term *technical diving* in 1991; founder and editor of aquaCORPS Journal (1990-1996); founded and produced original tek conferences (EuroTek, AsiaTek, Rebreather Forums 1.0 & 2.0); public speaker.

MENEZES, Gilberto, Brazil
Cave diver; 6,400 m (21,000 ft) penetration scooter/DPV dive in Bananeira Cave (2004).

MERCIER, Daniel, France
President of the Antibes World Festival of Underwater Pictures.

MESTRE FERRERAS, Audrey, France (1974-2002)
Competitive freediver married to Francisco 'Pipin' Ferreras; died in the Dominican Republic while attempting a No limits dive to 171 m (561 ft); inducted posthumously into the Women Divers Hall of Fame (2002); subject of Pipin Ferreras book - *The Dive: A Story of Love and Obsession*.

MEUR, Mathieu, France
Underwater photographer; author; instructor.

MEYER, Peter, Canada
British Columbia diving pioneer; instructor; former liveaboard and dive store owner.

MIERAS, Peter, Canada (1962-)
Underwater cinematographer (Subvision Productions) and conservationist; founder and host of the annual Barkley Sound Shark Week and six gill shark research project; owner of Rendezvous Dive Adventures; board member of Wild in Blue; a.k.a. *The Diving Dutchman*.

MIHAÏ, Constantin, Romania
Aquanaut (Romania *LS-1*); European record holder for longest habitat dive (*L.S.-1* Underwater Laboratory, Lake Bicaz, 2004); pioneer of diving in Romania.

MILLER, Sam, USA
Pioneer diver; director of numerous diving clubs; Director of Recreational Diving for the Historical Diving Society.

MILLER, Warren, USA (1954-)
Rebreather and technical diving instructor; underwater photographer; coordinated a four-day rebreather mission under saturation aboard the *Aquarius* habitat (2008); started a dive travel business with wife Karla in 1993; co-founder of Finger Lakes Scuba in 1998.

MILLINGTON, Dr. J. Thomas, USA
Researcher in hyperbaric and diving medicine (DCI); public speaker.

MILNE-EDWARDS, Henri, France (1800-1885)
Biologist; led the first underwater studies of marine life in 1826.

MIRON, Ionel, Ph.D., Romania
Aquanaut (Romania *LS-1*); Director of the SALMO Lacustris Dive Programme (A.I. Cuza University); pioneer of scientific diving in Romania.

MIRON, Liviu, Ph.D., Romania
Aquanaut (Romania *LS-1*); Director of the SALMO Lacustris Dive Programme (A.I. Cuza University); European record holder for longest habitat dive (*LS-1* Underwater Laboratory, Lake Bicaz, 2004).

MOLCHANOVA, Natalia, Russia (1962-2015)
World champion freediver that held 41 records in every competitive discipline except No Limits (NLT); disappeared while teaching a freediving course off the coast of Spain on August 2, 2015.

MOLES, Randall, DDS, USA
Orthodontist, expert in the diagnosis and treatment of jaw (TMJ) dysfunction; author; designed and developed the orthodontic custom moldable SeaCure mouthpiece in 1992.

MONACHON, Jean-Claude, Switzerland (1960-)
Founding member of the Recreational Scuba Training Council Europe (RSTC); former CEO of PADI Europe; helped launch Enriched Air, Discover Scuba Diving and other activities supporting the diving industry; public speaker.

MORGAN, Bev, USA (1932-)
Manufacturer of diving helmets; commercial diver; dive equipment designer and manufacturer; International Scuba Diving Hall of Fame (2011).

MORGAN, Jane, United Kingdom (1965-)
Photographer; writer; member of the British Society of Underwater Photographers; former online editor of Dive Magazine.

MORRIS, Simon, Canada (1958-)
Sculptor; creator of life size bronze memorials and mermaid sculptures for Grand Cayman, BWI, & British Columbia; recipient of the Canadian National Diving Achievement Award.

MOTT, Blair, USA (1971-)
Professional diver and instructor; former chief diver of Ocean Futures Society.

MOUNT, Tom, USA (1939-)
CEO of IANTD; founding member of NACD; former Training Director of YMCA SCUBA Program; writer; underwater photographer; NOGI Award (2001).

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MOUTON, Patrick, France (1947-)
Author specializing in the underwater world.

MUCHANSKI, Eugene, United States (1952-)
President of Dive Industry Association; writer; educator; former chief diving supervisor, U.S. Naval Reserves and submariner.

MULDER, Roy, Canada (1956-)
Underwater cinematographer (UWVIDEO1); conservationist; president of the Marine Life Sanctuaries Society of British Columbia; president of the Canadian Marine Environment Protection Society; former vice-president of the Underwater Council of British Columbia; founding director of Wild in Blue.

MULLER, Capt. Wally, Australia
Pioneer of the live-aboard industry in Australia's Great Barrier Reef and Coral Sea; International Scuba Diving Hall of Fame (2015).

MURAKAMI, Yasukichi, Japan (1880-1944) **[NEW]**
Early scuba equipment developer; obtained patents on valves and apparatuses in 1926; introduced pearl farming to Australia; died of heart disease in an internment camp during WWII.

MURCH, Andy, Canada
Photographer; writer; submersible pilot; owner of Big Fish Expeditions and Elasmodiver.com.

MURDOCH, Frank Nash, USA (1925-1995)
Illustrator; impressionist; underwater painter; took part in a controlled university experiment studying the relationship between LSD and creativity. **[VIEW PAINTINGS]**

MURPHY, Richard C., Ph.D., USA
Marine biologist; photographer; author; longtime chief scientist and expedition researcher for the Cousteau Society; Vice President of Science and Education for Ocean Futures Society.

MURPHY, Larry, USA
Chief of the Submerged Resources Center (SCRU) for the U.S. National Park Service.

MUSTARD, Alexander, Ph.D., U.K. (1975-)
Freelance marine biologist, author and photographer; inventor of **Magic Filters**; digital officer for the British Society of Underwater Photographers; associate and contributing editor for several photography publications; BBC Wildlife Photographer of the Year; GDT European Wildlife Photographer of the Year (2013).

NACHOUM, Amos, Israel (1954-)
Marine and wildlife photographer; writer; author; public speaker; expedition leader for Big Animals Photography Expeditions; co-founded Marine National Park of Israel on the Red Sea.

NADEAU, Bill, Canada
Commercial and technical diver; lead instructor for the Sport Diving Career Development Program; author; photographer; member of the Royal Canadian Mounted Police.

NADLER, Jeff, USA **[NEW]**
PADI executive from 1979 to 2015; founding member of the RSTC; appointed by the US State Department to represent the recreational dive industry at the UNESCO international convention on underwater cultural heritage (2001).

NAWROCKY, Pete, USA
Technical diver; cave diver; instructor; underwater photographer; writer; lecturer; TekDiveUSA Outstanding Contribution to the #Diving Industry award (2014).

NESBIT, John, USA (1954-2005)
Diving entrepreneur; former manager of the PADI Retail Association; DEMA Reaching Out Award (2006).

NICKLIN, Chuck, USA (1927-)
Pioneer underwater cinematographer and photographer; founded the Dive Locker in San Diego in 1959.

NICKLIN, Flip, USA (1948-)
National Geographic photographer; author; freediver; son of Chuck Nicklin.

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NITSCH, Herbert, Austria (1973-)
Competitive freediver; established AIDA No limits record of 214 m (702.1 ft) in 2007.

NIXON, Ted, USA
Introduced American red and white Diver Down flag in 1956.

NOE, Chuck, USA (1959-)
Cave diver; former divemaster on offshore Flower Gardens dive boats; diver on the Woodville Karst Plain Project in Florida and the Yucatan; director of the Gulf Brine Seep Expedition in 2001; director for the Good-enough Springs Exploration Project.

NOHL, Max, USA (NA-1960)
Engineer and designer; dove to 128 m (420 ft) in Lake Michigan in 1937 using a helium-oxygen mixture.

NOIROT, Didier, France (1957-)
Underwater cinematographer; cameraman for the Cousteau Society (1986-1998).

NOLAN, Brad, USA
Publisher of Dive Chronicles Magazine; manager of multiple dive shows.

NORTH, Wheeler J., USA (1922-2002)
Professor of environmental science; pioneer of scientific diving; devised techniques for restoring and farming kelp forests; purchased one of the first 10 Aqua-Lungs sold in the U.S.

NOUVIAN, Claire, France (1974-)
Freelance writer and film director specializing in underwater films; produced Night Underwater; collaborated on the film Microcean.

NUYTTEN, Phil, Ph.D., Canada (1942-) **[MOD]**
Sub-sea engineer; commercial diver; deep-sea explorer; author; carver and native advocate; entrepreneur; opened first dive store in 1958; founded Can-Dive Service (1966); designer of the *Newtsuit*; publisher of **DIVER Magazine**, President of **Nuytco Research**; given the name Tlaxan (Red Snapper) by the Kwakwaka'waka tribe; BTS Diver of the Year (Science); NOGI Award (1997); Order of British Columbia (1992); ROLEX Award for Enterprise (2008); Order of Canada (Officer, 2016).

OOMS, Harry Frank, USA (1955-2007)
Professional diver in the offshore oil industry; consultant (Greenwood Consulting Group); project manager for Shell GOM deepwater projects including Nakika and Mars.

ORR, Dan, USA
Biologist; instructor; author; consultant; president of the Academy of Underwater Arts & Sciences (AUAS); chairman of the Historical Diving Society (USA); former president and CEO of DAN; developed and implemented DAN Oxygen First Aid training; NOGI Award (1996), Wyland Icon Award (2009), Beneath the Sea Diver of the Year, Our World Underwater Award (1997).

OUDON, Olivier, France
Founder of Plongeurs.tv (2011), a.k.a. YouDive.tv, the first French online HD TV network dedicated to scuba diving; founder and former editor of Plongeurs International, a French magazine on scuba diving; author.

PACCALET, Yves, France (1945-)
Author; edited and co-authored several books by Jacques-Yves Cousteau; naturalist; poet; philosopher.

PAINLEVÉ, Jean, France (1902-1989)
Pioneer underwater cinematographer; produced over 200 films; co-founder of the world's first scuba diving club, Les Sous l'eau.

PALMER, Rob, UK (1951-1997)
Cave explorer; technical diving pioneer; author; writer (200+ magazine articles); member of the Explorer's Club and a Fellow of the RGS; British Cave Diving Group instructor, Director of TDI Europe; multiple cave records; Director Blue Holes Foundation; died while diving in the Red Sea.

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PARKER, David, United Kingdom
Inventor; manufacturer; founder of AP Valves; Diver Magazine (UK) Lifetime Achievement Award 2006; father of Martin Parker.

PARKER, Martin, United Kingdom
Inventor; manufacturer; public speaker; developer of the world's first production closed circuit rebreather (Inspiration); member of IANTD Rebreather Advisor Board; member of 2006 History Channel Chatterton & Kohler Britannic Expedition; son of David Parker.

PARKER, Rob, UK (1962-1997)
Cave explorer; rebreather pioneer; founded the Bristol Climbing Centre (1992); cameraman; died while filling in for the late Rob Palmer in a film production.

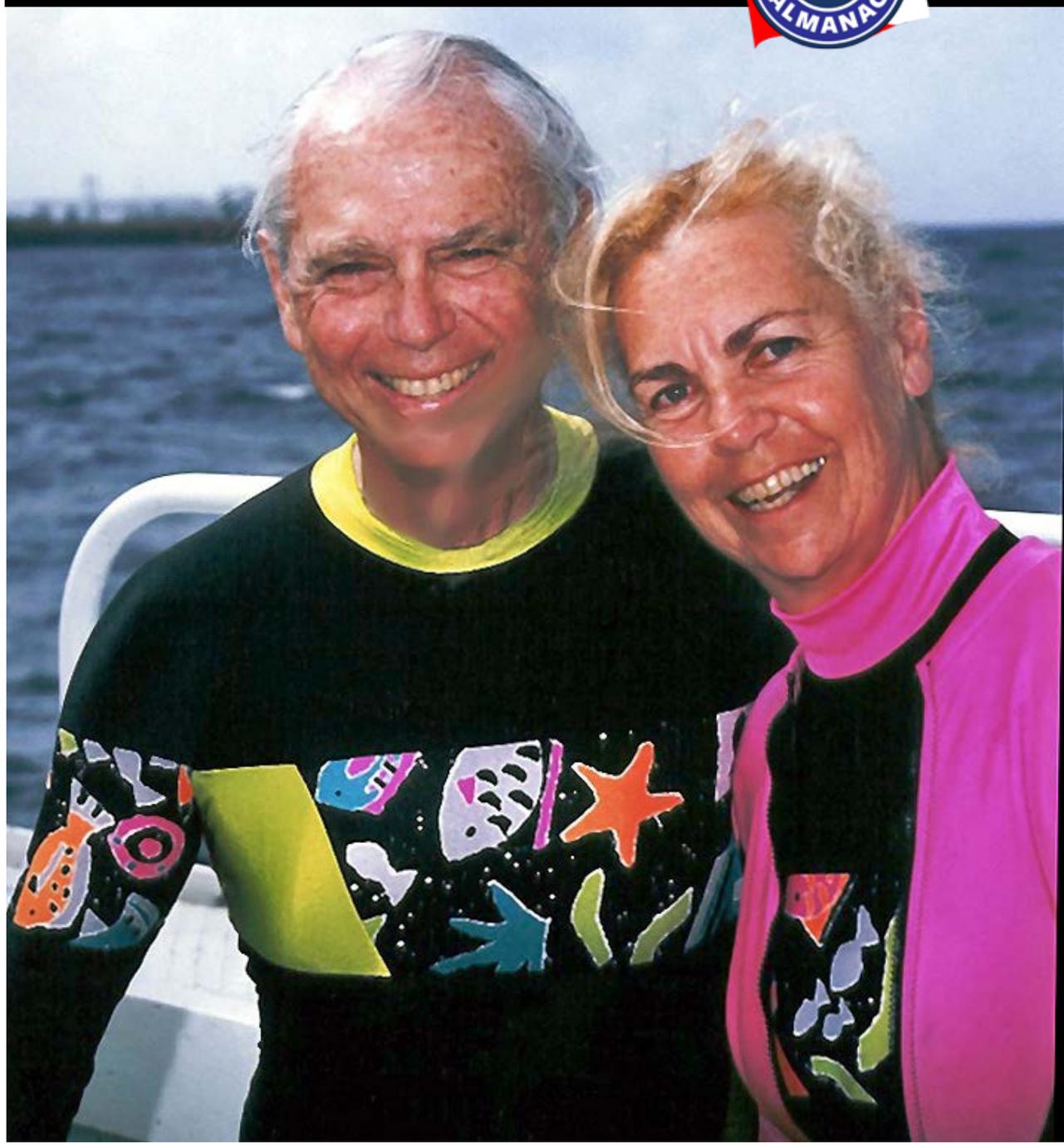
PARKER, Torrance, USA
Pioneer of the commercial diving industry; author; founded Parker Diving Service (1947); author of 20,000 Jobs Under the Sea; member of the Advisory Board of the Historical Diving Society; Commercial Diving Hall of Fame Award (ADCI, 2006).

PARRY, Zale, USA
Underwater actress and stuntwoman (*Sea Hunt*, *Kingdom of the Sea*, *Voyage to the Bottom of the Sea*); first woman to descend below 200 ft (209 ft / 64 m - 1954); dive instructor; member of the International Scuba Diving Hall of Fame; member of the Women Divers Hall of Fame.

PECHTER, Morton, USA (1922-2008)
Business tycoon; photojournalist; co-author of *What's in the Deep: An Underwater Adventure for Children*, the first children's book using underwater photographs; public speaker; Fellow of the Explorers Club; co-founder of the Long Island Science Museum; NOGI Award (2003); Beneath the Sea Diver of the Year (2008); Honorary Deep Sea Diver (U.S. Navy); SSI Platinum Pro 5000; International Scuba Diving Hall of Fame (2014); DEMA Hall of Fame (2014); Beneath the Sea Pioneer (2015).

PECHTER, Alese, USA (1929-)
Photojournalist; author; teacher; co-author of *What's in the Deep: An Underwater Adventure for Children*, the first Children's book using underwater photographs; public speaker; NOGI Award (2003); Beneath

Morton and Alese Pechter
Photo courtesy of **Morton and Alese Pechter**



the Sea Diver of the Year (2008); Honorary Deep Sea Diver (U.S. Navy); SSI Platinum Pro 5000; Fellow of the Explorers Club; co-founder of the Long Island Science Museum; inaugural inductee of the Women Divers Hall of Fame (2000); International Scuba Diving Hall of Fame (2014); DEMA Hall of Fame (2014); Beneath the Sea Pioneer (2015).

PEIRCE, Alec, Canada (1948-)
Owner of Scuba 2000, Canada's largest dive centre; diver since 1958; store owner since 1969; instructor; author; public speaker; former member of PADI IRRA Advisory Council; owns the world's largest collection of *Sea Hunt* and Lloyd Bridges memorabilia and one of the largest collections of vintage scuba gear; International Legends of Diving Award; SSI Platinum Pro 5000 Diver.

PELISSIER, Michael, USA
Co-founder and CEO of **Ocean Technology Systems** (OTS) in 1984.

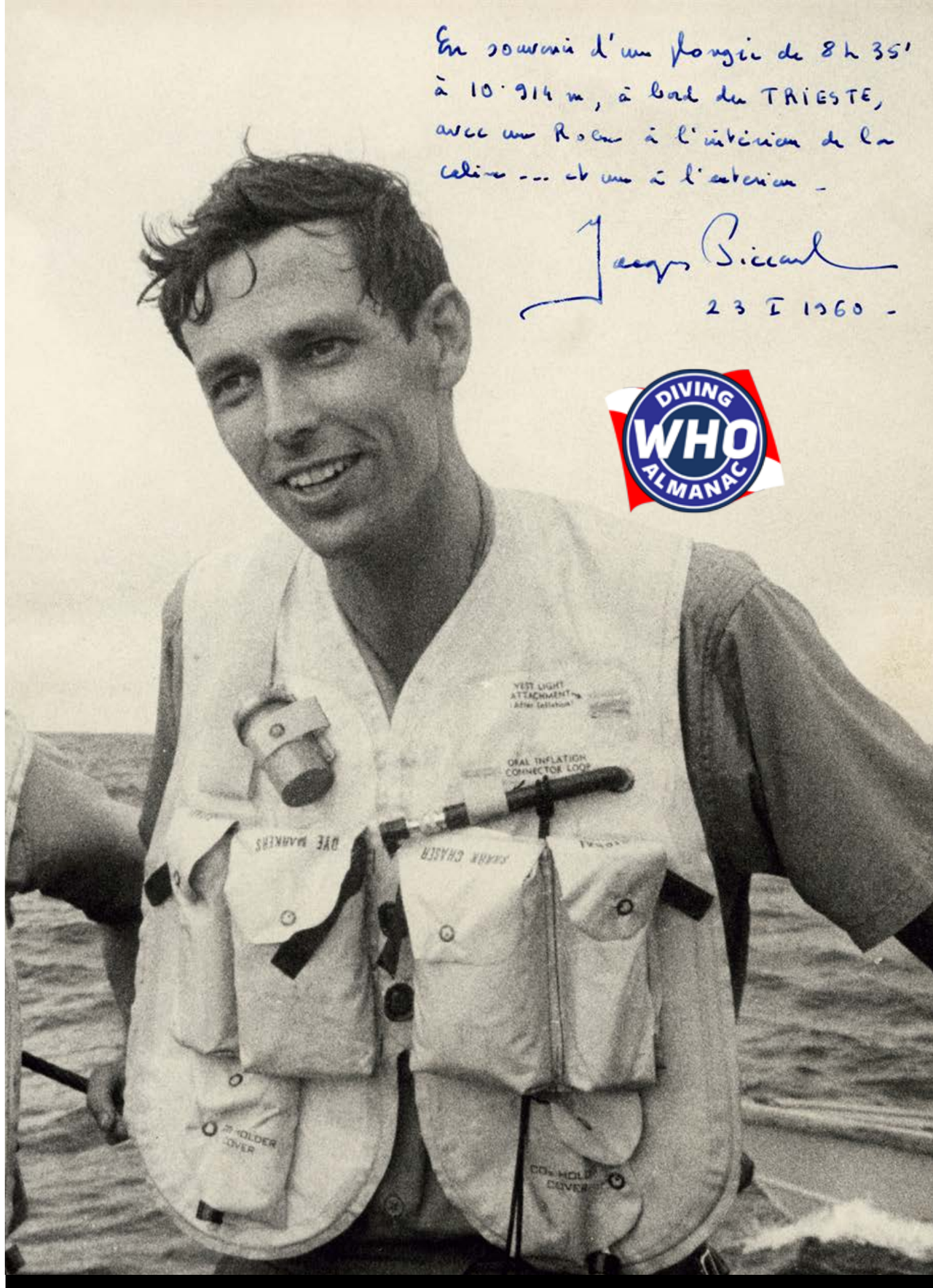
PELIZZARI, Umberto, Italy (1965-)
Competitive freediver; founded Apnea Academy of freediving.

PEMBERTON, Doug, Canada
Underwater photographer; writer; longtime contributor to DIVER Magazine (Vancouver).

PÉRIÉ BARDOUT, Emmanuelle, France (1979-)
Explorer; navigator; co-leader of Under The Pole expeditions; public speaker; author.

PERRINE, Doug, USA (1952-)
Marine wildlife photographer; author; founder of SeaPics; BG Wildlife Photographer of the Year (2004).

PERRY Jr., John H., USA (1917-2006)
Founder of Perry Oceanographics and The Perry Group; built the *Hydrolab* underwater habitat and several submersibles; served on President Johnson's U.S. Commission on Marine Sciences, Engineering and Resources; NOGI (1986).



Jacques Piccard. Media release by **ROLEX**

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PERRYMAN, Derek, Dominica
Owner and operator of Dive Dominica; member of the Dominica Watersports Association.

PETRON, Christian, France (1944-)
Clearance Diver in the French Navy; professional diver (COMEX); founder, producer and chief cameraman of Cinémarine; 70+ films to his credit including *The Big Blue*, *Atlantis*, *Océans*, and a documentary on the RMS *Titanic*.

PICCARD, Dr. Auguste, Switzerland (1884-1962)
Professor of physics; designer of the bathyscaphe *Trieste* with his son Jacques; designed a pressurized aluminum gondola for ballooning; reached record altitude of 15,785 m (51,775 ft) with Paul Kipfer in 1931.

PICCARD, Jacques, Switzerland (1922-2008)
Explorer; engineer; first person - along with Lt. Don Walsh - to have reached the deepest point on the earth's surface, the Challenger Deep (10,916 m - 35,813 ft), in the Mariana Trench on January 23, 1960 aboard the bathyscaphe *Trieste*; built four submarines including the *Auguste Piccard*, the world's first passenger submarine; founder of the Foundation for the Study and Protection of Seas and Lakes.

PIERCE, Richard, Australia
Photographer; artist; writer; biologist; architect.

PILLING, Ian, United Kingdom
Former Sub Aqua Association (SAA) National Diving Officer.

POLLOCK, Neal, W., Ph.D., Canada
Hyperbaric scientist; research director at DAN and research associate in the Center for Hyperbaric Medicine and Environmental Physiology at Duke University Medical Center; board of directors of the American Academy of Underwater Sciences.

PORTER, Joe, USA
Publisher and Editor of Wreck Diving Magazine; writer; public speaker.

POTTS, Wallis 'Wally', USA (1918-2002)
Underwater weapons designer; co-founder of the Bottom Scratchers Dive Club (San Diego) in 1933, the world's first dive club.

POWELL, David, USA (1927-)
Pioneer in diving and aquarium operations; aquarist; director Life Exhibit Development at the Monterey Bay Aquarium until 1997; author of *A Fascination for Fish - Adventures of an Underwater Pioneer*.

POWELL, Mark, United Kingdom
Technical instructor; author; public speaker; member of the British Diving Safety Group; EUROTEK Media Award (2010); TekDiveUSA Media Award (2014).

POZZOLI, Lionel, France
Underwater photographer; organized CMAS underwater photographic world championships.

PREZELIN, Louis, USA, France (1946-)
Longtime crewmember and diver of the Cousteau Society; cameraman; Director of Pacific Visions.

PRINCE ALBERT I OF MONACO, Monaco (1848-1942)
Oceanographer; statesman; humanitarian; founded the Oceanographic Museum of Monaco; led several research expeditions in the Mediterranean Sea and North Atlantic between 1885 and 1915.

PRINCE OF WALES, His Royal Highness, Prince Charles Philip Arthur George, United Kingdom (1948-)
President of the British Sub Aqua Club (BSAC); dove on the wreck of the *Mary Rose* (1975), a Tudor warship sunk off Portsmouth in 1545, making him the first member of the Royal Family to see the ship since Henry VIII watched it sink; dove under ice at Resolute Bay in the Canadian Arctic with Dr. Joseph MacInnis in 1975.

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PRODONOVICH, Jack, USA (1913-2008)
Underwater weapons designer; co-founder of the Bottom Scratchers Dive Club (San Diego) in 1933, the world's first dive club.

QUILICI, Folco, Italy (1930-)
Cinematographer; author; founding member of the Historical Diving Society and of the Marevivo Environmentalist Association; President of the Central Institute for Applied Marine Research, (ICRAM); editor of Mondo Sommerso from 1978 to 1982.

RANETKINS, Val, Canada
Pioneer in the development of underwater camera systems; founder of Amphibico.

RAVETCH, Adam, Canada (1961-)
Wildlife filmmaker specializing in Arctic species including the white bear, walrus and narwhal; marine naturalist; co-owner of Arctic Bear Productions with partner Sarah Robertson; Explorers Club Lowell Thomas Award (2007).

RAWLINS, John, Sir, United Kingdom (1922-2011)
Surgeon Vice Admiral; Director of Health and Research (Navy) 1975-1977; Medical Director General (Navy) 1977-1980; member of SEALAB program; developer of sea escape techniques for pilots of downed aircraft.

REBIKOFF, Dimitri, France (1921-1997)
Oceanographer and underwater surveyor; engineer; pioneer diver; underwater photographer; designed a revolutionary speargun; invented the portable electronic flash in 1947; developed the first underwater electronic flash in 1950, stereoscopy and film cameras; developed the world´s first underwater scooter (*Torpille*, 1952), which later became the world's first ROV, the *Poodle*; International Scuba Diving Hall of Fame (2015).

RECHNITZER, Andreas B., USA (1924-2005)
Directed record dive in the Marianas Trench; developed the first scuba diver training program for ocean scientists with Connie Limbaugh and Jim Stewart; confirmed the discovery of the *Monitor* shipwreck (1974); founding President of the Orange County Marine Institute; author; Presidential Distinguished Citizen Service Award; International Scuba Diving Hall of Fame (2005).

REED, Jeff, United Kingdom
BSAC National Instructor; Deputy National Diving Officer and Technical Chief Examiner (2007-present); Technical Group Leader (2004-2007); technical author; winner of the BSAC Jacques Cousteau/Aqualung Award 2006.

REID, Donnie, Canada
Marine biologist; DSO of Pavilion Lake Research Project; Project Manager for MARSLIFE Project, deep space research using *Nuytco* submersible in Kelly Lake; instructor trainer; writer; photographer.

RHODES, Arthur "Dusty", USA (1925-2013)
Pioneer of recreational diving in Thailand and Southeast Asia; NAUI instructor trainer; NAUI Lifetime Achievement Award (2003).

RICARD, Paul, France (1909-1997)
Founder of the Paul Ricard Oceanographic Institute on the French Mediterranean island of Embiez in 1966; founder of the Société Ricard, makers of the namesake Ricard anis and licorice-based appetizer (1932).

RICHARDS, Mose, USA
Cinematographer; producer; author; longtime crewmember and cameraman for the Cousteau Society.

RICHARDSON, Drew, USA
PADI Worldwide President and Chief Operating Officer; author; DAN/ROLEX Diver of the Year (1992); DEMA Hall of Fame (2004); Intl Scuba Diving Hall of Fame (2008); Wyland ICON Award (2012).

RIEFENSTAHL, Leni, Germany (1902-2003)
Became a diver at the age of 71; released her first underwater docu-

mentary *Impressionen unter Wasser* (Underwater Impressions) on her 100th birthday in 2002.

RIGER, Fred, Bahamas (1957-)
Owner and operator of Grand Bahama Scuba; President of the Grand Bahama Dive Association; instructor trainer; 14,000+ logged dives; avid conservationist; author; lecturer; married to Melinda, instructor; underwater photographer.

RIICHI, Watanabe, Japan
Engineer, developed an underwater breathing device under the name of Ohgushi's Peerles Respirator in 1920; the system which used air cylinders carried on a diver's back was adopted by the Japanese Navy.

RINALDI, Roberto, Italy (1963-)
Photographer; former crewmember and diver of the Cousteau Society.

ROBINSON, Blades, USA
Expert on public safety diving; director of Dive Rescue International.

ROBSON, Martin, United Kingdom (1961-)
Cave explorer; technical and cave instructor trainer; expedition leader; author; public speaker; member of the Training Committee (NSSCDS); member of the IANTD International Board of Advisors; author of *NSS-CDS Rebreather Cave Course Standards*; member of the British Cave Diving Group.

ROCKWELL, Kent, USA
Consultant on diving history; vintage diving equipment restorer; member of the Historical Diving Society; writer; a.k.a. *Rocky*.

ROESSLER, Carl, USA (1933-)
Author; writer; underwater photographer; former president of See & Sea Travel; led the first diving trips to many of today's most famous remote diving sites; member of the International Scuba Diving Hall of Fame (2007); NOGI Award (2008).

ROGERSON, Simon, UK (1970-)
Writer; underwater photographer; editor of SCUBA Magazine, the official journal of the British Sub-Aqua Club.

ROMEIRO, Joe, USA
Filmmaker and photographer; shark conservationist; co-founded 333 Productions with Bill Fisher; public speaker; member of the Explorers Club.

ROSENBERG, Steve, USA
Underwater photographer; co-author of *The Diving Guide*, Galápagos Islands (2004).

ROTMAN, Jeff, USA, (1949-)
Underwater photographer and author; BBC Underwater Wildlife Photographer of the Year (1991).

ROUGERIE, Jacques, France (1945-)
Underwater architect; designed underwater habitations and various see-through vessels; creator of the *Sea Orbiter*, a floating laboratory designed to drift across the ocean propelled by water current and wind (under development).

ROUQUAROL, Benoit, France (1826-1875)
Co-developer of a breathing device with an automatic demand valve and an air reservoir.

ROUSE, Norine, USA (1925-2005)
One of the world's first female diving instructors; active environmentalist involved in sea turtle and reef protection.

ROY, Barb, Canada
Freelance underwater photojournalist; Editor for X-Ray Magazine; co-owner of Orca Oceanic Diving & Photography; Director of the Dive Industry Association of British Columbia.

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RUSSELL, Matthew A., USA
Archaeologist with the National Park Service's Submerged Resources Center; Project Director for USS *Arizona* Preservation Project; Society for Historical Archaeology (SHA) UNESCO Committee; Advisory Council on Underwater Archaeology.

RUTKOWSKI, Dick, USA
President of Hyperbarics International; developed the first nitrox recreational diving program; DEMA Hall of Fame (2012).

SAGALEVITCH, Anatoly, Prof., Russia (1938-)
Oceanologist; Chief Scientist for Russian "Mir" submersibles aboard the research vessel Akademik Mstislav Keldysh; has led expeditions to the RMS *Titanic*, the *Bismarck*, and the crippled Russian submarine *Komsomolets*; Member of the Explorers Club.

SARANO, François, Ph.D., France (1954-)
Oceanographer; longtime scientific adviser to the Cousteau Society; expedition leader; research director of Deep Ocean Odyssey; public speaker; President of Longitude 181 Nature.

SARBONE, Ellen, USA
Photojournalist and editor; co-author of *The Diving Guide, Galápagos Islands* (2004).

SAVIGNAC, Richard, Canada
Marine biologist; Diving Safety Officer (DSO) at the Montreal Biodome.

SAWATZKY, David, M.D., Canada
Physician and expert in diving medicine; medical columnist for DIVER Magazine; awarded Star of Courage for rescuing a trapped diver in a Tobermory cave.

SAWYER, Ty, USA
Photographer; writer; Editorial Director at Ty Sawyer Media; host of *Another Shade of Blue: On Assignment with Ty Sawyer*; Editor-at-Large at Islands Magazine; former editor of Sport Diver Magazine, Skin Diver Magazine and Discover Diving; Fellow of the Explorers Club.

SCALLI, Frank, USA (1931-2004)
Author of first nationally adopted scuba instruction manual (1954); business developer at U.S. Divers for over 30 years; member of the first dive expedition to the sunken Italian luxury liner *Andrea Doria*; founding member of the Boston Sea Rovers; member of the Diving Hall of Fame.

SCARR, Dee, USA
Diving instructor; environmentalist; author; founded Action in Behalf of Coral (2005); founded Touch the Sea (1982); led numerous environmental projects on Bonaire; former columnist for Dive Training Magazine; awards include NOGI (2008) and Women Divers Hall of Fame.

SCHOTT, David, USA (1976-)
Underwater cameraman; 3D camera operator; technical diver; winner of multiple Emmy Awards; Fellow of the Explorers Club; member of the Karst Underwater Research team; member of The National Academy of Television Arts and Sciences; co-owner of Liquid Productions LLC.

SCHWABE, Dr. Stephanie, Ph.D., UK (1957-)
Cave explorer; geologist; biogeochemist specializing in Bahamian caves; discovered new cave systems and bacterial life forms; technical instructor; author; public speaker; founder of the Rob Palmer Blue Holes Foundation; Lila Hadley Luce Award for Courage; Fellow of the Explorers Club.

SCOTT, Lloyd, UK (1961-)
Completed the London Marathon in a diving suit (including hardhat) in five days; Director of Fundraising for the Autism Trust; Order of the British Empire (Member).

SEIFERT, Douglas, USA
Underwater photographer; writer.

SELISKY, Lee, USA
Founder and CEO of Sea Pearls; former president of DEMA; former-chairman of the Historical Diving Society; NOGI (2005); BTS (2009).

SEVERINSEN, Stig Åvall, Ph.D., Denmark (1973-)
World-champion freediver; instructor; author; founder of Breatheology.

SHANKS, Harry, USA
Diving pioneer; established Our World Underwater Scholarship Society and the Academy of Underwater Arts and Sciences (AUAS) which administers the NOGI Award.

SHARKEY, Malena, USA (1978-)
Underwater model; mermaid; SSI Instructor; boat captain; owner of Way Beyond Productions and Chesapeake Bay Diving Center.

SHAW, David, Australia (1954-2005)
Technical diver; multiple deep dive records on CCR; airline pilot; died while attempting to recover the body of another diver at Boesmansgat.

SHECKLER, Dale, USA
Editor of California Diving News; author of several books on diving in California; manager of the Scuba Show (Long Beach, California).

SHERIDAN, Robert, USA
Pioneer diver; President of Universal Diver Training (UDT); diving instructor; public speaker; built the first nitrox regulator for the diving industry while working for Beuchat USA and France (1990).

SHERMAN, Chris, UK (1957-)
Chief Inspector of Diving at UK Health & Safety Executive; former Royal Navy Diving Officer.

SHINE, Jerry, USA
Photographer; writer and author of natural history field guides; public speaker.

SHINOMIYA, Ryuzo, Japan
Competitive freediver.

SHORT, Phil, United Kingdom (1968-)
Technical and cave instructor; training director for IANTD UK; manufacturer consultant; development diver for the Ouroboros rebreather; expedition leader; cave explorer; public speaker; underwater camera assistant.

SHREEVES, Karl, USA
Research diver for the Cambrian Foundation Farb Monitor Expedition (1991); full-time writer and instructional designer for Diving Science and Technology (DSAT); columnist for Sport Diver Magazine.

SIEBE, Auguste, Germany (1788-1872)
Developed a surface-supplied diving helmet and airtight suit.

SIETAS, Tom, Germany (1977-)
Competitive freediver specialising in static apnea.

SIMMONS, Ronald Wayne, USA (1953-2007)
Caver and cave diver; Fellow of the National Speleological Society (1985); inventor of the Simmons Roller; died in a cave diving accident in Florida.

SIMONEAU, Clifford, USA (1959-2005).
Educator; environmentalist; pioneer of the recreational rebreather industry; co-founder of Silent Diving Systems (SDS); officer of the Shark Research Institute (SRI).

SKERRY, Brian, USA
Underwater photographer; contributing photographer for National Geographic Magazine; writer; former editor of Fathoms Magazine.

SKILES, Wes, USA (1957-2010)
Pioneer cave and technical diver; photographer and cinematographer; founder of Karst Productions and Karst Environmental Services; former Training Chairman of the NSSCDS; documented over 75 miles of unexplored passageways in Florida springs; NOGI (2008); died while diving off Boynton Beach Inlet.

SLATE, Spencer, Capt., USA (1947-)
Founded Capt. Slate's Atlantis Dive Center in 1978; founding member and former president of the Keys Association of Dive Operators; co-founder of the Florida Association of Dive Operators; instructor-train-

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er; author; Project Manager for the Spiegel Grove artificial reef project; International Scuba Diving Hall of Fame (2004).

SMALL, Peter, UK (1927-1962)
Co-founder of British Sub-Aqua Club with Oscar Gugen in 1953; died at the surface after a record dive with Hannes Keller at a depth of 311 m (1,020 ft) off Catalina Island (California) in 1962.

SMITH, Brian "Hurricane", Canada
Broadcaster; founder and host of **Planet Earth Diver**, a weekly radio scuba diving program.

SMITH, Gemma, United Kingdom (1990-)
Technical and rebreather instructor; CCR cave diver; first woman to dive on the Antikythera shipwreck; expedition Diver Medical Technician.

SNYDERMAN, Marty, USA (1949-)
Cinematographer; photographer; producer; author and public speaker specializing in the marine environment; DEMA Reaching Out Award (2008).

SOMERS, Lee, Ph.D., USA (1938-2015)
Pioneer in diving safety; Diving Safety Officer at the University of Michigan; instructor; lecturer; author; respectfully known as the *Michigan Mafia* during the 1970s along with his team; DAN/ROLEX Diver of the Year (1997).

SOTIRIOU, Vangelis, Greece
Diving instructor and cave diver; member of the first dive team to explore the underwater cave system of Lake Vouliagmeni (1978); founder of Volcano Diving Center (Santorini).

SOTO, Bob, Cayman Islands (1926-2015)
Pioneer of diving in the Cayman Islands since 1957; commercial diver; opened Cayman's first dive shop in 1957; member of the International Scuba Diving Hall of Fame (2000).

SPENCE, E. Lee, Ph.D., United States (1947-)
Pioneer underwater archaeologist; shipwreck expert; author; discoverer of numerous shipwrecks including the civil war submarine *H.L. Hunley* and the confederate blockade runner CSS *Georgiana*; President of the Sea Research Society; Vice-President of the International Diving Institute; NOGI (Science, 2013).

SPENCER, Carl, UK (1970-2009)
Technical diver; explored wreck of the RMS *Titanic* with James Cameron; key player in multiple television documentaries; led 2003 expedition to the HMHS *Britannic* which exposed how the wreck sank; member of a 2007 expedition on the *Carpathia* (150 m); Fellow Member of the Explorers Club.; died after a dive on the HMHS *Britannic*.

ST LEGER DOWSE, Marguerite, UK
Researcher on medical aspects of women and diving (Diving Diseases Research Centre in Plymouth); author; lecturer; two-time winner of Duke of Edinburgh's Prize; Women Divers Hall of Fame (2000).

STACHURA, Tomek, Poland
Expedition leader; instructor; entrepreneur; founder of drysuit manufacturing company Santi.

STANDING, Jim, United Kingdom (1973-)
Designer; inventor; co-founder of Fourth Element; European Co-ordinator OWUSS ROLEX Scholarship; EUROTEK Outstanding Contribution to the Diving Industry Award (2012).

STANLEY, Karl, USA
Submersible designer and pilot; founder of the Roatan Institute of Deep-sea Exploration (RIDE); has logged over 1900 submersible dives (4000+ hours) since 1998; discovered Lophelia reefs and a population of six gill sharks in the Cayman Trough off Roatan.

STANLEY, Rick, Canada
Owner of Ocean Quest Adventures, Atlantic Canada's largest scuba diving facility and resort; photographer; cinematographer; underwater heritage advocate; documenter of the Bell Island shipwrecks; co-founder of Ocean Net.

STANTON, Rick, United Kingdom (1961-)
Cave explorer; leader of Wakulla 2 cave diving expedition (USDCT);

rescue specialist; public speaker; British cave diving record at Wookey Hole (2005); member of British Cave Diving Group and Central Committee; DOXA Diver of the Conference Award (Eurotek 2008); MBE Award for services to cave diving (2013).

STEARNS, Walt, USA
Underwater photographer; photojournalist; consultant; environmentalist; instructor; SSI Platinum Pro 5000.

STEEL, John, USA (1921-1998)
Diving's first underwater artist; underwater photographer; often illustrated the cover of Skin Diver Magazine.

STÉNUIT, Robert, Belgium (1933-)
Wreck hunter; explorer; experimented with a submersible decompression chamber in 1962; discovered the Spanish Armada warship *Girona* (1967), the *Slotter Hooge* (1974), and treasure trove of rare Ming porcelain on the *Witte Leeuw* (1977).

STEPANEK, Martin, Czech Republic
Competitive freediver.

STEVEN (ROGEST), Ron, Canada (1957-)
Painter (marine dot art); donates art to support environmental causes; public speaker and MC.

STEWART, Don, Capt., Bonaire (1925-2014)
Diving and environmental protection pioneer; founder of Capt. Don's Habitat; member of the International Scuba Diving Hall of Fame (2005); a.k.a. *The Father of Bonaire*.

STEWART, James, USA
Diving pioneer; diving officer emeritus at Scripps Institution of Oceanography; consultant to NASA; developer of underwater training techniques for astronauts; NAUI Hall of Honor.

STEWART, Richard H. IV, USA (1950-)
Publisher and editor-in-chief; photojournalist; television producer; videographer; founded multiple magazines including Sport Diver and Ocean Realm (Wyland OCEAN REALM Journal); founder of OceanFest, EcoMedia, State of the Oceans Summit, World EcoSummit, Save the Manatee, and of the Dive Travel Association; co-founder of the Dive Industry Association and of Survival of the Sea Society; developed first underwater ENG broadcast video system; instructor; SSI Pro 5000.

STOCKERT, Andrea, USA
Divemaster for the film industry; worked on numerous productions including *Simon Birch* and *The Perfect Storm*; one of the few women divemasters in Hollywood; produced a television series on diving for Animal Planet; writer.

STONE, Bill, Ph.D., USA
Inventor; designer of rebreathers, regulators, DPVs, ROVs, submersibles, 3D mapping tools and submersible space probes; published more than 220 articles on far-ranging topics including spacecraft.

STONEMAN, John, M.Sc., Canada (1939-)
Award-winning underwater cinematographer; zoologist; president of Mako Films; producer of The Ocean World.

STOSS, Robert, Germany
Chairman of Scuba Schools International (SSI); former executive with ScubaPro and Johnson Outdoors; purchased Seemann Sub in 1997.

STOVEL, Trisha, Canada (1984-)
Underwater videographer; diving Instructor, dive industry media consultant; Co-Director of **Seaproof.TV**.

STRATTON, Rick, USA
Publisher of Northwest, Midwest and Northeast Dive News; Manager of Dive Travel Expo; former DEMA Board Member; former Navy pilot.

STRAZZERA, Patrice, France (1963-)
Underwater photographer and author on Mediterranean wrecks.

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Philippe Tailliez
Photo by Henry Hermellin (PD)



STREETER, Tanya, Cayman Islands (1973-)
Competitive freediver; record No limits dive to 160 m (525 ft) in 2002.

STRIKE, Paul, United Kingdom (1962 -)
Designer; inventor; co-founder of Fourth Element; EUROTEK Outstanding Contribution to the Diving Industry Award (2012).

STROMBERG, Bill, Sweden (1967-)
Competitive freediver; personal trainer; former president of AIDA International (The International Association for the Development of Apnea).

STRONG, Rocky, Ph.D., USA
Shark biologist; first scientist to extensively study the flight behaviour exhibited by white sharks in South Africa; chief scientist and underwater cinematographer for *Air Jaws*; photographer; television host; Our World- Underwater scholar (1984).

STRYKOWSKI, Joe, USA
Author; writer; photographer; scientific diver; instructor.

STUDLEY, Allan, USA
Photographer and videographer; rebreather (KISS) instructor; former dive center owner.

SULLIVAN, Jeremiah, USA
Marine biologist; inventor of the *Neptunic Sharksuit*, a flexible suit of armor to protect divers from shark bites (a.k.a. chain-mail anti-shark suit); founder of SharkArmor Tech; photographer.

SUMIAN, Dominique, France
Longtime crewmember and diver of the Cousteau Society; chief diver & expedition leader on the *Calypso*; cinematographer; marine commando and frogman in the French Navy; chief diver for the French Oceanographic Service; international sales for Aqua Lung.

SYMES, Peter, Denmark, UK (1961-)
Research scientist; media specialist; founder and publisher of **X-Ray International Dive Magazine** (2003); public speaker;

writer; photographer; co-founder and former editor of the Scandinavian Dive Magazine.

TAILLIEZ, Philippe, France (1905-2002)
Diving pioneer; author; introduced Jacques Y. Cousteau to the sport of goggle fishing in 1936; one of the *Mousquemers* along with Jacques-Yves Cousteau and Frédéric Dumas; first commanding officer of the Groupe d'étude et de recherche sous-marine (GERS) in 1945; first military group to employ the Cousteau-Gagnan Aqua-Lung; a.k.a. *The Father of Diving*.

TALBOT, Bob, USA
Filmmaker; developed specialized aquatic filming techniques using camera rigs, boats, and underwater propulsion vehicles; photographer specializing in whale and dolphin photography.

TATEISHI, Akira, Japan (1930-)
Publisher; underwater photographer; filmmaker; founder of diving magazine Marine Diving; member of the ISDHOF (2004).

TAYLOR, Jason de Caires, UK (1974-)
Sculptor; instructor; naturalist; created the world's first underwater sculpture park in Grenada, West Indies (2006); co-creator of MUSA (Museo Subacuático de Arte / Underwater Art Museum) off Cancun, Mexico.

TAYLOR, Ron, Australia (1934-2012)
Pioneer underwater explorer; filmmaker and photographer; first to film the white shark; first to dive with the white shark without a cage; co-invented the chain-mail shark suit; ocean conservationist; helped get the white shark and the grey nurse shark protected; member of the International Scuba Diving Hall of Fame (2000).

TAYLOR, Valerie, Australia (1936-)
Pioneer underwater explorer; filmmaker and photographer; first to film the white shark; first to dive with the white shark without a cage; co-invented the chain-mail shark suit; ocean conservationist; helped get the white shark and the grey nurse shark protected; member of the International Scuba Diving Hall of Fame (2000); member of the Women Divers Hall of Fame.

TEATHER, Robert G., Canada (1947-2004)
Taught underwater investigation to more than 2,000 public safety divers; author of the Encyclopedia of Underwater Investigation; 28-year veteran of the Royal Canadian Mounted Police; awarded the Cross of Valour for a rescue he performed in 1981; a.k.a. *The Ambassador to Public Safety Diving*.

TELUS, Teresa, UK
Wreck diver and discoverer; public speaker.

THOCTARIDES, Kostas, Greece (1968-)
Commercial diver; former supervisor and chief ROV pilot for the National Center for Marine Research of Greece; former member of the Hellenic Navy Special Forces Underwater Demolition Team; discovered wreck of the submarine HMS *Perseus* (1997); multiple honours for the search and recovery of missing divers and vessels; owner of Planet Blue Underwater Research.

THOMAS, Joe A., USA (1947-2015)
Key Largo dive-boat captain; instructor; conservationist; longtime member of REEF Advanced Assessment Team.

THOMPSON, William, UK (1822-1879)
Naturalist; took the world's first underwater photo in 1856 (exposure time was 10 minutes during which the camera flooded).

TILLMAN, Albert, (NAUI #1), USA (1928-2004)
Co-founder of NAUI and the Los Angeles County instructor program with Bev Morgan; implemented the first instructor certification courses in the world; founded UNEXSO in Freeport, Grand Bahama Island; International Scuba Diving Hall of Fame (2000); NAUI Lifetime Achievement Award (1998).

TOTH, Bonnie, USA
Volunteer extraordinaire with the Women Divers Hall of Fame, the Academy of Underwater Arts and Sciences, the Historical Diving Society, the Ocean Institute and the Santa Barbara Underwater Film Festival; owner of Bonnie Toth Advertising & Design; NOGI (2016).

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William Trubridge
Photo courtesy **Vertical Blue**



TREWAVAS, Louise, United Kingdom
Columnist for Diver Magazine (UK); editor of *Dive Girl*; record holder for deepest extreme underwater ironing.

TRUBRIDGE, William, New Zealand (1980-)
Competitive freediver and instructor; multiple freediving world record holder; first person to freedive below 100 m without fins or any other assistance (101 m / 331.36 ft) in 2010; founder of **Vertical Blue**

TUCKER, Teddy, Bermuda (1925-)
Shipwreck hunter; historian; artist; lecturer; founding member of the Beebe Project (1983); member of the Most Excellent Order of the British Empire Medal.

TZIMOULIS, Paul, USA (1936-2003)
Scuba diving pioneer; renowned underwater photographer; author; longtime publisher of Skin Diver Magazine; former board of advisors of NAUI, PADI and YMCA; former chairman of the Academy of Underwater Arts and Sciences; public speaker.

ULLOA, David, USA (1965-)
Professional diver; television personality; cinematographer; public speaker; video chief of staff for Advanced Diver Magazine and contributing writer for several more publications.

USHIODA, Masa, USA (1969-)
Underwater photographer.

VALENTINE, Mike, United Kingdom
Underwater cinematographer (credits include *Casino Royale* and *Star Wars: Episode 1 - The Phantom Menace)*.

VALLINTINE, Reg, UK (1930-)
Pioneer diver and instructor; historian; author; ran dive schools in Italy & Tunisia (1961-1967); Director General, British Sub Aqua Club (1969-1980); London Underwater Centre (1981-1998); Greenstone Diving Safety Award 1996; co-founder Historical Diving Society 1990.

VAN DREBBEL, Cornelius, Netherlands (1572-1633)
Inventor credited with building the first workable submarine in 1620; Drebbel Lunar Crater named in his honour.

VAN SCHAIK, Verna, South Africa (1970-)
World record holder for deep diving and cave diving.

VANN, Richard, Ph.D., USA (1941-)
Hyperbaric researcher; diving physiologist; Emeritus Assistant Professor at Duke University; former Vice President of Research for DAN; diving engineer at Ocean Systems; US Navy diving officer; Albert R Behnke Award (2012); NOGI (2014); DEMA Hall of Fame (2015);

VASSALLO, Alex, United Kingdom, (1960-)
Inventor; manufacturer; expedition leader; design & development engineer; gas specialist; public speaker; developer of technical diving equipment and accessories; member of the Starfish Enterprise Team.

VASSILOPOULOS, Peter, Canada
Author; photographer; longtime publisher of Diver Magazine (Vancouver).

VERDIER, Cédric, France
Cave and deep diver; author; writer; media consultant; instructor trainer; Regional Manager for DAN Europe.

VIDERS, Hillary, USA
Public speaker, educator and author; co-founder of the Women Divers Hall of Fame; member of the Explorer's Club; member of the American Academy of Underwater Sciences; Fellow of the American Society of Oceanographers; DAN ROLEX Diver of the Year (1999).

VIKTOR, USA (1959-)
Sculptor best known for his granite ocean art and busts of famous divers.

VOLK, Willy, (1973-)
Scuba diving blogger known for his quality reporting and sense of humour; founder of Divester.

WADSLEY, Jim, USA
Treasure hunter and salvager; discovered and participated in the salvage of the Brother Jonathan, California's only known treasure wreck.

WALLINGFORD, Peter, USA
President of Buoyancy Training Systems, Inc.; creator of the Diamond Reef Training and Evaluation System.

WALSH, Don, Ph.D., USA (1931-)
Dove to the deepest point of the ocean (Challenger Deep - 10,916 m - 35,813 ft) with Swiss undersea explorer Jacques Piccard aboard the bathyscaphe *Trieste* in 1960; former Dean of Marine Programs and Professor of Ocean Engineering at the University of Southern California; author; public speaker; Honorary Life Member of the Explorers Club; and the Adventurers Club; Fellow of the Royal Geographic Society.

WATERMAN, Stan, USA (1923-)
Pioneer underwater filmmaker and photographer; owned and operated a dive charter business in the Bahamas (1954-1958); co-producer and cameraman for *Blue Water, White Death* (1971), the first cinematic filming of the white shark; winner of five Emmys; won the first Father and Son Emmy for *Dancing With Stingrays*; writer; public speaker; former President of the Shark Research Institute (SRI); author of *Sea Salt* (2005) and *Sea Salt II: More Salt* (2015); subject of Discovery Channel special *The Man Who Loves Sharks*; member of the International Scuba Diving Hall of Fame (2000).

WATSON, Jim, United Kingdom
British Sub Aqua (BSAC) Safety & Development Manager; BSAC National Instructor.

WATSON, Neal, USA
Pioneer of dive resort franchising; President of the Bahamas Diving Association; commercial diver; dive instructor; treasure salver; underwater stuntman; holds the Guinness World Record for underwater distance on scuba (66 miles without surfacing); held the Guinness World Record for compressed-air diving depth (437 ft / 133 m) from 1968 to 1999; a.k.a. The Dive God.

WATT, James, USA (1951-2007)
Wildlife photographer; writer.

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WATTS, Hal, USA (1935-)
Founder of the Professional Scuba Association (PSA), originally known as the Florida State Skin Diving Schools in 1962; world air depth record at 390 ft (119 m) in 1967; world cave diving record at 415 ft (127 m) on air (2001); published the first manual for extended range deep diving for instructors in 1970; formed a specialty diving club known as the Forty Fathom Scubapros; a.k.a. *Mr. Scuba*.

WATTS, Scarlett, USA (1975-)
World record holder for deepest dive on air (women) in 1999 (425 ft / 130 m); member of the Women Divers Hall of Fame (2001).

WEINMAN, Steve, United Kingdom
Editor of Diver Magazine (UK); writer.

WERZ, Bruno, Ph.D., South Africa
Underwater archaeologist with the Southern African Institute of Maritime Archaeology; discovered oldest human artifact ever found underwater in 2005.

WESLEY, Claude, France (1930-)
Longtime crewmember and diver of the Cousteau Society; chief diver aboard the *Calypso*; world's first aquanaut with Albert Falco aboard the undersea habitat *Diogènes* in 1962 (Conshelf I); Conshelf II aquanaut; public speaker; co-author of *Les hommes de Cousteau* (1997).

WESTMORLAND, Stuart, USA (1958-2016) **[NEW]**
Stock photographer (marine mammals and natural history); 200+ magazine covers; photography travel tour leader; instructor.

WHELAN, Stephan, UK (1978-)
Founder, publisher and CEO of Deeper Blue, an online magazine on scuba diving and freediving.

WHITE, Daniel, Canada (1959-)
Widescreen cinematographer specializing in deep sea exploration.

WHITE, Frank, Canada
Founded Whites Manufacturing in 1956, the first wet suit manufacturing company in Canada, and first drysuit manufacturing company in North America; founder of Frank Whites Dive Stores.

WHITE, Ralph B., USA (1941-2008)
Explorer; underwater cinematographer; photographer; deep submersible cameraman (made several descents to the wreck of the RMS *Titanic*); Fellow of the Explorers Club.

WILLIAMS, James, B., Cdr., USA (1925-2001)
Instructor trainer; founder of the PADI International College; Navy diver and SEAL.

WILLOUGHBY, Jim, Canada
Underwater cinematographer; writer; public speaker; inaugural Ocean Pioneer Award (1996).

WINRAM, William, Canada (1961-)
Competitive freediver and world record holder; co-founder of AIDA Canada; first freediver to swim through the Arch in the Dahab Blue Hole (Egypt) without fins and on a single breath of air; shark conservationist; ocean ambassador of the IUCN Global Marine and Polar Programme (2013).

WISEMAN, James, USA
Underwater photographer; administrator of Wetpixel.

WOOD, James B., Ph.D., USA
Associate Director and Director of Education at the Waikiki Aquarium; former Director of Education at the Aquarium of the Pacific, author, webmaster and underwater photographer; pioneer in online marine science databases (Census of Marine Life, The Cephalopod Page, MarineBio.org); first person to raise a deep-sea octopus in captivity.

WU, Norbert, USA (1961-)
Photographer and filmmaker; writer and author; awards include the Pew Marine Conservation Fellowship, and the Antarctica Service Medal of the USA for his contributions to exploration and science in the U.S. Antarctic Program.

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WYLAND, USA (1956-)
Painter; sculptor; photographer; writer; advocate for marine resource conservation; founded the Wyland Foundation in 1993; has painted 100 life size marine life murals all over the world.

ZIGAHN, Armand "Zig," USA
Founder and Executive Director of Beneath The Sea; founded The Scuba Sport Rites Club (1975); co-founded Ocean Pals with his wife Joann; co-founded the Women Divers Hall of Fame; auxiliary Board Member of The Academy of Underwater Arts and Sciences; a.k.a. Zig.

ZISSOU, Steve, USA (1950-)
Fictional character from the film *The Life Aquatic* (2004); a.k.a. *Stevesy*.





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HALLS OF FAME & AWARDS

NOGI Award
- Arts, Science, Sports & Education, Distinguished Service, Environment
- Wyland Icon Award

International Scuba Diving Hall of Fame
- Ministry of Tourism Award

Women Divers Hall of Fame

DEMA Hall of Fame

Beneath the Sea Hall of Fame
- Legends of the Sea
- Dive Pioneers
- Diver of the Year

DAN / Rolex Diver of the Year

Our World-Underwater Award

NAUI Lifetime Achievement Award

BSAC Heinke Trophy

EUROTEK Awards
- Diver Award
- Discover Award
- Media Award
- Innovation Award
- Outstanding Contribution to the Diving Industry Award
- Lifetime Achievement Award

Historical Diving Society
- Hans Hass Diving to Adventure Award
- Leonard Greenstone Award
- Nick Icorn Diving Heritage Award

National Speleological Society
- Sheck Exley Award

Commercial Diving Hall of Fame
- John B. Galletti Memorial Award
- Tom Devine Memorial Award

ADEX Ambassadors Asia Dive Expo
- Ocean Ambassador
- Coral Reef Ambassador
- Ambassador of Photography

SSI Platinum Pro 5000

Our World-Underwater Scholarship Society
- North America, Europe

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WHO'S WHO INDEX

"And you may ask yourself, well … how did we get here?"

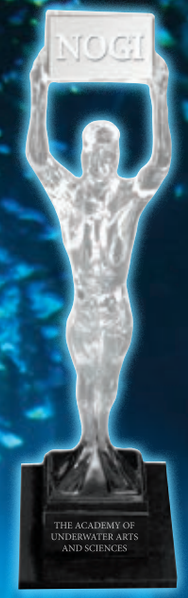


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http://www.planet-urth.com/mshandesign-home.htm

ACADEMY OF UNDERWATER ARTS & SCIENCES

2016 NOGI Recipients



The AUAS is an international, multi-disciplinary, non-profit organization dedicated to recognizing pioneers and leaders who have had a global impact on the exploration, enjoyment, safety, and preservation of the underwater world. AUAS is committed to supporting its members as they pass on the stewardship of the sea to future generations.



Stephen Frink
NOGI, Arts

Stephen Frink is among the world's most frequently published UW photographers, with a career spanning nearly four decades. He arrived in Key Largo in 1978 to open a small studio dedicated to UW photo services, primarily renting cameras and processing E-6 slide film, but he soon began to receive assignments to photograph and write articles for the consumer dive publications of the day. He worked as a photojournalist for Skin Diver magazine for 17-years, covering much of the Caribbean, Bahamas, and Florida Keys for the publication. Subsequently he worked as the Director of Photography for Scuba Diving magazine. Most recently, and for the past six years, Stephen has been the publisher of Alert Diver Magazine, a beautiful coffee-table collectible magazine for the members of the Divers Alert Network.

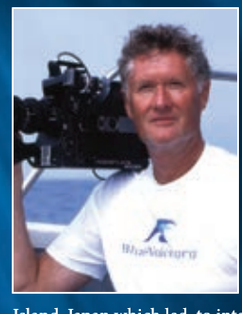


Mike Cochran
NOGI, Science

Mike Cochran is the CEO of Cochran Consulting, Inc. He has been a prolific and ingenious inventor, designer, and developer of dive computers and many other products during his career.

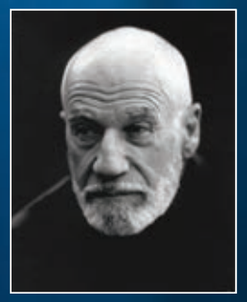
Mike started his work in the decompression field working with NASA at their Weightless Environmental Training Facility. Later, he worked closely with Capt. Ed Thalmann of the US Navy for over a year to understand, convert, and test his decompression algorithm and use it in a Cochran Dive Computer. Subsequently working with the Navy Experimental Diving Unit and the Navy SEAL community, his dive computer was used in the first open-water decompression computer-based dive in U.S. military history.

Mike has 57 US patents. Among his many awards are an appointment as an Admiral in the Texas Navy (by Gov. Rick Perry) and recognition as "Texas Instrument's Most Prolific Inventor" (by James Fischer, VP TI). He is a private pilot and an advanced scuba diver.



Hardy Jones
NOGI, Environment

Hardy Jones has spent more than thirty years investigating and working to save dolphins. He began unique research on dolphins in the Bahamas in 1978 that led too unique insight into the lives of dolphins in the wild. He has met dolphins face-to-face in locations from the Bahamas to French Polynesia to the fjords of Norway. In 1979 he broke the story of the slaughter of dolphins at Iki Island, Japan which led to international outrage and helped shut down the killing of dolphins in several villages in Japan. Since then Hardy has worked at Futo and Taiji to stop the last vestiges of slaughter on Japan's main island. Hardy has covered the increasing levels of toxic chemicals in the oceans and their connection to disease in dolphins and human beings. Most recently he documented the mass mortality of hundreds of dolphins the slaughter of dolphins for shark bait in Peru. Hardy is a former journalist with CBS News. He attended Tulane University and studied law at Columbia University under a CBS Foundation Fellowship. He served in the Peace Corps in Peru.



Bob Croft
NOGI, Sports & Education

Bob began diving in the mid 50's in the Florida Keys. The only SCUBA training available came from watching Lloyd Bridges "Sea Hunt" series on early TV. His first formal training came in in a navy SCUBA school in 1962. From there Bob moved to the "Escape Training Tank" at the Submarine School in Groton/New London Conn. It was there that Bob taught Submarine Escape and Navy SCUBA. During six years there Bob became an almost full time RESEARCH SUBJECT! He was physically instrumental in numerous research efforts that directly impacted the Navy and civilian diving world! Most notable was the discovery that, contrary to the NAVY DIVING MANUAL, the "human" diving mammal could breath hold dive safely beyond 300 feet. During a succession of chamber and open sea breath hold dives the theory of free diving man and free diving mammal was comparable! During his six years as a research subject Bob set 3 world records proving that a freediving mammal named man is more at home in the sea than was ever believed!In addition to training sub escape and navy scuba, Bob went on to become SCUBA certified by NAUI & PADI and then as an instructor for both. This was followed by working to train SCUBA instructors for both certifing agencies. He retired from the US Navy in 1974 after 23 years and retired from civilian employment in 2000.Bob resides in Pennsylvania with Edna, his wife of 60 years.



Bonnie Toth
NOGI, Distinguished Service

As a tireless and unpaid volunteer, Bonnie Toth has donated countless hours, working behind the scenes to promote, grow, and raise awareness for several non-profit diving and ocean related organizations: the Women Divers Hall of Fame, the Academy of Underwater Arts and Sciences, the Historical Diving Society, the Ocean Institute and the Santa Barbara Underwater Film Festival.

As creative director and owner of Bonnie Toth Advertising & Design in San Clemente, CA, Bonnie brings more than 35 years of expertise in creating brand image through graphic design, advertising and promotion. She has helped shape the visual identities of numerous diving industry giants.

For the past 10 years, it is Bonnie who has designed and produced the beautiful, stunning NOGI invitations and programs as well as the AUAS Zale Parry Scholarship certificates, all as an unpaid volunteer. She is the woman working behind the scenes making things happen! It is her love of the oceans and her genuine concern for the future of our water planet that motivates her passion and drive. Always eager to volunteer, Bonnie is a true leader in the diving industry.

NOGI AWARD

The Academy of Underwater Arts & Sciences (AUAS) is one of the oldest and most prestigious organizations in the diving community worldwide and the NOGI is the oldest and most prestigious award in the diving industry.

The **Academy of Underwater Arts and Sciences** is dedicated to recognizing the pioneers and leaders who have made a global impact on the exploration, enjoyment, and preservation of the underwater world and to passing the stewardship of the sea on to future generations.

The NOGI New Orleans Grand Isle Award is the oldest award and most prestigious award in the diving industry, dating back to 1960. The NOGI Award was originally created by Jay Albanese and Louis Cuccia as sanctioned by the Underwater Society of America (USOA). Each NOGI is a 24-inch high statuette which resembles the Hollywood Oscar statuette, thus earning the title, “the Academy Award of Diving.”

ARTS NOGI: Filmmakers, painters, photographers, sculptors and other artists who bring the majesty of the underwater world to people everywhere.

SCIENCE NOGI: Explorers, inventors, doctors and scientists whose work helps us understand, enjoy and protect our precious underwater realm.

SPORTS/EDUCATION NOGI: Outstanding athletes and teachers who make diving a safe, enjoyable and accessible activity for all who love the ocean.

DISTINGUISHED SERVICE NOGI: World-renowned as well as quiet achievers whose contributions keep the wheels of the diving industry and the global diving community turning.

ENVIRONMENT NOGI: People who, beyond their normal paid job, advocated, studied, lobbied, or otherwise helped far beyond anyone else to protect the oceans and the life within. The Environment NOGI was inaugurated in 2012.

2016
FRINK, Stephen (Arts)
TOTH, Bonnie (Distinguished Service)
COCHRAN, Mike (Science)
CROFT, Bob (Sports/Education)
JONES, Hardy (Environment)

2015
CUSSLER, Clive (Arts)
FOX, Rodney (Distinguished Service)
LUTZ, Dr. Richard (Science)
KIRBY, Bob (Sports/Education)
STONE, Dr. Gregory (Environment)

2014
ELLIS, Richard (Arts)
HANDELMAN, Lad (Distinguished Service)
MACDONALD, Bill (Environment)
VANN, Richard (Science)
HOLLIS, Mike (Sports/Education)

2013-2012
AW, Michael (Arts)
GILLIAM, Bret (Sports and Education)
PARKER, Dave (Distinguished Service)
RAY, G. Carleton, PhD (Environment)
SPENCE, E. Lee, M.H.D. (Science)

2011
CALOYIANIS, Nick (Arts)
DEGRUY, Mike (Distinguished Service)
LOBEL, Phillip, PhD (Science)
STETSON, Ed (Sports and Education)

2010
HALL, Michele (Arts)
HAUSER, Hillary (Distinguished Service)
HUMANN, Paul (Sports and Education)
LANG, Michael A. (Science)

PREVIOUS NOGI AWARDEES
ALBANESE, Joseph D. Jr. (DS, 1963) (D)
ANDERSON, Richard (Arts, 1970)
ASTURIAS, Oscar (DS, 1970)
AUERBACH, Dr. Paul (Science, 2007)
AUXIER, Jim (Arts, 1960) (D)
BACHRACH, Arthur J., Ph.D. (Science, 1973)
BALLARD, Robert D., Ph.D. (Science, 1975)
BARADA, Bill (Arts, 1967) (D)
BASS, George, Ph.D. (Science, 1974)
BEHNKE, Albert, M.D. (Science, 1969) (D)
BENCHLEY, Peter (Art, 2004)
BENJAMIN, George, Ph.D. (DS, 1978) (D)
BENNETT, Peter B., Ph.D. (Science, 1980)
BERGMAN, Dewey (S & E, 1977) (D)
BIRKELAND, Dr. Charles (Science, 2008)
BLAKESLEE, Chuck (Arts, 1960)
BOND, Capt. George (Science, 1964) (D)
BONIN, Dick (DS, 1982)
BOREN, Lamar (Arts, 1974) (D)

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BOVE, Alfred, M.D., Ph.D. (Science, 1994)
BRIDGES, Lloyd (S & E, 1982) (D)
BROOKS, Ernest H., II (Arts, 1975)
BROWN, Jim (S & E, 1979) (D)
BROWNING, Ricou (Arts, 1996)
BUSH ROMERO, Pablo (DS, 1965) (D)
CAHILL, Jim (Science, 2003)
CAMERON, James (Arts, 1999)
CARDONE, Bonnie (Arts, 2009)
CARGILE, Edward C. (S & E, 2002)
CARPENTER, Scott (DS, 1995)
CHRISTIANSEN, Jim (Science, 1961) (D)
CHURCH, Cathy (Arts, 1985)
CHURCH, Jim (Arts, 1985) (D)
CHURCH, Ron (Arts, 1973) (D)
CLARK, Eugenie, Ph.D. (Arts, 1965 / Sci. 1987)
CLARK, Robert (S & E, 1997)
COOK, Roger W. (Science, 1979)
COOPER, Richard A., Ph.D. (Science, 1982)
COUSTEAU, Capt. Jacques-Y. (DS, 1966) (D)
COUSTEAU, Jean-Michel (Science, 1993)
COUSTEAU, Philippe Pierre (Arts, 1977) (D)
CRAIG, Lt. Col. John D. (Arts, 1997) (D)
CRONIN, John (DS, 1985/S & E, 2001) (D)
CROSS, Ellis E.R. (S & E, 1975/ DS, 1992) (D)
CUCCIA, Louis R. (DS, 1967)
CURTSINGER, Bill (Arts, 2007)
DALLA VALLE, Gustav (S & E, 1962) (D)
DAVIS, C. B. “Ben” (DS, 1961)
DAVIS, Helen Turcotte (S & E, 1983)
DAVIS, Jefferson, M.D. (S & E, 1981) (D)
DAVIS, Ralph (S & E, 1967)
DAYTON, Paul, Ph.D. (Science, 2004)
DELAUZE, Henri G. (DS, 2004)
DILL, Robert, Ph.D. (Science, 1977) (D)
DOUBILET, David N. (Arts, 1978)
DRAKE, Harold (S & E, 1971)
DUGAN, James (Arts, 1962) (D)
DUMAS, Frederic (DS, 2000) (D)
EARLE, Sylvia A., Ph.D. (Science, 1976)
EDGERTON, Harold, Ph.D. (Sci., 1970) (D)
EGSTROM, Glen, Ph.D. (DS, 1969 / Sci. 1981)
EMPLETON, Bernard (S & E, 1973) (D)
ERNST, John (S & E, 1965)
EVANS, Bob (S & E, 2004)
FALCO, Albert (DS, 1999)
FAVER, Jack (Science, 1961) (D)
FEAD, Louis M. (S & E, 1980)
FEINBERG, Walter (DS, 1971) (D)
FENNELL, Frank (S & E, 1992)
FINE, John Christopher (S & E, 1993)
FINKLE, Elliott, Ph.D. (DS, 1983) (D)
FISHER, Melvin (S & E, 1978) (D)
FRESHEE, Rick (Arts, 1981) (D)
GAFFNEY, Jon (S & E, 1989) (D)
GAGNAN, Emile (DS, 2002) (D)
GALERNE, Andre (DS, 1988)
GEISZLER, John (S & E, 1981) (D)
GIDDINGS, Al (Arts, 1972)
GIMBLE, Peter (Arts, 1971) (D)
GOWER, Mike, (DS, 2009)
GRAVER, Dennis K. (S & E, 1990)
GRIFFIS, Nixon (DS, 1981) (D)
GRIGG, Richard W., Ph.D. (Science, 1999)
GROSVENOR, Melvin, Ph.D. (DS, 1975) (D)
HALL, Howard W. (Arts, 1993)
HAMILTON, R. W. Bill, Ph.D. (Science, 1995)
HARDY, Jon (S & E, 1988) (D)
HARVEY, Guy C., Ph.D. (Arts, 2004)
HASS, Hans, Ph.D. (Sci. 1998 / DS, 1998)
HAUBER, Carl H. (DS, 1960)
HENDRICK, Walt “Butch”, Jr. (S & E, 2009)
HENDRICK, Walt, Sr. (S & E, 1985)
HIGH, William (S&E, ‘64 / Sci. ‘91 / DS ‘07)
HOLLIS, Bob (Science, 2001)
HURTADO, Genaro (Arts, 1982) (D)
ICORN, Nick (DS, 1974)
KELLER, Hannes (Science, 2009)
KILBRIDE, Bert (S & E, 1987)
KLEIN, Sr., Jordan (Arts, 1991)
KOBLICK, Ian G. (DS, 1990)
KRISTOF, Emory (Arts, 1987)
LAMBERTSEN, Christian J., M.D. (Sci. 1971)
LANPHIER, Edward, M.D. (Science, 1963) (D)
LEANEY, Leslie (S & E, 2003)
LENTZ, Terry (S & E, 1968)
LILLIS, Mary Edith (S & E, 1963 / DS, 1994)
LIMBAUGH, Conrad (Science, 1978) (D)
LINK, Edwin (Science, 1965) (D)
LITTLEHALES, Bates (Arts, 1976)
LONG, Richard W. (S & E, 1991)
MACINNIS, Joseph, M.D. (Science, 1972)
MARDEN, Luis (Arts 1963) (D)
MARX, Robert F. (DS, 1976)
McANIFF, John J. (DS, 1962)
McKENNY, Jack (DS, 1977 / Arts, 1988) (D)
MEISTRELL, Bill (D) and Bob (S&E 2007)
MILLER, James W., Ph.D. (Science, 1986)
MORGAN, Bev (Arts, 1990 / S & E, 1995)
MOUNT, Tom (S & E, 2000)
MURPHY, Geri (Arts, 2001)
MURPHY, Richard, Ph.D. (S & E, 1998)
NEWBERT, Chris (Arts, 2003)
NICHOLSON, Christopher (Science, 1992)
NICKLIN, Charles (S & E, 1975 / Arts, 1986)
NICKLIN, Flip (Arts, 1994)
NICHOLSON, Christopher (science, 1992)
NORTH, Wheeler, Ph.D. (S &E, 1974) (D)
NUYTTEN, Phil, Ph.D. (Science, 1997)
ORR, Dan, M.S. (S & E, 1996)
OSTERHOUT, Ralph (DS, 1984)
OWEN, David M. (Science, 1962)
PARRY, Zale (DS, 1973)
PAWLOWICZ, T. F. “Duke” (S & E, 1970)
PECHTER, Alese (DS, 2003)
PECHTER, Mort (DS, 2003)
PERRY, Jr., John H. (DS, 1986)
PETERSON, Mendel (Arts, 1983)
PHINIZY, Coles (Arts, 1964) (D)

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PICCARD, Hon. Jacques, Ph.D. (Sci. 1967)
PYLE, Richard, Ph.D. (Science, 2004)
RANDALL, John E., Ph.D. (Science, 2000)
RAWLINS, John, Surgeon V-Admiral (DS '96)
REBIKOFF, Ada (Arts, 2000)
REBIKOFF, Dimitri (Arts, 1966) (D)
RECHNITZER, Dr. A.B., (Sci '68 / DS '89 / S&E '99) (D)
ROESSLER, Carl (Sports and Education, 2008)
RUGGIERI, George, Ph.D. (Science) (D)
SAGALEVITCH, Anatoly M., Ph.D. (Sci. 2002)
SAMMON, Richard M. (DS, 1987)
SCALLI, Frank (DS, 1972)
SCARR, Dee (DS, 2008)
SKILES, Wes (Arts, 2008)
SEFTON, Nancy (Arts, 1984)
SELISKY, Lee (DS, 2004)
SHANKS, Harry (DS, 1980)
SHILLING, Charles, M.D. (DS, 1979) (D)
SHINN, Gene (Science, 1984)
SLATER, Richard A., Ph.D. (Science, 1988)
SOMERS, Lee H., Ph.D. (S & E, 1994)
STEWART, James R. (S & E, 1969)
STITH, David R. (DS, 1968)
STONEMAN, John (Arts, 2002)
SULLIVAN, Kathryn D., Ph.D. (Science, 1996)
TAILLIEZ, Capt. Philippe (DS, 1997) (D)
TALBOT, Bob (Arts, 1995)
TAYLOR, Ron (S & E, 1966)
TAYLOR, Valerie (Arts, 1980)
TEPLEY, Lee, Ph.D. (Arts, 1979)
TILLMAN, Albert (DS, 1964) (D)
TORS, Ivan (Arts, 1989) (D)
TUCKER, E. B. Teddy, M.B.E. (DS, 1991)
TZIMOULIS, Paul (Arts, 1969) (D)
VAN DER AUE, Otto, M.D. (Sci. 1983) (D)
ULLRICH, Arthur H. (S & E, 1976)
VEZZANI, Eugene J.D., Ph.D. (Science, 1960)
VIDERS, Hillary, Ph.D. (DS, 2001)
WALSH, Don, Ph.D. (Science, 1989)
WATERMAN, Stanton A. (Arts, 1968)
WEICKER, Gov. Lowell P., Ph.D. (DS, 1993)
WELLS, J. Morgan, Ph.D. (S & E, 1984)
WHITE, Ralph (Arts, 1992)
WICKLUND, Robert I. (Science, 1990)
WILMS, Birgitte (Arts, 2003)
WORKMAN, Robert M.D. (Sci. 1966) (D)
WYLAND (Arts, 1998)
YOUMANS, George (S & E, 1960) (D)
ZIGAHN, Armand (S & E, 2004)

WYLAND ICON AWARD

The Wyland ICON Award, in conjunction with the Academy of Underwater Arts and Sciences, recognizes the achievements of those who have made a positive difference for our water planet.

2013
NEDIMEYER, Ken
STONE, Greg

2012
MACGILLIVRAY, Greg
MOORE, Capt. Charles
RICHARDSON, Dr. Drew
ZIGAHN, JoAnn

2011
CHENG, Eric
HEINERTH, Jill
INGRAM, Tom
NUYTTEN, Dr. Phil

2010
ABERNETHY, Jim
AW, Michael
GILKES, Martha Watkins
SAWYER, Ty

2009
KRISTOFF, Emory
ORR, Dan
FRINK, Stephen
HARVEY, Guy

2008
BLAKE, Sir Peter
MAYOL, Jacques
WATT, James
WHITE, Ralph

2007
PARRY, Zale
DOUBILET, David
FOX, Rodney

INTL SCUBA DIVING HALL OF FAME

Every year, the Board of Directors of the International Scuba Diving Hall of Fame (ISDHOF) under the Chairmanship the Cayman Islands Minister for Tourism, Commerce, Transport & Works, selects a group of persons from around the globe, who have made a contribution to the development and/or promotion of recreational scuba diving.

2016
BARTH, BOB
BRAVO, Ramon
COUSTEAU, Philippe Sr.

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HALL OF FAME INDEX

COVE, Stuart
KATAOKA, Kyuhachi (Early pioneer)
MACINNIS, Joe, MD
OHGUSHI, Kanezo (Early pioneer)
WATANABE, Riichi (Early pioneer)

2015
HIGH, WILLIAM “Bill”
HUGHES, Peter Hughes
JONES, Dr. Albert
MULLER, Wally
REBIKOFF, Dimitri

2014
PECHTER, Alese & Morton
ACKER, Bill
NICKLIN, Chuck
ORR, Dan
WATSON, Neal

2013
KILBRIDE, Bert
HARVEY, Guy
SCHMIDT, Rolf and Petra ROEGLIN
DAVISON, Sam

2012
CAMMICK, Ric & Do
CUSSLER, Clive
KIPP, Ron
LEANEY, Leslie
TARLTON, Kelly
ZIGAHN, Zig & JoAnn

2011
HALL, Howard & Michele
LABAN, André
LEE, Clement
MORGAN. Bev
POWER, Allan

2010
CLARK, Dr. Eugenie
ICORN, Nick
TORIBIONG, Francis
WYLAND

2009
AISEK, Kimiuo
ROSENSTEIN, Howard
MURPHY, Geri
SMITH, Larry

2008
CHURCH, Cathy
HALSTEAD, Bob
MERCIER, Daniel
RICHARDSON, Drew
STEVEN, Ron

2007
COLEMAN, Neville
FOX, Rodney
HUMANN, Paul
ROESSLER, Carl
ERICKSON, Ralph

2006
No inductees in 2006

2005
BERGMAN, Dewey
BROOKS, Ernest, II
RECHNITZER, Andreas B., Ph.D.
STEWART, Don

MINISTRY OF TOURISM AWARD
HUBBELL, Tom
MILBURN, Peter

2004
ANDERSON, Dick
BALL, Mike
GREENBERG, Jerry
McDONALD, Kendall
SLATE, Captain Spencer
TATEISHA, Akira

2003
AUXIER, Jim
BLAKESLEE, Chuck
COUSTEAU, Jean-Michel
DUMAS, Frederic
KLEIN Sr., Jordan
SCALLI, Frank

2002
CRONIN, John J.
DOUBILET, David
HOLLIS, Bob
PARRY, Zale
TORS, Ivan
TZIMOULIS, Paul J.

2000 (Inaugural Inductees)
BRIDGES, Lloyd
COUSTEAU, Jacques-Yves
CROPP, Ben
CROSS, E.R.
DALLA VALLE, Gustav
DAVIS, Dr. Jefferson C. Jr.
EARLE, Sylvia, Ph.D.
EATON, Bernie
GAGNAN, Émile
GIDDINGS, Al
HASS, Hans
HASS, Lotte
LAVANCHY, Jack
MCKENNEY, Jack
SOTO, Bob

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TAYLOR, Ron
TAYLOR, Valerie
TILLMAN, Al
WATERMAN, Stan

WOMEN DIVERS HALL OF FAME

The Women Divers Hall of Fame (WDHOF) is an international non-profit professional honor society whose member contributions span a wide variety of fields including: The Arts, Science, Medicine, Sports, Exploration, Marine Archeology, Media, Service, Dive Training and Education, Safety, Business, Marine Environment and Conservation, Free Diving, Commercial Diving, and Military Diving.

Created in 1999 and incorporated in 2001 by six founding sponsors: Beneath the Sea, Inc., the Underwater Society of America, the Women's Scuba Association, Women Underwater, Hillary Viders, Ph.D., and Capt. Kathy A. Weydig; WDHOF, Inc. was granted its 501(c)(3) status in 2002.

WDHOF's two-part mission is to:
1. Recognize women divers who have made outstanding contributions to the exploration, understanding, safety and enjoyment of our underwater world, and...

2. Support the underwater world and its associated careers by promoting opportunities for women and men in diving through scholarships, internships and mentorship opportunities and a worldwide network of industry contacts.

2016
GROSS, Patti Kirk
JAMES, Laura
KERNAGIS, Dawn
NEWMAN, Chantelle
PETZOLD, Ruth
UNSER, Cody

2015
BENCHLEY, Wendy
BENJAMIN, Cecilie
COTTON, Amanda
DONAT, Meg
LANDERS, Lt. Grace (USN)
SLATE, Amy

2014
ALLEN, Barbara
BARSKY, Kristine
HICKERSON, Emma L.
JENKINS, Jayne
SULLIVAN, Deidre
THOMSEN, Tamara

2013
CONNELLY, Mary
COSTENARO, Lynn
COUSTEAU, Simone Melchior
HAREL-BORNOVSKI, Tova
KAGAN SCHOTT, Becky
RODRIGUEZ, Lynn
WACHTER, Georgann S.

2012
BEHRENS-FURNISS, Amelia
EASTERBROOK, Nancy
GUARASCIO, Nancy
PARISH, Robin
SHIMLOCK, Maurine

2011
BAUER, Sally E.
BIER, Gina
BIRD, Christine Rooney, MD
COUSTEAU, Céline
DELOACH, Anna
STRAUS, Karen
LANGEVIN, Maureen
WESTMORLAND, Michele
WHITCRAFT, Deborah
ZENATO, Cristina

2010
BOWMAN, Jane
DAYE, Sheri
CRAWLEY, Annie
FORSBERG, Joan
GREENHALGH, Deb
HASSON, Anne Davis
LITTLER, Diane Scullion, Ph.D.
OLIVEROS, Chief Petty Officer Roseanne
ORTINS, Faith
ROCHAT, Leslie

2009
CLARK, Dr. Melanie A.
CRUICKSHANK, Mandy-Rae
EISEN, Randi
FIENE, Pauline
GEORGE-ARES, Anita
PEYTON, Margo

2008
ISKRA, Dr. Darlene M., Commander, USN (ret)
McGEE, Nancy
SULLIVAN, Dr. Kathryn

2007
DE LA VALDENE, Valerie
DOUBILET, Anne
HERB, Martha

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HALL OF FAME INDEX

HUTTON, Lauren
LONG, Susan
MACAPAGAL-ARROYO, Gloria
MARTEL-BOURBON, Holly
SMITH, Debbie
STEFANYSHYN-PIPER, Heidemarie
TOTH, Bonnie
WHEATON, Jennifer

2006

BRADLEY, Georgienne
KEGELES, Sharon Lee
OCHERT, Adina S.
RUNNALLS, Dr. Lesley A.
UGUCCIONI, Donna Marie
VAN HEEST, Valerie

2005

BUNKLEY-WILLIAMS, Lucy, Ph.D.
BUSH, CDR Bette
HUBBELL, Linda C.
STAYER, Pat
WIDDER, Edie, Ph.D.

2004

BINELLI, Carla
CASSANO, Capt. Victoria Anne, MD
GILLIGAN, M. Veronica (Ronni)
HERNANDEZ, CDR Rene S., Ph.D.
HODGES, Vallorie J.
PUGH, Michelle
TALGE, Helen K., Ph.D.

2003

APPLEGATE, Renee Steven
BALDWIN, Carole, Ph.D.
DUDZINKI, Kathleen, Ph.D.
HARDEN, CDR Gina
de MEYER, Kalli
MURRAY, Rusty
PITKIN, Linda
POMPONI, Shirley, Ph.D.
YOST, CDR Lori

2002

BELLEFEUILLE, Monique J
BODENSTEDT, Commander Debra
FOLLMER, Joan M.
GILKES, Martha Watkins
JOHNSON, Connie
MESTRE, Audrey
PASCAL-GUARINO, Carolyn
REED, Sherry A.
SAHLER, LCDR Erica
SAMMON, Susan
SERPIERI, Claudia
TEGNER, Mia Jean, PhD
TRUKKEN, Sue J.
WAHRMANN, Sally A.
WILMS, Birgitte
ZIEFLE, Julianne

2001

ALARY, Danielle
BONEM, Rena M., Ph.D.
BONNIN, Mary J.
CARRELL, Toni
CASTLE, Cathryn
CONNELLY, Cecelia A.
FLETCHER, Susie
GAAR, Frances
HANSON, Norma
HAYWARD, Joyce S.
JERMAN, Paula M.
KAYAR, Susan R., Ph.D.
KIESER, June M.
KOHANOWICH, Cdr Karen
LEVINE, Marie
MITCHELL, Lisa A.
MOORE, Valerie S.
MURPHY, Geri
PREKER, Marianne
RABER, Janice
ROTHSCHILD, Kathy
SEFTON, Nancy
SHECKLER, Kim Reed
STOCKERT, Andrea D.
TOBIAS, Donna M.
THOMAS, Bridget K., RN
TURNER, Ruth, Ph.D.
VERDIER, Eveline
WATTS, Scarlett D.
WILSON, Laurie J.
ZIGAHN, JoAnn

2000 (Inaugural Inductees)

BANGASSER, Susan, Ph.D
BIESER, Capt. Janet
BOOKSPAN, Dr. Jolie
BRADLEY, Jana
BROWN, Tamara
CARDONE, Bonnie J.
CARTER, Jennifer
CHURCH, Cathy
CLARK, Dr. Eugenie
COURTER, Cindi
CUSH, Cathie
DAVIS, Helen T.
DRAFAHL, Sue
DUDAS, Evelyn Bartram
EARLE, Dr. Sylvia
ECKHOFF, Mary Ellen
FERRIS-FISCHER, Mary Jo

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FISHER, Dolores E.
FIFE, Dr. Caroline
FRAZIER, Dottie
FRANKLIN, Regina
FUNKHOUSER, Lynn
GIESECKE, Anne, Ph.D.
GRAY, Linda
GRIMM, Brigit K.
HALEY, Erika-Leigh
HASS, Lotte
HALL, Michele
HAUSER, Hillary
HEANEY-GRIER, Mehgan
HEINERTH, Jill
HOFFMAN, Edith D.
HULTS, Maria
KINAHAN, Lise
KING, Jennifer
KNAFELC, Capt. Marie, MD Ph.D
KRISTOVICH, Dr. Ann H
LANDER, Barb
LILLIS, Mary Edith (Mel)
LYNN, Capt. Diann Karin
MORGAN, Connie Lyn
MORGAN, Ella-Jean
MORRA, Sue, Ph.D.
MORRISSETTE, Denise J.
MOUNT, Patti
NEAL, Jan
NEWELL-MORTARA, Patty
O'NEILL, Erin
ORR, Betty
PARRY, Zale
PECHTER, Alese O.
PRAGER, Ellen J., Ph.D.
RODUNER, Vreni
ROSE, Carol Taylor
ROUSE, Norine
ROYAL, Betsy
SADLER, Lorraine Bemis
SCARR, Dee
SCHOLLEY, Cdr. Bobbie
SLEEPER, Jeanne Bear
ST LEDGER-DOWSE, Marguerite
STREETER, Tanya
TAYLOR, Dr. Maida Beth
TAYLOR, Valerie
VAN HOESEN, Dr. Karen
VIDERS, Hillary, Ph.D.
WALTEN, Kay
WESTERFIELD, Renee
WEYDIG, Kathy A.
WINGERT, Frankie
YAGER, Jill, Ph.D.
ZAFERES, Andrea

DEMA HALL OF FAME

The Reaching Out Award was first presented by DEMA in1989. The original intent was to recognize individuals who have made a significant contribution to the sport of diving by "reaching out" in some special way to improve the sport for everyone.

2016 [NEW]
AKINS, Lad
LEANEY, Leslie

2015
GATACRE, Jim
VANN, Dr. Richard

2014
HAMMER, Patrick
PECHTER, Alese & Morton

2013
COVE, Stuart - Travel
SOMERS, Dr. Lee - Education

2012
ORR, Dan - Education & Safety
RUTKOWSKI, Richard - Education & Safety

2011
BATHGATE, Fraser - Education
HUGHES, Peter - Travel

2010
JONES, Dr. Jose - Educator
NICKLIN, Chuck - Photographer, Cinematographer

2009
HIGH, Bill - Safety Research & Education
LANG, Michael - Diving Science & Education

2008
LEE, Clement - Dive Travel
SNYDERMAN, Marty - Photography

2007
DOUBILET, David - Photographer
SOTO, Bob - Dive Travel

2006
HUMANN, Paul - Author/Photographer
NESBIT, John - Training (posthumously)

2005
ICORN, Nick - Training Agencies
WATSON, Neal - Travel Destinations

2004
LONG, Dick - Manufacturer
RICHARDSON, Drew - Training Agencies

2003
CHURCH, Jim - Photographer/Educator

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DEMA Show Honored as One of the 50 Fastest-Growing Shows

DEMA Show was recognized as one of the fastest growing shows in the U.S. by Trade Show Executive Magazine during the Fastest 50 Awards & Summit on May 19-21 at the Hyatt Regency Chicago. DEMA Show 2014 grew by more than three times the average rate of all trade shows in the U.S.

Diving Equipment & Marketing Association (DEMA) Executive Director, Tom Ingram, represented DEMA and the dive industry at the Fastest 50 Awards & Summit as DEMA Show was honored as one of the fastest growing shows in the U.S. by net square feet of exhibit space. Out of 50 honorees in the category, DEMA ranked number 21 with a 16.4% increase in net square feet of paid exhibit space!

“DEMA is proud to have accepted this award from Trade Show Executive; a trusted news and industry resource for trade shows both large and small. It was an honor to be recognized and have the opportunity to network with professionals from other fast-growing trade shows from around the country,” said Tom Ingram, DEMA Executive Director. “With the continuing help of National Trade Productions, the management partner for DEMA Show, we continue to look to other growing trade shows for ideas and trends that can ensure the success of DEMA Show for our exhibitors and attendees.”

DEMA would like to extend a sincere THANK YOU to all exhibitors and attendees for their participation in the Show and for making DEMA Show one of the fastest 50 growing shows in the U.S.!

DEMA SHOW 2015 | ORLANDO, FLORIDA

Registered Attendees & Personnel	Registered Buyers	Number Of Exhibitors	Number Of Booths
9,189	2,022	631	1,421



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DEMA SHOW

November 4–7, 2015
Orlando, Florida
www.demashow.com

The 2015 DEMA Show in Orlando was a resounding success. The largest trade-only event in the world for companies doing business in the scuba diving, ocean water sports and adventure/dive travel industries, attracted hundreds of exhibitors and thousands of dive and travel industry professionals from around the world.

In addition to providing an arena in which to conduct business and network, DEMA Show offers participants the most extensive education curriculum in the industry including DEMA-Sponsored Seminars and Exhibitor-Sponsored Seminars from participating by manufacturers, travel destinations and dive certification organizations.

Attendees of the 27th annual presentation of the Reaching Out Awards celebrated New Orleans style during a Mardi Gras-themed evening in honor of Jim Gatacre and Dr. Richard Vann, recipients of the 2015 DEMA Reaching Out Award (ROA). You can read their profiles in the Diving Almanac's Who's Who chapter.

DEMA's executive director, Tom Ingram, also announced that the dive industry's pre-eminent trade show will return to the Big Easy (New Orleans) in 2020, Regular rotation between Orlando and Las Vegas will continue till 2020.

The DEMA Show is produced by DEMA, The Diving Equipment & Marketing Association.

For more information, visit the DEMA Show website:
www.demashow.com

Opening day at DEMA Show 2015 in Orlando, Florida. Photo courtesy **DEMA.org**

DEMA HALL OF FAME 2003 CONTINUED

CHRISTINI, Ed - Training Agencies
GALLAGHER, Jean - Educator

2002
KIPP, Ron - Travel Destinations
JEHLE, Charlie - Manufacturer
HARDY, Jon - Educator
BENNETT, Dr. Peter B. - Educator

2001
BRIGHAM, Ike - Manufacturer
CAHILL, James - Retailer
TAYLOR, David - Environmental Award

2000
CHURCH, Cathy - Photographer
HOLLIS, Bob - Manufacturer
SHEARER, Gordon - Manufacturer

1999
CUSSLER, Clive - Author
GIDDINGS, Al - Photography/Cinematography
HALL, Howard - Photography/Cinematography
MERKER, Ron - Retailer/Educator

1998
GAFFNEY, John - Training Agencies
CLARK, Bob - Training Agencies
STEWART, Captain Don - Travel Destinations

1997
DORSEY, Joe - Retailer
HASS, Dr. Hans - Photography & Cinema
TZIMOULIS, Paul - Photojournalist

1996
McANIFF, John - Educator
MORGAN, Bev - Manufacturer
WEISS, Fred - Manufacturer

1995
GRAY, Robert - The DEMA Show

1994
AUXIER, Jim - Creator of Skin Diver Magazine
BLAKESLEE, Chuck - Creator of Skin Diver
BRIDGES, Lloyd - Actor
COUSTEAU, J-M - Environmentalist & Explorer

1993
CARPENTER, Scott - Explorer & Author
CLARK, Eugenie - Marine Biologist
PARRY, Zale - Actress

1992
BONIN, Dick - Manufacturer
ERICKSON, Ralph - Training Agencies
KEVORKIAN, Michael - Inventor, Educator & Retailer
SCALLI, Frank - Training Agencies

1991
CRONIN, John - Training Agencies
DAVISON, Sam Jr. - Manufacturer
EARLE, Dr. Sylvia - Marine Biologist
POST, Arnold - Retailer
STEWART, James - Scripps Inst. of Ocean.

1990
CROSS, E.R. - Educator
MEISTRELL, Bill & Bob - Manufacturers
KELLY, T.A. “Mike” - Founder of DEMA
TILLMAN, Al - Training Agencies

1989
COUSTEAU, Jacques-Yves - Environmentalist, Explorer & Inventor
EGSTROM, Dr. Glen - Educator
McKENNEY, Jack - Photography & Cinema
WATERMAN, Stan - Photography & Cinema

BENEATH THE SEA

The BTS Legend of the Sea and Diver of the Year are awarded annually to individuals that are highly respected for their accomplishments in areas affecting the diving community.

LEGEND OF THE SEA
2016 PADI
2015 Jean-Michel Cousteau
2014 Eugenie Clark
2013 Ron & Valerie Taylor
2012 Ernie Brooks
2011 Jacques Cousteau
2010 Phil Nuytten
2009 Zale Parry
2008 Sylvia Earle
2007 Stan Waterman

DIVE PIONEERS
2016 Wayne Hasson
2015 Morton and Alese Pechter

DIVER OF THE YEAR
Up to four recipients may be selected from the following categories:

- **Arts**
- **Science - Environment**
- **Sports - Education**
- **Distinguished Service**

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HALL OF FAME INDEX

Nominations must be sent prior to October 1st in the year preceding the awards ceremony.

2016
BENCHLEY, Wendy (Environment)
LUTZ, Richard A., Ph.D. (Science)
RICHARDSON, Drew, Ph.D. (Service)
ZIEFLE, Bill (Education)

2015
COUSTEAU, Fabien (Science)
INGRAM, Tom (Education)
SAHM, Keith (Service)

2014
BUCKLEY, George (Education)
FUNKHOUSER, Lynn (Arts)
TOTH, Bonnie (Service)

2013
CUSSLER, Clive (Arts)
FRINK, Stephen Frink (Arts)
ROESSLER, Carl Roessler (Service)
STELLA, Joe (Service)

2012
AW, Michael (Arts)
HASS, Peter (Service)
HULTS, Maria (Education)
SCHOLLEY, Barbara (Service)

2011
BRYLSKE, Dr. Alex Brylske (Education)
COOPER, Dr. Richard (Science)
EVANS, Bill (Service)
WATKINS GILKES, Martha (Environment)
HALL, Howard and Michele (Arts)

2010
CHURCH, Cathy (Arts)
SAWYER, Ty (Education)
CORNELL, Paul (Service)

2009
BETTS, Edward A. (Education)
EGSTROM, Dr. Glen (Service)
JONES, Dr. Jose (Education)
SNYDER III, Stewart (Service)
SELISKY, Lee (Service)

1976-2008
ALARY, Danielle (Arts)
ALBRECHT, David (Arts)
ANDERSON, Dick (Arts)
AUERBACH, Paul (Science)
BACHAND, Robert (Service)
BACKER, Terry (Environment)
BALLARD, Robert (Science)
BLANCO, Leandro (Arts)
BOSTON SEA ROVERS, The (Education)
BLUE PLANET, The (Arts)
BROOKS II, Ernest (Arts)
BERG, Dan (Arts)
BETTS, Edward A. (Education)
BRIDGES, Lloyd (Lifetime Achievement)
BOWEN, Margaret (Service)
BURKE, Steve (Service)
BUTLER, Glenn (Science)
CALDWELL, James (Service)
CAMERON, James (Arts)
CARPENTER, Scott (Science)
CHATTERTON, John (Education)
KOHLER, Richie (Education)
CHOWDHURY, Bernie (Education)
COUSTEAU, Jean-Michel (Environment)
DOUBILET, David (Arts)
DRAFAHL, Jack & Sue (Arts)
EARLE, Dr. Sylvia (Legend of the Sea)
EGSTROM, Dr. Glen (Service)
ELLIS, Richard (Arts)
EMMERMAN, Michael (Education)
EVANS, Bob (Science)
FENNELL, Frank (Service)
FINE, John C. (Science)
FOX, Rodney (Arts)
FULLMER, Jack (Education)
GALERNE, André (Pioneer)
GILBERT, Michel (Arts)
GILLIAM, Bret (Education)
GILLIAM, Peter (Pioneer)
GIPSTEIN, Tod (Arts)
HAMILTON, Bill (Science)
HAMMOND, Bill (Service)
HARDICK, Steve (Education)
HARVEY, Guy (Arts)
HASS, Hans (Legend of the Sea)
HASSON, Wayne (Environment)
HENDRICK Sr., Walter (Education)
HENDRICK III, Walter (Education)
HODGE, Bunky (Education)
HOLLIS, Bob (Pioneer)
HUGHES, Peter (Environment)
JAHR, Ray (Service)
JANULIS, Ted (Arts)
JERMAN, Paula (Service)
JONES, Dr. Jose (Education)
KRISTOF, Emory (Science)
LAMBERTSON, Christian (Lifetime Achievement)
LEANEY, Leslie (Service)
LOEWY, Nita (Environment)
LONG, Dick (Service)
MARX, Sir Robert (Lifetime Achievement)
McANIFF, John (Service)

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MOLINARI, Guy (Service)
MOUNT, Tom (Education)
MYERS, Roy (Science)
NAWROCKY, Pete (Arts)
NUYTTEN, Phil (Science)
ORR, Dan (Education)
PAKAN, Joe (Service)
PARRY, Zale (Arts)
PECHTER, Alese (Arts)
PECHTER, Morton (Arts)
PIERCE, Albert (Education)
POST, Arnold (Pioneer)
ROSE, Carol (Service)
SAMMON, Rick (Arts)
SCALLI, Frank (Service)
SCARR, Dee (Environment)
SEGARS, Herb (Arts)
SELISKY, Lee (Service)
SKILES, Wes (Education)
SNYDER III, Stewart (Service)
STANTON, Mark (Arts)
STEWART, Don (Pioneer)
STEWART, Lance (Science)
STOLZENBERG, Ed (Service)
STRATTON, Charles (Science)
TAYLOR, Ron (Arts)
TAYLOR, Valerie (Arts)
TUCKER Jr., Ray (Service)
UNDERWATER SOCIETY OF AMERICA (Serv.)
VANN, Richard (Science)
VIDERS, Hillary (Environment)
WARD, Lee (Service)
WATERMAN, Stan (Legend of the Sea)
WATTS, Hal (Education)
WHITE, Ralph (Science)
WYLAND (Arts)
ZAFERES, Andrea (Education)

DAN / ROLEX DIVER OF THE YEAR

The award is given each year to an individual who has contributed significantly to dive safety or the DAN mission. Winners of the DAN/ROLEX Diver of the Year Award receive a plaque and a specially engraved ROLEX Oyster Perpetual Submariner Date dive watch.

2016 KRACK, Kirk
2015 MITCHELL, Simon, Ph.D.
2014 VAN HOESEN, Karen, M.D.
2013 CHAPMAN, Frank L.
2012 BRYLSKE, Alex, Ph.D.
2011 NEUMAN, Tom, M.D.
2010 HOBBS, Gene
2009 AUERBACH, Dr. Paul
2008 MONTOYA, Dr. Ivan
2007 BOZANIC, Dr. Jeff
2006 TAYLOR, Scott
2005 JONES, Dr. A. Jose
2004 JASKULSKI, Thomas A.
2003 ZAFERES, Andrea
2002 KAISER, Marc
2001 HAMILTON, Dr. William “Bill”
2000 MACKAY, Greg
1999 VIDERS, Dr. Hillary
1998 DUNFORD, Richard
1997 SOMERS, Dr. Lee
1996 LONG, Dick
1995 BANK, Marjorie
1994 EGSTROM, Dr. Glen
1993 HUGGINS, Karl
1992 RICHARDSON, Dr. Drew
1991 LANG, Michael
1990 CORRY, James
1989 HENDRICK, Walt “Butch”

OUR WORLD-UNDER-WATER AWARD

The OW-U Outstanding Achievement Award dates back to 1971 and honors those divers whose life work has advanced and promoted diving.

2016 FRINK, Stephen
2015 NACHOUM, Amos
2014 DOUBILET, David & HAYES, Jennifer
2013 HEINERTH, Jill
2012 NUYTTEN, Phil
2011 BROOKS, Ernest
2010 TROTTER, David
2009 STEVENS, Ron
2008 KOHL, Cris
2007 GILBERT, Michel & ALARY, Danielle
2006 SCHUTT, Paul
2005 STEINBORN, Bill
2005 AQUATIC EDUCATION GROUP
2004 ERICKSON, Ralph D.
2003 LONG, Dick
2002 LONGMAN, Bruce & Sue
2001 WINBUSH, Leroy
2000 SHANKS, Harry
2000 MARKSTAHLER, Joyce
1999 SKILES, Wes
1998 BRIDGES, Lloyd
1997 ORR, Dan
1996 KRISTOFF, Emory
1995 PEDERSON, Vern
1994 LOVIN, Bill
1993 BANK, Marjorie
1992 WAGNER, Dan
1991 BROOKS, Ernie
1990 WACHOLZ, Chris
1989 SHEARER, Gordon

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1988 ROUSE, Norine
1987 STEELE, John
1986 SWANSON, Arthur
1985 SHINN, Gene
1984 DAVISON, Sam
1983 BASSETT, Dr. Bruce
1982 WALKER, T. Lloyd
1981 MARX, Sir Robert
1980 BACHRACH, Dr. Arthur
1979 TZIMOULIS, Paul
1978 EARLE, Dr. Sylvia
1977 FRESHEE, Rick
1976 WATERMAN, Stanton
1975 McKENNY, Jack
1974 EGSTROM, Dr. Glen
1973 GIDDINGS, Al
1972 MACINNIS, Dr. Joseph
1971 THE COUSTEAUS

NAUI LIFETIME ACHIEVEMENT AWARD

2014 BOZANIC, Jeffrey
2014 DAVIS, Ben
2004 HIGH, William “Bill”
2003 RHODES, Arthur “Dusty”
2002 EGSTROM, Glen
1998 TILLMAN, Albert

BSAC HEINKE TROPHY

The Heinke Trophy is the Club’s premier award. It was donated to the BSAC in 1958 by the old established British diving firm of Heinke, which had been making high quality hard-hat diving equipment for many years and had then developed its own special range of diving apparatus. Although the Company was later taken over by Siebe-Gorman, some of its original products continued to be made and were available from Collins and Chambers.

Heinke always took a pride in quality and service, so it is appropriate that this superb trophy, in the form of a shield with a silver sports diver motif, should be awarded annually to the BSAC Branch judged to have done the most to further the interests of its members and of the BSAC.

It is suggested that Branches prepare and keep yearly records of their activities and achievements using the format of a Heinke Trophy entry. For a year of particularly high achievement, such records could quickly be brought together to form an entry for the Heinke Trophy Award. The Award is accompanied by a cash prize of £1000, to be used for furthering Branch diving and associated activities.

2015 South Bay Scuba
2014 Bradford Sub Aqua Club
2013 Oxford BSAC
2012 Octopus BSAC
2011 Scarborough Sub Aqua Club
2010 Clidive
2009 Edinburgh University
2008 CUUE (Cambridge University)
2007 Darwen
2006 Totnes
2005 Leicester Underwater Exploration
2004 Kingston & Elmbridge
2003 Bishop Auckland
2002 Severnside, Bristol
2001 Hereford
2000 Leamington & Warwick
1999 Clidive
1998 St Albans
1997 Hull
1996 High Wycombe
1995 Edinburgh
1994 Brunei
1993 Totnes
1992 Doha
1991 Edinburgh University
1989 Bermuda
1988 Merseyside
1987 Staines & District
1986 Edinburgh University
1985 Weymouth & Portland
1984 Maidstone
1983 Coopers, Slough
1982 UCNW, Bangor
1981 Folkestone
1980 Bermuda
1979 Blackpool & Fylde
1978 London
1977 Reading
1976 Perth, Scotland
1975 Bromley
1974 Cayman Islands
1973 Calypso, Malta
1970 Reading
1968 Chelsea
1966 London
1964 Southsea
1963 Southsea
1962 Southsea
1961 Jamaica
1960 Brighton & Worthing
1959 London
1958 York

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EUROTEK AWARDS

The EUROTEK Awards acknowledge people, companies, equipment or services that have inspired divers, enabled them to further their diving, or made their diving safer.

DIVER AWARD

"An individual who has inspired or influenced you with their significant contirbution to advanced or technical diving". This award is dedicated to the memory of Keith Morris, a technical diver.

2014 MALLINSON, Jason (Cave Diver)
2012 LUNDGREN, Richard (Wreck Diver)
2010 WARING, Rick (Wreck Diver)
2008 STANTON, Rick (Cave Diver)

DISCOVER AWARD

"An award given for significant discoveries in the field of advanced or technical diving". This can include discoveries in the fields of equipment design; diving medicine, science and research; diver education; expedition diving *et al.*

2014 MITCHELL, Associate Prof. Simon J.

MEDIA AWARD

"An advanced or technical diving film, programme (radio or television) or publication (book or magazine) that has educated, inspired or influenced your diving"

2014 *Rebreather Forum 3 Conference Proceedings*; VANN, Dr Richard D, DENOBLE, Dr Petar J, POLLOCK, Dr Neal W
2012 *Divers Of The Dark*; APUNEN, Antti and SUHONEN, Janne
2010 *Deco for Divers*; POWELL, Mark
2008 *Wreck Diving Magazine*; PORTER, Joe

INNOVATION AWARD

"An advanced or technical diving product or service that has enabled you to further your diving or made your diving safer"

2014 Shearwater Research Petrel and NERD; PARTRIDGE, Bruce and Lynn
2012 TEKCamp; STANTON, Martin and Amy
2010 Oxygen Cell Checker; NARKED AT 90
2008 Inspiration Rebreather; AP DIVING

OUTSTANDING CONTRIBUTION TO THE DIVING INDUSTRY AWARD

"The unsung hero who has gone the extra mile to support and develop others in the field of advanced and technical diving"

2014 EVANS, Mark Richard; Sport Diver Magazine
2012 STANDING, Jim and STRIKE, Paul; Fourth Element
2010 WOMACK, John; Otter Watersports

LIFETIME ACHIEVEMENT AWARD

"An individual who you admire for their consistent contributions or discoveries that have advanced or opened up the field of technical diving". This award is dedicated to the memory of EUROTEK Co-Founder Carl Spencer

2014 Dive Educator and Equipment Inventor; HIRES, Lamar
2012 aquaCORPS Founder; MENDUNO, Michael
2010 Cave Diver and Author; FARR, Martyn
2008 Marine Engineer and Diver; GURR, Kevin

HISTORICAL DIVING SOCIETY

HANS HASS DIVING TO ADVENTURE AWARD

2014 Professor Wei Cheng Cui & The Chinese State Oceanic Administration
2013 Laurent Ballesta
2010 Sylvia Earle, Ph.D.
2007 Bev Morgan
2006 Stanton Waterman
2005 Daniel Mercier
2004 James Cameron
2003 Ernie Brooks

LEONARD GREENSTONE AWARD

2015 Sylvester "Willy" Wilson

NICK ICORN DIVING HERITAGE AWARD

2015 Ed Larochelle
2014 California Wreck Divers
2013 Bob Barth and Dave Sullivan
2012 Iain Macquarrie and Bert & Karin Dodde
2011 Don Barthelmess

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2010 Ryan Spence
2009 Aquazoo
2008 The Museum of Tropical Queensland & The Langley Family
2007 Loves Park Scuba
2006 Sandy Lydon & Tim Thomas
2005 Lucien Cabrolie, Philippe Rousseau & Jan de Groot
2004 Colin Taylor
2003 Kim & Dale Scheckler
2002 Mares America & Beneath The Sea

NATIONAL SPELEOLOGICAL SOCIETY

The Sheck Exley Safe Cave Diving Award is presented by the National Speleological Society Cave Diving Section to divers who have completed 1,000 safe cave dives. The Henry Nicholson Safe Cave Diving Award is presented to those who have completed 500 safe cave dives. The Abe Davis Safe Cave Diving Award is presented to divers who have completed 100 safe cave dives.

SHECK EXLEY AWARD

ARGYRIADIS, Argyris
ARMSTRONG, Brian
ARMSTRONG, Heather
BOZANIC, Jeff
COURTNEY, Richard
DIPANFILO, Ralph
JESSOP, Kelly
LEWIS, Steve
MCCUMBER Jr., Peter W.
MELTON, Gene
OIGARDEN, Bill
PATTERSON, Dan
PEARCY, Tom
RICHARDS, Jason Erik
RICHARDS, Johnny
ROSS, Walter E.
SORENSON, Edd
THOMSEN, Tamara
TOUSSAINT, Nick
WILSON, Forrest
WOMBLE, Jim
WYATT, Jim
ZUMRICK, John

COMMERCIAL DIVING HALL OF FAME

The ADCI Commercial Diving Hall of Fame was established in 2003 and officially inaugurated at Underwater Intervention 2005 with 25 inductees. This first class of inductees was previous recipients of the John B. Galletti and Tom Devine Awards.

The purpose of the ADCI Commercial Diving Hall of Fame is to recognize and honor the lifetime achievement of those individuals whose dedication and accomplishments have significantly contributed to Commercial Diving. Persons are nominated by commercial diving industry peers and reviewed by a committee of previous Commercial Diving Hall of Fame recipients that have been selected by the ADCI Board of Directors. Postumous Awards are noted by the letter “P”

2016
VON ALVENSLEBEN, Mike
WISWELL, George

2015
BERAN, Dr. John
SWARTZ, Denny
VIDRINE, S. Joe

2014
BELL, Van T. (P)
CUNDIFF, George
VAN METER, Dr. Keith, M.D.

2013
GEYER, Richard
MERRIMAN, Bob
GOLDBERG, Lawrence

2012
MICHEL, Drew
LEBLANC, Paul

2011
SANFORD, Joe (P)
ANGEL, Tom
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2010
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MILLS, Bud

2009
HONAKER, Robert W.
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SERIO, Dr. Joseph

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MANLOVE, John (P)
WORKMAN, Dr. Robert (P)
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2007
O'NEILL, Wilber "Jerry"
STEPHENS, Walter "Whitey"

2006
REEDY, Jack
PARKER, Torrence
LONG, Dick
CRUZE, Rodney

2005
BARTH, Bob

JOHN B. GALLETTI MEMORIAL AWARD

2003 HOLLAND, H. "Dutchy"
2002 GRUBBS, Conway Whitey (P)
2001 SAXON, Ross
2000 KIRBY, Bob
1999 DORE, Bill
1998 HELBURN, Steve
1997 SAVOIE, Joe (P)
1996 CROSS, Ellis R. (P)
1995 GALERNE, André
1994 SMITH Jr., Jack D.
1992 JOHNSON, John T.
1992 NEWBURY, Herbert G. (P)

1991 MACINNIS, Dr. Joseph
1990 HANDELMAN, Lad
1989 BLACK, Murray (P)
1988 NUYTTEN, Phil
1987 DELAUZE, Henri
1986 JOINER, Jim
1985 SAMSON, George W. (P)
1984 EVENS, Dick (P)
1983 HUGHES, D. Michael
1982 MORGAN, Bev
1981 HUGH, Dan Wilson
1980 LAMBERTSEN, Dr. Chris
1979 WARNER, Cdr. Jackie (P)
1978 BOND, Capt. George

TOM DEVINE MEMORIAL AWARD

2002 CALDWELL, Jim
2001 HAZELBAKER, Jon
2000 JAGER, Rick
1999 AICHELE, Fred
1997 McGOVERN, Mike
1996 CROFTON, Juan R.
1995 McKENZIE, Ms. Bernice (P)

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Since 1999, the organisers of ADEX have supported the environment and all within it, encouraging the advancement of human knowledge and well-being of our lands and oceans. Today, this extends to a special group who, more than most, understand the value of keeping our planet safe and sound.

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2014 CHANDRAWINATA, Nadine
2013 OSMAN, Nuraliza
2012 HISHAN, Sarah
2011 KELLER, Denise

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2015 ADIJUWONO, Anne K.

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SSI PLATINUM PRO 5000 DIVER

The roots of the Platinum Pro 5000 Diver level go back to 1992, with the introduction of the SSI Century Diver card, the first card in the industry earned for making 100 dives. It was such a hit that SSI announced it would create additional cards for 500 and 1000 dives. Bill Gleason from Skin Diver Magazine proposed that there should be a card recognizing the most experienced divers, those with 5000 dives. Bob Clark, founder of SSI, thought this was an outstanding idea.

SSI and Skin Diver Magazine decided to recognize these people at a grand and formal cocktail party at DEMA, the world's largest diving show. Nikon cameras offered their award-winning team to put together a professional presentation of underwater images, and the first Platinum Pro5000 Diver party was held in 1993.

The **Platinum Pro5000 Diver** card cannot be purchased. Individuals must **apply** for the award and be recommended in writing by two Platinum Pros. Applications are reviewed to ensure they qualify, and over the years many have been rejected.

There are two ways individuals can qualify for the card:

1. Make 5,000 or more dives
2. Make 2,500 dives and document a significant contribution to the recreational scuba diving industry.

2015

Guy Bannister
Nicholas Blacklaws
Dimitris Bonovolias (Pro)
Peter Cross (Pro)
Iain Goodfellow
Wilfried Herve
Germaine Maguire
Antonio Portugal Ramirez (Pro)
Stephen R Read
Duarte F. Silvestre (Pro)
Mamoru Yasuda

2014

Ehab A AbuAladel (Pro)
Rabie Adra (Pro)
Gordon E Beach (Pro)
Roberto Cesar Buiocchi (Pro)
Fernando Campagnoli (Pro)
Cathryn Castle
Bryan Coetzee (Pro)
Marcel Do Espirito Santo (Pro)
Joe Donne (Pro)
Kai-Christian Dunkelmann (Pro)
Larry Elsevier
Beverly Factor
Glen R. Faith (Pro)
Christian Farnbauer (Pro)
Simon Garrity (Pro)
Tom Gebhardt (Pro)
Miquel Gibert Morant (Pro)
Marcos Gonzalez (Pro)
Karl J Graddy (Pro)
Tracy E. Grubbs (Pro)
Robert J. Hartman (Pro)
Moosa Hassan
Joel Howell (Pro)
Gilson C. Jezler Galvao (Pro)
Scott Johnson
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Regina Kleinert (Pro)
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Bruno Leblanc (Pro)
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Hans Linzenich (Pro)
Trace Malinowski
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Manny Montoro
Charley Oxley (Pro)
Neal W. Pollock
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Sheila R. Shelton (Pro)
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James S Sommer (Pro)
Michael W. Steidley (Pro)
Thomas Steinmetz (Pro)
Al Stewart (Pro)
Philippe Tabbagh (Pro)
Michael Joerg Timm (Pro)
Paul Weldon Wagenseller (Pro)
Brian Warner (Pro)
Randy E. Wright (Pro)

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Richard N Best
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Larry P Connor (Pro)
Don DeMaria
Jan Dudzinski (Pro)
Brian D. Ettinger (Pro)
Nino Faranda (Pro)
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Wolfgang Suckrau
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Charles M Tyler (Pro)
Kenneth Lee Wheeler (Pro)

2012

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Vicente Albanez
David Albright (Pro)
Pierluigi Azzolina (Pro)
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Marilyn S. Burton (Pro)
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For more than 40 years, the Our World-Underwater Scholarship Society® has provided firsthand experiences in underwater-related disciplines to young people considering careers in the underwater world. Each year, a scholar is selected from North America, Europe, and Australasia to work with leaders in marine-related fields partaking in endeavors ranging from scientific expeditions, underwater research, field study, laboratory assignments, equipment testing and design, photographic instruction, and/or other specialized assignments. Scholars spend a year traveling extensively to gain exposure and get hands-on experiences in activities that will contribute to a well-rounded education.

Each Rolex Scholar is granted a coordinator who assists in organizing his or her itinerary. Breadth of experience is emphasized, but each program is tailored to meet each scholar's background and interests. Itineraries may include time with specialists in such areas as biology, archaeology, dive industry-related operations, underwater photography, and conservation. Other areas of study may include:

- Hyperbaric Medicine
- Equipment Design and/or Manufacturing
- Education
- Dive Management
- Marine Expeditions
- Government/Policy
- Tourism
- Publishing
- Commercial and Research Diving
- Ecological Activism

The global underwater community views the Rolex Scholars as having the potential to make significant contributions to the underwater world even though they may not have yet chosen a specific career path. Exposure to a wide array of topics and work environments provides the scholars with a broad overview of the underwater world that will help guide career decisions.

NORTH AMERICA

The society offers summer internships in North America for 1-3 month periods to college undergraduates and graduating seniors. Internship recipients receive a grant to help fund travel to/from site, room and board, and a stipend to cover living expenses. Our current North American internship sponsors include the REEF Environmental Education Foundation, American Academy of Underwater Sciences (AAUS), National Park Service, and "Sport Diver" Magazine and Monterey Bay Aquarium.

EUROPE

The European Young Photographer Internship provides an opportunity for a promising young photographer to further develop skills and experience by working alongside an already accomplished underwater photographer. Sponsored by Rolex, this internship is awarded to the winning entrant at a competition held during the International Festival of Underwater Film in Marseilles, France.

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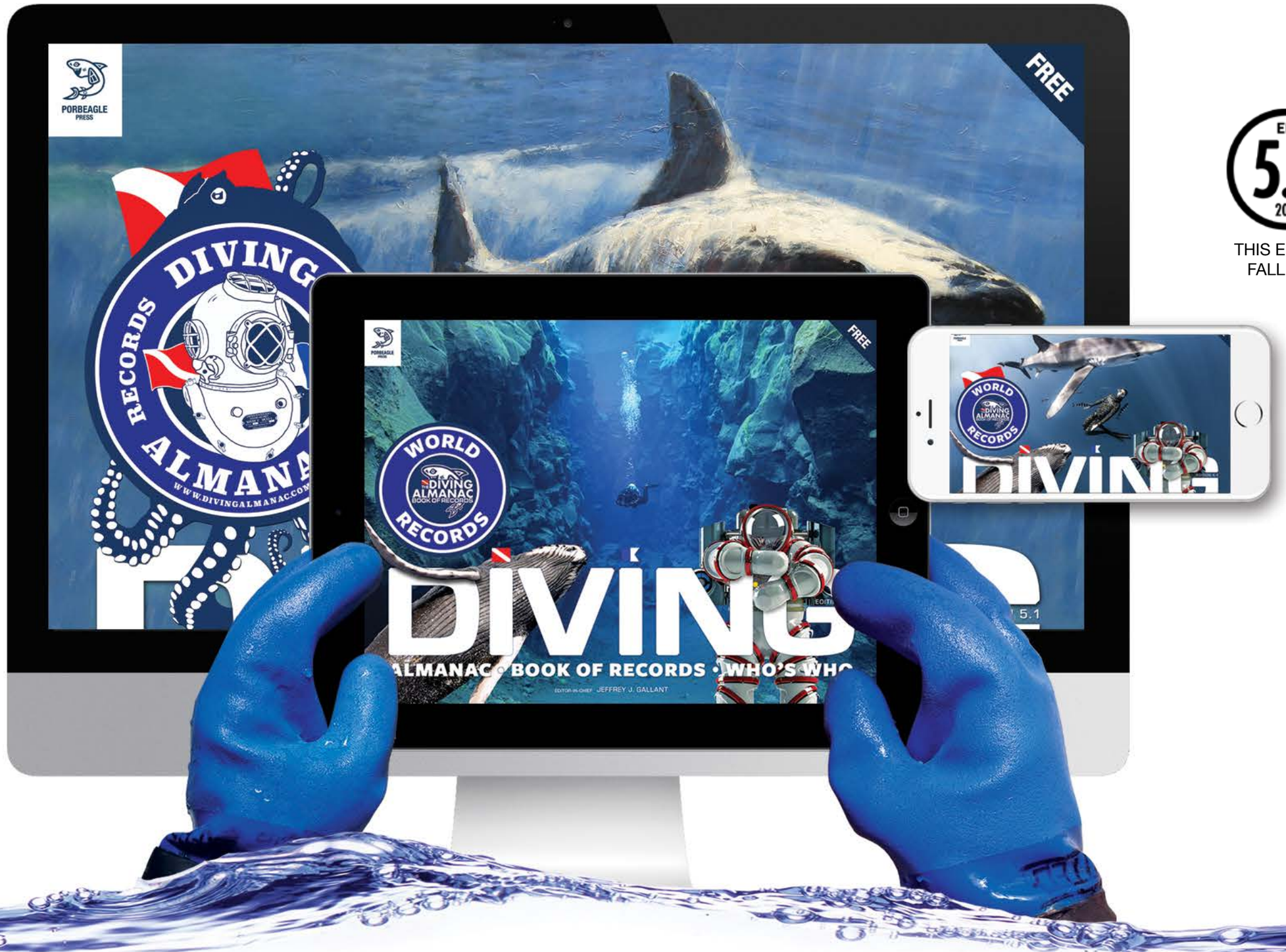
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