

Contents

Preface	ix
Acknowledgments	xi
About the author	xii
List of figures	xiv
List of tables	xvi
List of panels	xvii
List of abbreviations and acronyms	xviii
Section I Diving	1
1 No Limits freediving	3
How deep can you dive?	5
No Limits research	6
The dangers of No Limits	11
In pursuit of the ultimate depth	15
References	18
2 Technical and saturation diving	19
Technical diving	20
Decompression sickness	22
Extreme diving	25
Rebreathers	28
Types of rebreathers	32
The closed-circuit rebreather	33
The Evolution closed-circuit rebreather	34
Saturation diving	36
Biochemical decompression	40
References	43

Section II	Manned Submersibles and Undersea Habitats	45
3	Hardsuits	47
	ADS2000 hardsuit	49
	Training	52
	Exosuit	54
	The future of atmospheric diving systems	57
4	Manned submersibles	61
	Mir	61
	Alvin	64
	The ocean's astronauts	67
	Concept of operations	68
	Shinkai	69
	Shinkai 6500	69
	The future of manned submersibles	72
5	Personal submersibles and underwater flight	75
	Personal submersibles	76
	SEAmagine	77
	Ocean Pearl	77
	Triumph	80
	U-Boat Worx	83
	Hydrobatic submersibles	84
	Hawkes Ocean Technologies	84
	Deep Flight Super Falcon	86
	Underwater flight school	88
	Deep Flight II	90
	Sub Aviator Systems	91
	Pilot training	92
	Game change	93
6	Ocean outpost	95
	Present-day undersea resorts	97
	Jules Verne Undersea Lodge	97
	Present-day undersea research habitats	99
	MarineLab	99
	Aquarius	99
	Future resorts and habitats	106
	Poseidon	106
	Hydropolis	107
	Atlantica	109
	Ocean outpost	110
	Life support system	110
	Diving procedure	119

Other systems	120
Aquanaut selection	121
Crew selection	123
Section III Ocean Exploitation	125
7 Deep-sea mining and energy exploitation	127
Black smokers	127
Oil	130
Geothermal energy	133
Autonomous underwater vehicles	134
The future	139
References	139
8 Ocean medicine	141
Dr. Fenical	142
CMBB	143
Drugs to market	144
Coral and bone grafts	147
Future bioprospecting	148
References	149
Section IV Revolutionary Undersea Medicine	151
9 Liquid breathing and artificial gills	153
Why breathe liquid?	154
Artificial gills	158
Human ventilation system	158
Fish gills	158
Fish blood	159
Oxygen consumption	160
References	164
10 Becoming homo aquaticus	167
Bioengineering	168
Vasculoid	170
The concept	170
Subsystems and concept of operations	173
Power and biocompatibility	174
System control and reliability	175
Installation	176
A step closer to homo aquaticus?	177
References	178

Appendix 179

Epilogue 183

Index 185

<http://www.springer.com/978-1-4419-6356-7>

Ocean Outpost

The Future of Humans Living Underwater

Seedhouse, E.

2011, XIV, 187 p. 56 illus., 51 illus. in color., Softcover

ISBN: 978-1-4419-6356-7