

Diving an Advanced Science & Technology

The Book is composed of two volumes of 476 pages and 528 pages of 17cmX24cm each. (Total of 1004 Pages).

Volume One

History of Diving

Diving Physics.

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Dive Tables & Computers

Dive Equipment

Technical Diving&Nitrox.

Dangerous Marine life

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Volume one

Diving History

A brief History of Arabs and diving for pearls ,an important economical and commercial activity took place and continued for thousands of years in Gulf area ,for the last 100 years pearl diving characterized the life style of locals ,Cities like Kuwait , Dubai , Al-Khobar ,Doha and Muscat evolved from small fishing villages to a world wide known trade centers , the influence of Arab Sailors , tradesmen and merchants extended to India, China and other parts of Asia ,the pearls trade continued until Japanese invented Pearls farming which put an end to this trade and caused a great loss and economical depression .

Then, a gift from God came in time, oil was discovered, Local societies moved from brightness of pearls to flare of oil, an era of great economical and social changes. Diving for pearls became a heritage and a folklore. From Arabs and Diving, I have moved to origins of diving from early humble attempts 500 years B.C till today covering the following Topics of

Volume one:-

Diving in Arabic Language

Arabs & Diving

Pearls Shells

Formation of Pearls in shells

Diving For Pearls

A working Day on Pearl Diving Boat.

Tools and equipment of pearl diving

Laws & Regulations of pearl diving
Pearl diving trips
Techniques of diving for pearls
Distribution of the catch
Seasons of pearl diving
Maladies & Dangers of pearl diving
Medical treatments used by pearl Divers
Military and Commercial origins of Diving
Diving bells
Lethbridge's Dive suits
Deene's Suit
Siebe's Suits
Caissons
Paul Bert
John Scott Haldane
Evolution of the Scuba Diver
Evolution of the Recreational Diver
E. Gagnan & J. E. Cousteau
Hans Hass & Red Sea
Evolution of Training Associations
Diving & Tourism
Red Sea The Mecca of Divers
Hans Hass
Jack E. Cousteau
Eugene Clarke
Why we dive
Our young generation and Diving
Hot Dive areas in Red Sea
Careers in Diving Industry.
Career in Recreational Diving
Career in Commercial Diving
Summary
References of Section

Diving Physics

This sections includes the typical types of information and topics required to be known by every Diver , Advanced Diver , Dive Master and Instructor , I have just simplified ideas ,elaborated and supported explanations with illustrations and photos when possible , bearing in mind the fact that the book will be read by lay persons ,and the lack of further sources of information in reader's language (Arabic) , Diving Physics section include the following topics :-

Introduction to physics science .

Matter & Atom

Contents of atom

Mass of atom.

Periodic table of Elements

Molecules & Compounds

Ionic bonding
Covalent bonding
States of matter
Energy
Types of Energy
Water
Chemical structure of water
Physical characteristics of water
Gases in water
Water & Heat
Heat & Temperatures
Heat measurement units
Heat Capacity of water
Water and heat transfer
Conduction & convection
Light & Water
Light what is it?
Electromagnetic waves
Visible spectrum
Light reflection & refraction
Vision underwater
Visual reversal
Light absorption
Sound & Water
Sound what is it ?
Sound waves
Sound speed
Hearing underwater
Sound travel underwater
Sound Reflection & refraction
Absorption of Sound
Buoyancy
Archimedes Principle
Importance of fine tuning weight when diving .
Sample problems and solutions
Atmospheric Air
Contents of air
Table of air contents by volume.
Specifications of Grade E of U/W Breathing air
Oxygen
Ozone and Oxygen Radical
Nitrogen
Carbon Dioxide
Water Vapor
Carbon Monoxide
Hydrogen
Nobel Gases, Helium, Neon, Argon, Krypton, Xenon and Radon
Table of comparison of chemical characteristics of gases
Summary
References of the section

Diving Physiology

This section covers all major topics required to be known by every Diver, Advanced Diver, Rescue Diver, Dive Master and Instructor. I have just simplified ideas, elaborated and supported explanations with illustrations and photos when possible, bearing in mind the fact that the book will be read by lay persons, avoiding complicated medical terms. In pressure-related traumas and maladies I have separated the effects of pressure on the human body and divided them into two main topics, the direct effects of pressure which includes traumas resulting from pressure changes and Effects of Indirect pressure which include Nitrogen Narcosis and Decompression Illnesses. Diving Physiology section includes the following topics :-

Introduction to science of Physiology.

Human Body Systems

Living Body cells

Circulatory System

Blood and Blood Contents

Blood pressure

Breathing System

Breathing

External Breathing

Breathing Cycle

Lung Volume

Gases Exchange in Alveoli

Dead Air Spaces

Internal Breathing

Breathing System Control

Carotid Sinus Reflex

Diving and Breathing System

Air Consumption & Breathing

Asphyxia

Hypoxia & Anoxia

Breathing & Carbon Dioxide

Hypercarbia or Hypercapnia

Hypocarbia or Hypocapnia

Shallow water Blackout

Direct Effects of Pressure

Introduction

Barotraumas Causes, Squeeze & Expansion

Lungs Barotraumas, Pneumothorax, Mediastinal & Subcutaneous Emphysem.

Arterial Gas Embolism

Hearing System

Ear Barotraumas

Middle Ear Barotraumas
External Ear Barotrauma
Sinuses Barotrauma
Mask Barotrauma
Teeth Barotrauma
Stomach & Intestines Barotrauma
External Ear & Diving
Swimmer's Ear
Bacterial & Fungal Infections
Controlling Ear problems
Indirect Effects of pressure
Nitrogen Narcosis
Medical & Recreational Drugs & Narcosis
Decompression Illness
Physics & Physiology and Decompression
Physics of bubble formation
Effects of Gas bubbles on body biochemistry
Factors increase susceptibility to DCI.
Flying after Diving
Types of DCI
DCI Signs & Symptoms
Appearance of DCI Symptoms
Diagnosing DCI Cases
Recovering from DCI
DCI Treatment
Oxygen Toxicity
Pulmonary oxygen toxicity
Neurological Oxygen Toxicity
Carbon Monoxide Toxicity
Osteonecrosis
Near Drowning & Drowning
First Aid & CPR
Oxygen First Aid & Diving
Summary
References of Section

Section Four

Sharks

This section provides answers of several question addressed by divers and non divers a like,. I have refuted several misconceptions about sharks, considering the matter of fact that, I am a well known of having a long experience in diving with sharks in Red Sea.

The section includes the following topics:-

Introduction

Erroneous misconceptions in forms of scientific reports

Scientific Facts about sharks

Anatomy of Sharks

Streamlining & Balance
Digestive system
Breathing System
Sensory Systems
Reproduction of sharks
Feeding
Fishes accompany sharks
Summary
References of section

Volume Two

Diving Environment

This section covers a wide variety of topics related to our diving environment with special emphasis on protecting Marine life and it is adapted to our local environments And include the following topics:-

Theories of evolution of Universe
Old civilizations Theories
Islamic Civilization Theories
European renaissance Theories
Modern Civilization Theories
Evolution of Galaxies
Evolution of our Solar System
The Milky Way Galaxy
The Condensation Theory
The Separation Theory
Evolution of Earth
The planet earth
Structure of Earth
Lithosphere
Hydrosphere
Atmosphere
Biosphere
Layers of Earth
Layers of Atmosphere
Gases of Atmosphere
Evolution of continents and oceans
Wagner Theory
Evolution of Red Sea
Climate & Weather
Seasons Why & How seasons change.
Differences of timing on earth .
International Date line
Winds
What is wind?

Air movements on earth
General wind patterns
Coriolis effect & Multi cell winds
Local Winds
Sand storms (Touse & Haboub) (in Egypt and Arabia)
Daily winds (Sea Breese, Land, Valley and mountain breeze)
Water Circle on earth
Water distribution on earth
Why sea water is salty?
Factors affect salinity of seas.
Ocean Currents
Sea currents
Ocean General Currents patterns
Tides, reasons and effects on water movements
Local Currents
Rip Currents
Tidal Currents
Waves
Tsunami waves
Oxygen cycle on earth
Green house effect and increasing heat of earth
Carbon dioxide Cycle on earth
Carbon Cycle on earth
Nitrogen Cycle on earth
Acidity and alkalinity (pH) Factor

References of the section

Dive Tables

**Dive Tables and decompression theories where always
A problem to understand for most divers and even dive
Instructors in our area, dive computers sold to divers are
programmed with decompression logarithms based on
decompression theory used..This is the reason I thought of
Introducing major decompression theories, this will help divers
appreciate, understand, use and follow what tables
Say. Lack of knowledge and negligence were main causes
Of DCI cases in our area, the dive tables section includes the
following topics:-**

Introductions, Different tables& Computers why?

When DCI was first known?

John Scott Haldane

Haldane...The Theory

Half time tissues

Haldane Decompression Tables

The Pros & Cons of Haldane's Theory.

After Haldane

US Navy Researches.,

Concept of Pressure Groups Designation letters

Residual Nitrogen Time

Decompression Diving

No-Decompression Diving
Maximum speed of ascent
US Navy Dive Tables (The Original tables)
Modified US Navy Tables
Use of US Navy Tables
Bottom Time
Max. No Decompression Limits
Repetitive Dives and US Navy.
US Navy No-Decompression Tables
Residual Nitrogen Tables
Problems and solutions
US Navy & Recreational Diving
British Navy Tables
Revised BSAC 88 Tables
Swiss/German Dive tables
Buehlmann Tables
The Canadian Theory & Tables
DCIEM Tables
PADI "DSAT "Tables
Use of PADI Tables
Problems & Solutions
M/L Diving
Dive Computers
References of the Section

Dive Equipment

**This section of the book covers essential knowledge
Of diving equipment needed by all divers from Open water
Diver level to professional diver level, a detailed elaboration
On equipment components and how it works, as all other
sections, it is supported by schematic illustrations and photos
, I did not go into details on some items which can be found in
available books in Arabic .**

Introduction

Why Every Diver should buy equipment
Origin and evolution of diving regulators
Double hose Regulator
Single Hose regulator
Closed & Semi closed circuit Breaching systems
Open Circuit breathing system
Scuba regulator
First stage Types & Function
Piston & Diaphragm
Balanced and Unbalanced first stages
Comparison of 1st. Stages
Yoke & DIN Types
Environmental Seal
Regulator 2nd. Stages
Types & Functions

Valves, down stream & Upstream
How to select the proper Regulator.
Care and maintenance of regulator
Diving Devices
Essential information needed while diving
Additional information needed while diving.
Depth & Pressure Gauges
Types, Designs, selection, care & maintenance.
Diving Cylinders
Types, Sizes, selection, care and maintenance.
Marks on Tanks, what they mean?
Visual & Hydro-test of scuba tanks .
Tank Valves, Types and function, Care and maintenance.
BC Vests, types, styles, selection, care & maintenance.
Dive masks, snorkel, fins, weight systems, and wet suits, types,
selection, care and maintenance.
Dive accessories Marker Buoy, Lift bags, slates
, Gear Bag, .
References of the section

Technical & Nitrox Diving

We have an Essay in Arabic that states "If you do not know it, forget about it" .This is applied in case of diving in general and particularly in case of Nitrox and Tec. Diving.
Knowledge was and still is the main obstacle of fast growth of diving in General and Nitrox diving in particular.
Misconceptions and Illiteracy of not only common divers but high percentage of dive masters and dive Instructors , who lack knowledge of modern diving sciences , Urged me to extend the text of the book to cover this important subject ,
A special emphasis on safety and the need to differentiate recreational diving from deep technical diving and advantages of use of Nitrox as an alternative breathing gas for scuba diving.

Section Topics

Introduction

Definition of Technical diving

Types of Technical & Commercial Diving

Surface Supply Vs. Scuba

Equipment & Gases of Tech. Diving

Tec-Rec Diving

Hazards Of Deep diving

Heliox , Trimix diving

Decompression Dive tables

Nitrox

Enriched Air.. What is it ?

How it is prepared, DNAX and EANx

Advantages of EANx Diving

EAD Concept
Partial Pressure of Oxygen & Oxygen Exposure
EANx Dive tables
Comparison of No Decompression limits of Nitrox & Air
Dive equipment & Nitrox
Oxygen Compatibility
EANx training
Summary
References of the section

Dangerous Marine life

This section is dedicated to answer most questions of sea Sports enthusiasts about dangerous creatures and injuries inflicted by sea life ,questions addressed by swimmers, divers and none divers a like , .

Without complicated scientific classifications, a simple presentation on how they look, how they behave, where they live, What they feed on, possible injuries, prevention and first aid. Another area where no reference in Arabic is available.

Like other sections of the Book, this section is enriched of photos and Illustrations and covers the following topics :-

Tiger Shark

Mako

Hammerhead

Silver tip Shark

Black tip Shark

White tip Reef Sharks

Nurse Shark

Prevention of Shark attacks

Importance of Knowledge & Understanding

How to recognize offensive behavior of sharks

What to do in case of a shark attack

Protection measures

Sharks Injuries

First Aid

Barracuda

Sting Ray

Moray Eel

Crown of Thorn

Electric Ray

Stone Fish

Scorpion Fish

Surgeon Fishes

Sea Urchins

Cone Shells

Jelly Fish

Hydras
Sea Anemone
Summary
References of section