Summary of Volume 1

Foreword

Preface

Chapter 1. Background and Challenges of Submarine Exploration in the 19th Century

1.1. Submarine exploration
1.2. Means of communication in the 19th Century: birth of the telegraph
   1.2.1. Aerial optical telegraph
   1.2.2. Electric telegraph
1.3. Establishment of the first international telecommunications network
   1.3.1. National links, overhead cables
   1.3.2. International links and submarine cables
   1.3.3. Expansion of the global telegraph network
1.4. Economic and political contexts of England in the 1870s

Chapter 2. Sailors and Scientists of the H.M.S. Challenger

2.1. Introduction
2.2. Biographies of the Royal Navy officers
   2.2.1. George Henry Richards
   2.2.2. George Strong Nares
   2.2.3. Frank Tourle Thomson
   2.2.4. John Fiot Lee Pearse Maclear
   2.2.5. Thomas Henry Tizard
   2.2.6. Pelham Aldrich
2.3. Biographies of the scientific team
   2.3.1. William Benjamin Carpenter
   2.3.2. Charles Wyville Thomson
   2.3.3. John Murray
   2.3.4. Henry Nottidge Moseley
   2.3.5. Rudolf von Willemoës-Suhm
   2.3.6. John Young Buchanan
   2.3.7. John James Wild

2.4. List of officers, scientists and members of the technical, medical and administrative bodies of the *Challenger* expedition when departing from Portsmouth, on December 21, 1872

**Chapter 3. Narrative Summary of the H.M.S. Challenger Cruise**

3.1. Introduction
3.2. Explorations in 1873
   3.2.1. North Atlantic Ocean
   3.2.2. South Atlantic Ocean
   3.2.3. Indian Ocean
3.3. Explorations in 1874
   3.3.1. Indian Ocean
   3.3.2. South Pacific Ocean – Tasman Sea
   3.3.3. Central Pacific Ocean
   3.3.4. North Pacific Ocean
3.4. Explorations in 1875
   3.4.1. Central Pacific Ocean
   3.4.2. North Pacific Ocean
   3.4.3. Central Pacific Ocean (Tahiti)
   3.4.4. South Pacific Ocean
3.5. Explorations in 1876
   3.5.1. South Pacific Ocean
   3.5.2. South Atlantic Ocean
   3.5.3. North Atlantic Ocean
3.6. Epilogue of the cruise

**Chapter 4. Scientific Equipment and Observations of the H.M.S. Challenger**

4.1. Introduction
4.2. The H.M.S. *Challenger* and its scientific facilities
   4.2.1. Refurbishment of the upper deck
   4.2.2. Refurbishments of the main deck
   4.2.3. Refurbishment of the lower deck and the hold
4.3. Dredging and sounding instruments
  4.3.1. Dredges and trawls
  4.3.2. Accumulators
  4.3.3. *Hydra* Sounding Machine
4.4. Dredging, trawling and sounding methods
  4.4.1. Dredging and trawling methods
  4.4.2. Method of sounding
  4.4.3. Precision and uncertainty in depth measurement
4.5. Immersion speed of a sounding apparatus
  4.5.1. Free fall of the *Hydra* Sounding Machine
  4.5.2. Fall of the *Hydra* Sounding Machine connected to the line, under constant external tensile strength
  4.5.3. Observation of the entrance of the line in water
4.6. Contribution of the H.M.S. *Challenger*’s expedition to knowledge of seabed relief
  4.6.1. Summary of current knowledge relating to the Earth and the geomorphology of the seabed
  4.6.2. Examples of bathymetric surveys illustrating the different types of seabed relief
4.7. Observation of the ocean waters during the expedition of the H.M.S. *Challenger*
  4.7.1. Methods and instruments of measurement
  4.7.2. Examples of measurements

**Conclusion**