1. Record Nr. UNINA9910830033703321

Autore	Beech Martin <1959->
Titolo	Terraforming mars / / Martin Beech, Joseph Seckbach, Richard Gordon
Pubbl/distr/stampa	Hoboken, New Jersey : , : Scrivener Publishing, , [2022] ©2022
ISBN	1-119-76193-X 1-119-76199-9 1-119-76186-7
Descrizione fisica	1 online resource (592 pages)
Collana	Astrobiology Perspectives on Life in the Universe
Disciplina	620.419
Soggetti	Planets - Environmental engineering Life on other planets Outer space Exploration
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Cover -- Half-Title Page -- Series Page -- Title Page -- Copyright Page -- Contents -- Preface -- Part 1: Introduction -- 1 Terraforming and Colonizing Mars -- 1.1 Introduction -- 1.2 Earth: A Terraformed Planet -- 1.3 Planetary Environments -- 1.4 Terraforming Mars -- 1.5 The Role of Solar Wind -- 1.6 Ethical Aspects -- 1.7 Venus, Moon, Titan… -- References -- Part 2: Engineering Mars -- 2 Terraforming Worlds: Humans Playing Games of Gods -- Early Mars -- Oceans Here and There -- The Mars We are Creating Here -- Mars: An Arena of Delusions? -- References -- 3 Mars, A Stepping-Stone World, Macro-Engineered -- 3.1 Introduction -- 3.2 Mars-Crust as Kinetic Architecture -- 3.3 A Crust-Infrastructure Mixture -- 3.4 Infrastructure and Life-Styles -- 3.5 Atmosphere Enhancements for Mars -- 3.6 Between Then and Now -- Acknowledgments -- References -- 4 Efficient Martian Settlement with the Mars Terraformer Transfer (MATT) and the Omaha Trail -- 4.1 Introduction -- 4.2 Construction Efficiencies of MATT's Small-Scale Terraformation -- 4.2.1 Impact Terraformation for Settlement -- 4.2.2 Impactor Redirection with DE-STARLITE -- 4.2.3 Subaqueous Hab Network at Omaha Crater -- 4.3 Provisioning Efficiencies of the Omaha Trail -- 4.3.1 Deimos Dock --

Protons -- 11.4.2 Shielding Against 1 GeV Protons -- 11.4.3 Shielding Effectiveness in the Mars Environment -- 11.5 Discussion -- 11.5.1 Electrostatics -- 11.5.2 Refrigeration -- 11.5.3 Self-Shielding Solenoids -- 11.5.4 Alternate Self-Shielding and Source-Shielding -- 11.5.5 Safety in Transit Across Crater Rim -- 11.5.6 Safety in Spacecraft Launch and Landing -- References.
12 Mars Future Settlements: Active Radiation Shielding and Design Criteria About Habitats and Infrastructures -- 12.1 Introduction -- 12.2 The Problem of Cosmic Radiations -- 12.3 The Protection System with Artificial Magnetic Fields -- 12.4 Details of Our Proposal -- 12.5 Further Developments -- 12.6 Modular Settlement on Mars -- Acknowledgments -- References -- 13 Crop Growth and Viability of Seeds on Mars and Moon Soil Simulants -- 13.1 Introduction -- 13.2 Materials and Methods -- 13.2.1 Regoliths -- 13.2.2 Species Selection -- 13.2.3 Organic Matter and Bacteria -- 13.2.4 Experimental Design -- 13.2.5 Harvest and Measurements -- 13.3 Results -- 13.3.1 Fruit Setting and Biomass -- 13.3.2 Seed Weight and Germination -- 13.4 Discussion -- 13.5 Outlook Issues for the Future -- Acknowledgements -- References -- Appendix -- 14 The First Settlement of Mars -- 14.1 Introduction -- 14.2 Colony Location -- 14.3 Colony Timeline -- 14.3.1 Setup Phase -- 14.3.2 Investment Phase -- 14.3.3 Self-Sufficiency -- 14.4 Colony Design -- 14.5 The Basics - Power, Air, Water, Food -- 14.5.1 Food -- 14.5.2 Water -- 14.5.3 Air -- 14.5.4 Power -- 14.6 The Material World -- 14.6.1 Metals -- 14.6.2 Plastics -- 14.6.3 Ceramics and Composites -- 14.6.4 Mining -- 14.7 Exports, Economics, Investment and Cash Flow -- 14.7.1 Interplanetary Real Estate -- 14.7.2 Intellectual Property Export -- 14.7.3 Research Tourism -- 14.7.4 Investment and Cash Flow -- 14.8 Politics - A Socialist's World -- 14.9 Conclusion and Further Thoughts -- References -- Part 6: In Situ Resources -- 15 Vulcanism on Mars -- 15.1 Introduction -- 15.2 Martian Geology -- 15.2.1 Mars: Creation and Thermal Evolution -- 15.2.2 The Martian Crust -- 15.3 Vulcanism -- 15.3.1 Types of Volcanoes -- 15.3.2 Recognition of Other Styles of Vulcanism -- 15.3.3 Martian Meteorites -- 15.3.4 Is Mars Still Volcanically Active?.
References -- 16 Potential Impact-Related Mineral Resources on Mars -- Introduction -- Terrestrial Ore Deposit Types Associated with Impact Craters -- Martian Target Craters -- Conclusions -- References -- 17 Red Gold - Practical Methods for Precious-Metal Survey, Open-Pit Mining, and Open-Air Refining on Mars -- 17.1 Introduction -- 17.2 Martian Precious-Metal Ore from Asteroids -- 17.3 Martian Precious-Metal Survey and Physical Assay -- 17.4 "Mars Base Alpha" - A Red Gold Mining Camp -- 17.5 Semi-Autonomous Open-Pit Mining -- 17.6 Comminution and Separation of Meteoric Ore -- 17.7 Extracting Metals with Induction/Microwave Smelter -- 17.8 Refining with Hydrometallurgical Recovery and the Miller Process -- 17.9 Separating Precious Metals with Saltwater Electrolysis -- 17.10 Kovar Foundry -- 17.11 Maximizing ISRU, Minimizing Mass and Complexity -- 17.12 Scale-Up and Scale-Out -- 17.13 Conclusion, with Observations and Recommendations -- References -- Part 7: Terraforming Mars -- 18 Terraforming Mars: A Cabinet of Curiosities -- 18.1 Introduction and Overview -- 18.2 Planet Mars: A Brief Observational History and Overview -- 18.3 The Beginnings of Change -- 18.4 The Foundations -- 18.5 First Blush -- 18.6 Digging In -- 18.7 (re)Building the Martian Atmosphere -- 18.8 Magnetic Shielding -- 18.9 Heating the Ground -- 18.10 A Question of Time -- 18.11 Conclusions -- References -- 19 Terraforming Mars Rapidly Using Today's Level of Technology -- 19.1 Introduction -- 19.2 Solar Wind -- 19.2.1 Solar Wind Abundances --