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PURPOSEFUL REFLEXES AND INSTINCTIVE BEHAVIOR; 15 NEURAL EVENTS RELATED TO LEARNING AND MEMORY; 16 EPILOGUE: WITH OBSERVATIONS ON THE RELATION OF THE NERVOUS SYSTEM TO MIND; BIBLIOGRAPHY; INDEX

Sommario/riassunto

Recent developments have extended our knowledge of the basic functions of nerves: notably, the demonstration of the mechanism within nerve fibers which transports a wide range of essential materials. In order to understand how this discovery occurred, it is necessary to examine its history. The story begins in ancient Greece when nerves were conceived of as channels through which animal spirits carried sensory impressions to the brain. As science developed, the discoveries of various physical and chemical agents supplanted the agency of animal spirits until the molecular machinery of transport was recognized. In this fascinating and complete history, Sidney Ochs begins with a chronological look at this path of discovery, followed in the second half by a thematic approach wherein the author describes the electrical nature of the nerve impulse, fiber form and its changes in degeneration and regeneration, reflexes, learning, memory and other higher functions in which transport participates.

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1.3.10 Operational and Supply Chain Risks from Inefficiencies and Environmental Changes
1.4 Green and Sustainable Energy Sources and Their Conversion: Hydro, Biomass, Wind, Solar, Geothermal, and Biofuel1.4.1 Solar PV Plants; 1.4.2 Wind Power; 1.4.3 Geothermal Power; 1.4.4 Concentrating Solar Thermal Power (CSP) Plants; 1.4.5 Biomass; 1.4.6 Biofuel; 1.5 Electrochemistry: a Technological Overview; 1.6 Electrochemical Rechargeable Batteries and Supercapacitors (Li Ion Batteries, Lead-Acid Batteries, NiMH Batteries, Zinc-Air Batteries, Liquid Redox Batteries); 1.6.1 Lead-Acid Batteries; 1.6.2 NiMH Batteries; 1.6.3 Li-Ion Batteries; 1.6.4 Zinc-Air Batteries
1.6.5 Liquid Redox Batteries1.7 Light Fuel Generation and Storage: Water Electrolysis, Chloro-Alkaline Electrolysis, Photoelectrochemical and Photocatalytic H2 Generation, and Electroreduction of CO2; 1.7.1 Water Electrolysis; 1.7.2 Electrochemistry of Water Splitting; 1.7.3 Chlor-Alkaline Electrolysis; 1.7.4 Photoelectrochemical and Photocatalytic H2 Generation; 1.7.5 Carbon Dioxide Reduction; 1.8 Fuel Cells: Fundamentals to Systems (Phosphoric Acid Fuel Cells, PEM Fuel Cells, Direct Methanol Fuel Cells, Molten Carbon Fuel Cells, and Solid Oxide Fuel Cells); 1.8.1 Alkaline Fuel Cells
1.8.2 Direct Methanol Fuel Cells1.8.3 Phosphoric Acid Fuel Cells (PAFCs); 1.8.4 Proton Exchange Membrane Fuel Cells; 1.8.5 High-Temperature Molten Carbonate Fuel Cells; 1.8.6 Solid Oxide Fuel Cells; 1.9 Summary; Acknowledgments; References; Further Reading; 2 Electrochemical Engineering Fundamentals; 2.1 Electrical Current/Voltage, Faraday's Laws, Electric Efficiency, and Mass Balance; 2.1.1 Current Efficiency; 2.1.2 Mass Balance; 2.2 Electrode Potentials and Electrode-Electrolyte Interfaces; 2.2.1 Potential Difference; 2.2.2 Electrode-Electrolyte Interfaces
2.3 Electrode Kinetics (Charger Transfer (Butler-Volmer Equation) and Mass Transfer (Diffusion Laws))

Sommario/riassunto

In this handbook and ready reference, editors and authors from academia and industry share their in-depth knowledge of known and novel materials, devices and technologies with the reader. The result is a comprehensive overview of electrochemical energy and conversion methods, including batteries, fuel cells, supercapacitors, hydrogen generation and storage as well as solar energy conversion. Each chapter addresses electrochemical processes, materials, components, degradation mechanisms, device assembly and manufacturing, while also discussing the challenges and perspectives for each energy sto