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HEAVY WATER **AND THE WARTIME RACE** **FOR NUCLEAR ENERGY**

PER F DAHL

Heavy Water And The Wartime Race For Nuclear Energy

Charles R. Loeber



Heavy Water And The Wartime Race For Nuclear Energy:

Heavy Water and the Wartime Race for Nuclear Energy Per F Dahl, 2023-05-31 Heavy water deuterium oxide played a sinister role in the race for nuclear energy during the World War II It was a key factor in Germany's bid to harness atomic energy primarily as a source of electric power its acute shortage was a factor in Japan's decision not to pursue seriously nuclear weaponry its very existence was a nagging thorn in the side of the Allied powers Books and films have dwelt on the Allies efforts to deny the Germans heavy water by military means however a history of heavy water has yet to be written Filling this gap Heavy Water and the Wartime Race for Nuclear Energy concentrates on the circumstances whereby Norway became the preeminent producer of heavy water and on the scientific role the rare isotope of hydrogen played in the wartime efforts by the Axis and Allied powers alike Instead of a purely technical treatise on heavy water the book describes the social history of the subject The book covers the discovery and early uses of deuterium before World War II and its large scale production by Norsk Hydro in Norway especially under German control It also discusses the French German race for the Norwegian heavy water stocks in 1940 and heavy water's importance for the subsequent German uranium project including the Allied sabotage and bombing of the Norwegian plants as well as its lesser role in Allied projects especially in the United States and Canada The book concludes with an overall assessment of the importance and the perceived importance of heavy water for the German program which alone staked everything on heavy water in its quest for a nuclear chain reaction

Heavy Water and the Wartime Race for Nuclear Energy Per F Dahl, 2023-05-31 Heavy water deuterium oxide played a sinister role in the race for nuclear energy during the World War II It was a key factor in Germany's bid to harness atomic energy primarily as a source of electric power its acute shortage was a factor in Japan's decision not to pursue seriously nuclear weaponry its very existence was a nagging thorn in the side of the Allied powers Books and films have dwelt on the Allies efforts to deny the Germans heavy water by military means however a history of heavy water has yet to be written Filling this gap Heavy Water and the Wartime Race for Nuclear Energy concentrates on the circumstances whereby Norway became the preeminent producer of heavy water and on the scientific role the rare isotope of hydrogen played in the wartime efforts by the Axis and Allied powers alike Instead of a purely technical treatise on heavy water the book describes the social history of the subject The book covers the discovery and early uses of deuterium before World War II and its large scale production by Norsk Hydro in Norway especially under German control It also discusses the French German race for the Norwegian heavy water stocks in 1940 and heavy water's importance for the subsequent German uranium project including the Allied sabotage and bombing of the Norwegian plants as well as its lesser role in Allied projects especially in the United States and Canada The book concludes with an overall assessment of the importance and the perceived importance of heavy water for the German program which alone staked everything on heavy water in its quest for a nuclear chain reaction A Global History of the Nuclear Arms Race Richard Dean Burns, Joseph M. Siracusa, 2013-04-23 Written by two preeminent

authors in the field this book provides an accessible global narrative of the nuclear arms race since 1945 that focuses on the roles of key scientists military chiefs and political leaders The first book of its kind to provide a global perspective of the arms race this two volume work connects episodes worldwide involving nuclear weapons in a comprehensive narrative fashion Beginning with a discussion of the scientific research of the 1930s and 1940s and the Hiroshima decision the authors focus on five basic themes political dimensions technological developments military and diplomatic strategies and impact The history of the international nuclear arms race is examined within the context of four historical eras America s nuclear monopoly America s nuclear superiority superpower parity and the post Cold War era Information about the historical development of the independent deterrence of Britain France and China as well as the piecemeal deterrence of newcomers Israel India Pakistan and North Korea is also included as is coverage of the efforts aimed at the international control of nuclear weapons and the diplomatic architecture that underpins the global nuclear non proliferation regime

Strategic Studies Thomas G. Mahnken, Joseph A. Maiolo, 2014-01-10 The second edition of Strategic Studies A Reader brings together key essays on strategic theory by some of the leading contributors to the field This revised volume contains several new essays and updated introductions to each section The volume comprises hard to find classics in the field as well as the latest scholarship The aim is to provide students with a wide ranging survey of the key issues in strategic studies and to provide an introduction to the main ideas and themes in the field The book contains six extensive sections each of which is prefaced by a short introductory essay The Uses of Strategic Theory Interpretation of the Classics Instruments of War Intelligence and Deception Nuclear Strategy Irregular Warfare and Small Wars Future Warfare Future Strategy Overall this volume strikes a balance between theoretical works which seek to discover generalisations about the nature of modern strategy and case studies which attempt to ground the study of strategy in the realities of modern war This new edition will be essential reading for all students of strategic studies security studies military history and war studies as well as for professional military college students

Savannah River Site at Fifty Mary Beth Reed, 2002 The heart of the book is a historical treatment of Savannah River Site s operations its peak period of production 1953 to 1979 Developments in reactor technology and chemical separations heavy water production waste management and the research goals of the Savannah River Laboratory are described in layman s terms and are amply illustrated This history profiles the individuals who brought the plant to maturity and explores the two themes that define the nuclear weapons workplace safety and security

[A True Story of an American Nazi Spy](#) Robert A. Miller, 2013-02-27 A True Story of an American Nazi Spy William C Colepaugh A Biography William C Colepaugh was born and raised in Black Point Connecticut Living on the banks of Long Island Sound he developed a love for the sea and aspired to become a naval architect His goals were sidetracked by his lack of educational skills as he failed in his attempt at a degree from either the Naval Academy or MIT Influenced by family members schoolmates and social acquaintances he developed a love for Germany and all things German This love grew to a desire to

go to Germany to further attempt to achieve his original goals. It didn't take long for him to become disenchanted after he finally arrived in Germany as the Germans had different plans for him. He was trained as an espionage agent and saboteur by the SS and returned to the United States to carry out his mission with a fellow German national, Eric Gimpel. After a 54-day submarine journey, they landed near Bar Harbor, Maine, with 60,000 diamonds, fire arms, and espionage equipment and made their way to New York City, that was to become their base of operation. However, after three weeks, mistrust developed between the two spies. Colepaugh broke loose from Gimpel with the money but was soon outsmarted by the seasoned spy. Soon after, Colepaugh decided to turn himself in to the FBI and provided them with enough information that culminated in the capture of Gimpel a few days later. They were tried and convicted by military tribunal and sentenced to be hanged, but presidential politics and world events led to a change in their sentence to life in prison. Colepaugh served 15 years in Federal prison and was released in 1960. For the next 42 years of his life, he functioned as a successful businessman, community member, and husband, with his past only known to a select few, including his wife. In 2002, he was exposed by a journalist and lived in seclusion the remaining three years of his life.

The Scientific World of Karl-Friedrich Bonhoeffer Kathleen L. Housley, 2018-09-05. In twentieth-century Germany, Karl Friedrich Bonhoeffer rose to prominence as a brilliant physical chemist, even as several of his relatives, Dietrich Bonhoeffer among them, became involved in the resistance to Hitler, leading to their executions. This book traces the entanglement of science, religion, and politics in the Third Reich and in the lives of Karl Friedrich, his family, and his colleagues, including Fritz Haber and Werner Heisenberg. Nominated for the Nobel Prize, Karl Friedrich was an expert on heavy water, a component of the atomic bomb. During the war, he was caught in the middle between relatives who were trying to kill Hitler and friends who were helping Hitler build a nuclear weapon. Karl Friedrich emerges as a complex figure: an agnostic whose brother was a renowned theologian and a chemist who both reluctantly advised German nuclear scientists and collaborated with Paul Rosbaud, a spy for the British. Illuminating the uneasy position of science in twentieth-century Germany, *The Scientific World of Karl Friedrich Bonhoeffer* is the story of a man in love with chemistry, his family, and his nation, trying to do right by all of them in the midst of chaos.

Peculiar Liaisons John S. Craig, 2005. Presenting famous and infamous individuals and events that shocked the world and helped set the scene for today's history, this book illustrates how little is really known about some of the most dramatic and most studied events. Who motivated whom, how and why, and what counterplots and alternative scenarios may have been at play? Terrorism, the fomenting of revolution, undermining from within, and trumped-up events to spur a nation to go to war: these techniques are not new. The public's interest in certain personalities never seems to wane: Mata Hari, Gavrilo Princip, Sidney Reilly, T. E. Lawrence, Jimmy Doolittle, Hitler, Reinhard Heydrich, and Lee Harvey Oswald, among others. Each chapter presents two or three characters and elaborates on their lives and how they relate to historical events in the 20th century. The book starts with an incident in 1903 in the Balkans and moves chronologically forward to the assassination of JFK.

Racing for the

Bomb Robert S. Norris, 2014-10-21 In September 1942 Colonel Leslie R Groves was given the job of building the atomic bomb As a career officer in the Army Corps of Engineers Groves had overseen hundreds of military construction projects including the Pentagon Until now scientists have received the credit for the Manhattan Project s remarkable achievements And yet it was Leslie R Groves who made things happen It was Groves who drove manufacturers construction crews scientists industrialists and military and civilian officials to come up with the money the materials and the plans to solve thousands of problems and build the bomb in only two years It was his operation and in *Racing for the Bomb* he emerges as a take charge can do figure who succeeds in the face of formidable odds Revealed for the first time in *Racing for the Bomb* Groves played a crucial and decisive role in the planning timing and targeting of the Hiroshima and Nagasaki missions Norris offers new insights into the complex and controversial questions surrounding the decision to drop the bomb in Japan and Groves s actions during World War II which had a lasting imprint on the nuclear age and the Cold War that followed Grove s extensive influence on key institutions of postwar America has been overlooked for too long In this full scale biography which includes archival material and family letters and documents and features several previously unpublished photographs Norris places Groves at the center of the amazing Manhattan Project story Skyhorse Publishing along with our Arcade Good Books Sports Publishing and Yucca imprints is proud to publish a broad range of biographies autobiographies and memoirs Our list includes biographies on well known historical figures like Benjamin Franklin Nelson Mandela and Alexander Graham Bell as well as villains from history such as Heinrich Himmler John Wayne Gacy and O J Simpson We have also published survivor stories of World War II memoirs about overcoming adversity first hand tales of adventure and much more While not every title we publish becomes a New York Times bestseller or a national bestseller we are committed to books on subjects that are sometimes overlooked and to authors whose work might not otherwise find a home **Last Hope Island** Lynne

Olson, 2017-04-25 A groundbreaking account of how Britain became the base of operations for the exiled leaders of Europe in their desperate struggle to reclaim their continent from Hitler from the New York Times bestselling author of *Citizens of London* and *Those Angry Days* When the Nazi blitzkrieg rolled over continental Europe in the early days of World War II the city of London became a refuge for the governments and armed forces of six occupied nations who escaped there to continue the fight So too did General Charles de Gaulle the self appointed representative of free France As the only European democracy still holding out against Hitler Britain became known to occupied countries as Last Hope Island Getting there one young emigr declared was like getting to heaven In this epic character driven narrative acclaimed historian Lynne Olson takes us back to those perilous days when the British and their European guests joined forces to combat the mightiest military force in history Here we meet the courageous King Haakon of Norway whose distinctive H7 monogram became a symbol of his country s resistance to Nazi rule and his fiery Dutch counterpart Queen Wilhelmina whose antifascist radio broadcasts rallied the spirits of her defeated people Here too is the Earl of Suffolk a swashbuckling British aristocrat whose

rescue of two nuclear physicists from France helped make the Manhattan Project possible Last Hope Island also recounts some of the Europeans heretofore unsung exploits that helped tilt the balance against the Axis the crucial efforts of Polish pilots during the Battle of Britain the vital role played by French and Polish code breakers in cracking the Germans reputedly indecipherable Enigma code and the flood of top secret intelligence about German operations gathered by spies throughout occupied Europe that helped ensure the success of the 1944 Allied invasion A fascinating companion to Citizens of London Olson s bestselling chronicle of the Anglo American alliance Last Hope Island recalls with vivid humanity that brief moment in time when the peoples of Europe stood together in their effort to roll back the tide of conquest and restore order to a broken continent Praise for Last Hope Island In Last Hope Island Lynne Olson argues an arresting new thesis that the people of occupied Europe and the expatriate leaders did far more for their own liberation than historians and the public alike recognize The scale of the organization she describes is breathtaking The New York Times Book Review Last Hope Island is a book to be welcomed both for the past it recovers and also quite simply for being such a pleasant tome to read The Washington Post A pointed volume Olson tells a great story and has a fine eye for character The Boston Globe *The Bastard Brigade* Sam Kean, 2019-07-09 From New York Times bestselling author Sam Kean comes the gripping untold story of a renegade group of scientists and spies determined to keep Adolf Hitler from obtaining the ultimate prize a nuclear bomb Scientists have always kept secrets But rarely have the secrets been as vital as they were during World War II In the middle of building an atomic bomb the leaders of the Manhattan Project were alarmed to learn that Nazi Germany was far outpacing the Allies in nuclear weapons research Hitler with just a few pounds of uranium would have the capability to reverse the entire D Day operation and conquer Europe So they assembled a rough and motley crew of geniuses dubbed the Alsos Mission and sent them careening into Axis territory to spy on sabotage and even assassinate members of Nazi Germany s feared Uranium Club The details of the mission rival the finest spy thriller but what makes this story sing is the incredible cast of characters both heroes and rogues alike including Moe Berg the major league catcher who abandoned the game for a career as a multilingual international spy the strangest fellow to ever play professional baseball Werner Heisenberg the Nobel Prize winning physicist credited as the discoverer of quantum mechanics a key contributor to the Nazi s atomic bomb project and the primary target of the Alsos mission Colonel Boris Pash a high school science teacher and veteran of the Russian Revolution who fled the Soviet Union with a deep disdain for Communists and who later led the Alsos mission Joe Kennedy Jr the charismatic thrill seeking older brother of JFK whose need for adventure led him to volunteer for the most dangerous missions the Navy had to offer Samuel Goudsmit a washed up physics prodigy who spent his life hunting Nazi scientists and his parents who had been swept into a concentration camp across the globe Ir ne and Frederic Joliot Curie a physics Nobel Prize winning power couple who used their unassuming status as scientists to become active members of the resistance Thrust into the dark world of international espionage these scientists and soldiers played a vital and largely untold

role in turning back one of the darkest tides in human history **Building the Bombs** Charles R. Loeber, 2012 From the Back Cover The Nuclear Weapons Complex NWC is a nationwide group of government owned sites that is responsible for the design development production modification repair assemble disassembly and testing of all nuclear weapons in the U S stockpile The NWC has evolved since the beginning of the Manhattan Project in 1942 to meet national security objectives It has met these objectives by building the weapons that ended World War II building a stockpile of weapons that served as a deterrent to the Soviet Union during the Cold War incorporating new technologies into the stockpile safely downsizing the stockpile and dismantling the excess nuclear weapons after the Cold War was over and ensuring that the remaining stockpile is safe and reliable This book provides a high level summary of this story It begins in 1905 with Einstein s Special Theory of Relativity and his famous equation $E=mc^2$ and ends in the year 2001 with a discussion of the post Cold War challenges for the NWC It explains how and why the NWC grew from three sites at the start of the Manhattan Project to over fifty sites at the height of the Cold War to eight sites three laboratories four production plants and one test site after the Cold War ended

Time, Quantum and Information Lutz Castell, Otfried Ischebeck, 2013-04-17 This publication centers on the extraordinary ideas in and concepts of physics of th Carl Friedrich von Weizsäcker At the time of his 90 birthday on June 28 2002 it seems the right moment to try such a survey The themes of two Festschriften for Carl th th Friedrich von Weizsäcker on the occasion of his 60 and 70 birthdays E Scheibe and G Suessmann eds *Einheit und Vielheit* and K Meyer Abich ed *Physik Philosophie und Politik* were his unique capability to encompass physics philosophy and politics He may be more known publicly today for his efforts for containment of the Cold War nuclear threat for the abolition of war as an instrument of international politics for the social responsibility of scientists and for the Conciliar Process of the Churches for Justice Peace and the Integrity of Creation But physics has been his primary professional vocation and has always remained in the center of his thought and life But even in light of the physics focus of this book it would not do justice to Carl Friedrich von Weizsäcker to restrict his achievements in physics to efforts only accessible to professionals The contributions in Part 1 show how his very concentration on physics has led him to take an active part in problems of politics social change philosophy and religion

Redeemer Nation Orrin Schwab, 2004 In this book Dr Orrin Schwab develops the concept of the modern technocratic state as part of a global technocratic culture and civilization The author argues that technocratic cultural and institutional forms were and are part of a collective script for Western culture The American script combined the scientific commercial and technological aspects of the Enlightenment with the radical 17th century Protestant belief in America as a new Zion In the twentieth century the synthesis of mission along with global technocratic knowledge and institutions created the Wilsonian liberal technocratic order As the principal agent and protector of the modern capitalist international system America the self defined Redeemer Nation has moved through the controlled anarchy of international relations from one war and crisis to the next confirmed in its self defined role and mission **A Depth Psychological Study of the Peace Symbol**

Michelle Rivera-Clonch,2023-07-05 This engaging new book uncovers the cultural context behind the peace symbol s emergence its growing significance in the 1960s and its ongoing presence in today s worldwide grassroots and nonviolent social action protests Since its debut in 1958 the peace symbol has become a ubiquitous presence in broadcasted images of protest and resistance yet most citizens are unaware of the symbol s history or psychological evolution It is a unique modern symbol in that it is at once an omnipresent and yet entirely unknown entity This noteworthy text engages readers in fresh and thought provoking ways around the interdependent relationships of peace and war recognition and secrets symbol and chaos and action and inaction to name a few In this book Rivera Clonch brings a depth psychological analysis to Post World War II s escalating nuclear tensions and rhetoric and links it to today s increasing consciousness around social injustices and nonviolent activism This is a timely and relevant interdisciplinary case study exploring the peace symbol through the dimensions of cultural secrets and psychological shadow nuclearized storytelling and symbology and grassroots nonviolent social action A Depth Psychological Study of the Peace Symbol will be of interest to Jungian and depth psychologists as well as students and scholars of peace studies and psychology

Secret Weapons and World War II Walter E. Grunden,2005 Grunden s analysis of this fundamental flaw in the Japanese war effort seamlessly weaves together science technology and military history to provide an entirely unique look at a crucial but understudied aspect of World War II Comparing the science and weapons programs of all the major combatants he demonstrates that Japan s failure was nearly inevitable given its paucity of strategic resources an inadequate industrial base the absence of effective centralized management to coordinate research military hostility toward civilian scientists and bitter interservice rivalries In the end Japan could not overcome these obstacles and thus failed to make the transition to the kind of Big Science it needed to ward off its enemies and dominate the Far East

BOOK JACKET

Japan at War in the Pacific Jonathan Clements,2022-05-10 A lucid history of the rise and fall of militarism in Japan New York Journal of Books Japan at War in the Pacific recounts the dramatic story of Japan s transformation from a Samurai led feudal society to a modern military industrial empire in the space of a few decades and the many wars it fought along the way These culminated in an attempt by Japan s military leaders to create an Asia Pacific empire which at its greatest extent rivaled the British Empire in scope and power The battle for supremacy in the Pacific brought the Japanese to great heights but led ultimately to the nation s utter devastation at the end of World War II culminating with the dropping of atomic bombs on Hiroshima and Nagasaki the only time such weapons have been used in warfare In this book author Jonathan Clements offers fascinating insights into The wars that Japan fought during its rise to supremacy in the western Pacific including the Russo Japanese War the seizure of Manchuria and war in China and the Pacific theater of World War II The many military actions undertaken by Imperial Japanese forces including the horrific Rape of Nanjing the surprise attack on Pearl Harbor the decisive defeat at the Battle of Midway the savage Battles of Okinawa and Iwo Jima and many more The motivations and beliefs of Japan s leaders as well as the policy decisions of a government

dedicated to expansion which ultimately led to a complete dismantling of the nation's political and social order during the Allied Occupation. With over 75 photographs and maps, this book vividly recounts the brutal story of Japan's military conquests. Clements charts the evolution of the Japanese empire in the Pacific and the influence of a ruthless military-led government on everything from culture and food to fashion and education, including the anthems and rallying calls of a martial nation which were silenced long ago but continue to echo in Asian politics. [Special Operations in Norway](#) Ian Herrington, 2019-04-04 Between 1940 and 1945 Britain's Special Operations Executive (SOE) carried out sabotage and organised resistance across occupied Europe. Over 5 years, SOE sent over 500 agents into Norway to carry out a range of operations from sabotage and assassination to attempts to organise an underground guerrilla army. This book is the first multi-archival international academic analysis of SOE's policy and operations in Norway and the influences that shaped them, challenging previous interpretations of the relationship between this organisation and both the Norwegian authorities and the Milorg resistance movement. **Molecules That Amaze Us** Paul May, Simon Cotton, 2014-10-23 This new book is by two knowledgeable and expert popularizers of chemistry and deals exclusively with molecules and compounds rather than with the simpler atoms and elements. It is based on the very successful Molecule of the Month website that was begun by Paul May fifteen years ago and to which his co-author Simon Cotton has been a frequent co-contributor. [The Quantum Exodus](#) Gordon Fraser, 2012-02-23 When the Nazis came to power in 1933, they immediately expelled Jewish academics, unwittingly changing the power balance of world science. When war came, these scientific refugees raced to engineer the atomic bomb to prevent Nazi Germany from getting there first. This book tells the story of how the Bomb and the Holocaust became locked in a grisly race.

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