

International Acclaim for *The Prize*

“Monumental analysis of the history and politics of oil . . . Engagingly written and a landmark of research.”

—*Newsweek*

“If you want to know what really makes the world go round, Yergin’s colorful history of the petroleum industry is indispensable.”

—*Time*

“Deserves to become the standard text on the history of oil.”

—Leslie H. Gelb, front page, *The New York Times Book Review*

“There is no doubt about Yergin’s basic thesis: Oil is power, big power . . . Yergin rightly has a lot to tell us.”

—Theodore C. Sorensen, front page, *The Washington Post Book World*

“A compelling history . . . that clarifies the contemporary world situation.”

—*Los Angeles Times*

“Yergin has not written the history of oil but the history of the world from the point of view of oil. And he has written it very well, with an eye for the relevant and often amusing detail. . . . He marveled at his discoveries and, thanks to his great literary gifts, he is able to make us marvel as well. . . . Yergin is finally as much a psychologist as he is a geologist and a historian—one who knows that oil is somewhere, deep down, in everybody’s emotions under two other names: wealth and power.”

—Robert Mabro, front page, *Chicago Tribune Book World*

“Impressive mastery . . . Daniel Yergin is as well equipped as anyone to build the bridge between oil and world diplomacy. . . . He attempts nothing less than a rewriting of world history, to bring oil out of the garage into the cabinet-rooms.”

—Anthony Sampson, author of *The Seven Sisters*, *The Spectator*

“More than a gripping tale of international politics, *The Prize* chronicles oil’s role in shaping the twentieth century’s ‘Hydrocarbon Society’ of expressways, suburbs—and pollution—as well as ‘Hydrocarbon Man,’ who shows little inclination to give up the conveniences of automobiles, suburban homes and other oil-based essentials of life.”

—*Atlanta Constitution*

“Dazzling. . . . a masterful study of how oil has dominated and shaped world events in the twentieth century.”

—Jeremy Campbell, *London Evening Standard*

“The best history of oil ever written. . . . Yergin’s account [of World War II] is utterly persuasive and . . . downright gripping. . . . *The Prize* . . . brings our knowledge of the twentieth century—the Age of Oil—into sharper focus.”

—*Business Week*

“This is a book about greed, ambition and the lust for power. It is about the people who have made the oil industry what it is—from Sheikh Yamani and George Bush to Armand Hammer and Saddam Hussein. . . . Yergin is a wonderful storyteller.”

—Stephen Butler, *Financial Times* of London

“Compulsive reading. . . . Daniel Yergin’s new book must be required reading for everyone from the Prime Minister to the new Desert Rats.”

—*London Daily Mail*

“Strongly recommended.”

—Conor Cruise O’Brien, *Times Literary Supplement*

“*The Prize* is the story of how a ‘mere commodity’ has shaped the politics of the twentieth century and profoundly changed the way we lead our lives . . . a significant book . . .”

—*Houston Chronicle*

“Compelling and comprehensive. . . . his narrative proceeds like a developing photograph of our times.”

—*The New Yorker*

“Fascinating. . . . *The Prize* revels in the drama.”

—*The Economist*

“Remarkable. . . . an incredible work . . . exciting and easy to read. . . . Compulsory reading for politicians and top officials [and] anyone concerned with an accurate history of this century.”

—Peter Walker, former UK Secretary of State for Trade and Industry,
The Independent

“Captivating. . . . readers will be well rewarded. . . . Without oil, it would be impossible to think of America’s place in the world.”

—*Asahi Shimbun*, Tokyo

“*The Prize* manages to be both serious socio-economic history and wonderful entertainment. Yergin . . . has a real knack for making his characters come alive. . . . Oil as a force of history has become bigger than nations or individuals.”

—*Far Eastern Economic Review*

“It would be impossible to fully understand . . . the ‘age of oil,’ without reading *The Prize* by Daniel Yergin. . . . *The Prize* is beyond exceptional . . . it is an entrancing tale of promoters, industrialists, and politicians; it is packed with historical detail but written with richness and intrigue . . .”

—Jeff Sandefer, *The National Review*

“Impeccably researched and fluently written . . . You can’t read Yergin’s account of the improbable cast of characters who built the modern oil business without marveling at the role of luck and accident in any process of economic creation.”

—George Gendron, *Inc. Magazine*

“A magnificent epic story. . . . The Century of Oil will continue into the next century.”

—*Nihon Keizai Shimbun, The Japan Economic Journal*

B o o k s b y
D a n i e l Y e r g i n

Author

*The New Map: Energy, Climate, and
the Clash of Nations*

*The Quest: Energy, Security, and the
Remaking of the Modern World*

Shattered Peace: Origins of the Cold War

Coauthor

*The Commanding Heights:
The Battle for the World Economy*

Energy Future

Global Insecurity

Russia 2010

DANIEL YERGIN

THE
PRIZE

THE EPIC QUEST
FOR OIL,
MONEY & POWER

FREE PRESS

New York Amsterdam/Antwerp London
Toronto Sydney/Melbourne New Delhi



FREE PRESS

A Division of Simon & Schuster, LLC
1230 Avenue of the Americas
New York, New York 10020

Copyright © 1991, 1992, 2008 by Daniel Yergin
Epilogue copyright © 2025 by Daniel Yergin
Title logo copyright © 1992 by WGBH Educational Foundation

All rights reserved,
including the right to reproduce this book
or portions thereof in any form whatsoever.
For information address Free Press Subsidiary Rights Department,
1230 Avenue of the Americas, New York, NY 10020.

This Free Press trade paperback edition March 2025

FREE PRESS and colophon are trademarks of Simon & Schuster, LLC

For information about special discounts for bulk purchases,
please contact Simon & Schuster Special Sales at:
1-866-506-1949 or business@simonandschuster.com.

Designed by Irving Perkins Associates, Inc.

Manufactured in the United States of America

30

The Library of Congress has cataloged the Simon & Schuster edition as follows:

Yergin, Daniel.

The prize: the epic quest for oil, money, and power / Daniel Yergin.

p. cm.

Includes bibliographical references and index.

1. Petroleum industry and trade—Political aspects—History—20th century.
2. Petroleum industry and trade—Military aspects—History—20th century.
3. World War, 1914–1918—Causes. 4. World War, 1939–1945—Causes.
5. World politics—20th century.

I. Title.

HD9560.6. Y47 1990

338.2'782'0904—dc20

90-47575

CIP

ISBN-13: 978-1-4391-1012-6

ISBN-10: 1-4391-1012-3

Lyrics on page 536 © 1962 Carolintone Music Company, Inc. Renewed 1990.

Used by permission.

Poem on pages 688–689 from *The Intellectual Adventure of Ancient Man*

by H. and H. A. Frankfort, John A. Wilson,

and Thorkild Jacobsen, page 142, © 1946

The University of Chicago. Used by permission.

To Angela, Alexander, and Rebecca

Contents

List of Maps		xi
Prologue		xiii
PART I	THE FOUNDERS	I
Chapter 1	Oil on the Brain: The Beginning	3
Chapter 2	“Our Plan”: John D. Rockefeller and the Combination of American Oil	19
Chapter 3	Competitive Commerce	40
Chapter 4	The New Century	62
Chapter 5	The Dragon Slain	80
Chapter 6	The Oil Wars: The Rise of Royal Dutch, the Fall of Imperial Russia	98
Chapter 7	“Beer and Skittles” in Persia	118
Chapter 8	The Fateful Plunge	134
PART II	THE GLOBAL STRUGGLE	149
Chapter 9	The Blood of Victory: World War I	151
Chapter 10	Opening the Door on the Middle East: The Turkish Petroleum Company	168
Chapter 11	From Shortage to Surplus: The Age of Gasoline	190
Chapter 12	“The Fight for New Production”	212
Chapter 13	The Flood	227
Chapter 14	“Friends”—and Enemies	243
Chapter 15	The Arabian Concessions: The World That Frank Holmes Made	263

PART III	WAR AND STRATEGY	287
Chapter 16	Japan's Road to War	289
Chapter 17	Germany's Formula for War	311
Chapter 18	Japan's Achilles' Heel	333
Chapter 19	The Allies' War	350
PART IV	THE HYDROCARBON AGE	371
Chapter 20	The New Center of Gravity	373
Chapter 21	The Postwar Petroleum Order	391
Chapter 22	Fifty-Fifty: The New Deal in Oil	413
Chapter 23	"Old Mossy" and the Struggle for Iran	432
Chapter 24	The Suez Crisis	461
Chapter 25	The Elephants	481
Chapter 26	OPEC and the Surge Pot	501
Chapter 27	Hydrocarbon Man	523
PART V	THE BATTLE FOR WORLD MASTERY	543
Chapter 28	The Hinge Years: Countries Versus Companies	545
Chapter 29	The Oil Weapon	570
Chapter 30	"Bidding for Our Life"	595
Chapter 31	OPEC's Imperium	615
Chapter 32	The Adjustment	635
Chapter 33	The Second Shock: The Great Panic	656
Chapter 34	"We're Going Down"	681
Chapter 35	Just Another Commodity?	697
Chapter 36	The Good Sweating: How Low Can It Go?	726
Chapter 37	Crisis in the Gulf	750
Epilogue	Reflections on <i>The Prize</i>	763
Chronology		773
Oil Prices and Production		776
Notes		779
Bibliography		839
Acknowledgments		865
Photo Credits		871
Index		873

List of Maps

The Independents Break Out: The First Long Distance Pipeline, Tidewater, 1879	28
Marcus Samuel's Coup: The Voyage of the Murex, 1892	53
Opening Up the Middle East: Oil in Persia, 1901	128
The Red Line Agreement, July 1, 1928	189
The Great Migration of the 1920s: Mexico's Golden Lane to Venezuela's Lake Maracaibo	218
War in Europe and North Africa	321
War in the Pacific	342
The Great Oil Deals: Middle East Consortia, 1951	405
Alaskan Pipeline and Alternate Routes, Early 1970s	555

Prologue

WINSTON CHURCHILL CHANGED his mind almost overnight. Until the summer of 1911, the young Churchill, home secretary, was one of the leaders of the “economists,” the members of the British Cabinet critical of the increased military spending that was being promoted by some to keep ahead in the Anglo-German naval race. That competition had become the most rancorous element in the growing antagonism between the two nations. But Churchill argued emphatically that war with Germany was not inevitable, that Germany’s intentions were not necessarily aggressive. The money would be better spent, he insisted, on domestic social programs than on extra battleships.

Then on July 1, 1911, Kaiser Wilhelm sent a German naval vessel, the *Panther*, steaming into the harbor at Agadir, on the Atlantic coast of Morocco. His aim was to check French influence in Africa and carve out a position for Germany. While the *Panther* was only a gunboat and Agadir was a port city of only secondary importance, the arrival of the ship ignited a severe international crisis. The buildup of the German Army was already causing unease among its European neighbors; now Germany, in its drive for its “place in the sun,” seemed to be directly challenging France and Britain’s global positions. For several weeks, war fear gripped Europe. By the end of July, however, the tension had eased—as Churchill declared, “the bully is climbing down.” But the crisis had transformed Churchill’s outlook. Contrary to his earlier assessment of German intentions, he was now convinced that Germany sought hegemony and would exert its military muscle to gain it. War, he now concluded, was virtually inevitable, only a matter of time.

Appointed first lord of the admiralty immediately after Agadir, Churchill vowed to do everything he could to prepare Britain militarily for the inescapable day of reckoning. His charge was to ensure that the Royal Navy, the symbol and

very embodiment of Britain's imperial power, was ready to meet the German challenge on the high seas. One of the most important and contentious questions he faced was seemingly technical in nature, but would in fact have vast implications for the twentieth century. The issue was whether to convert the British Navy to oil for its power source, in place of coal, which was the traditional fuel. Many thought that such a conversion was pure folly, for it meant that the Navy could no longer rely on safe, secure Welsh coal, but rather would have to depend on distant and insecure oil supplies from Persia, as Iran was then known. "To commit the Navy irrevocably to oil was indeed 'to take arms against a sea of troubles,'" said Churchill. But the strategic benefits—greater speed and more efficient use of manpower—were so obvious to him that he did not dally. He decided that Britain would have to base its "naval supremacy upon oil" and, thereupon, committed himself, with all his driving energy and enthusiasm, to achieving that objective.

There was no choice—in Churchill's words, "Mastery itself was the prize of the venture."¹

With that, Churchill, on the eve of World War I, had captured a fundamental truth, and one applicable not only to the conflagration that followed, but to the many decades ahead. For oil has meant mastery through the years since. And that quest for mastery is what this book is about.

At the beginning of the 1990s—almost eighty years after Churchill made the commitment to petroleum, after two world wars and a long Cold War, and in what was supposed to be the beginning of a new, more peaceful era—oil once again became the focus of global conflict. On August 2, 1990, yet another of the century's dictators, Saddam Hussein of Iraq, invaded the neighboring country of Kuwait. His goal was not only conquest of a sovereign state, but also the capture of its riches. The prize was enormous. If successful, Iraq would have become the world's leading oil power, and it would have dominated both the Arab world and the Persian Gulf, where the bulk of the planet's oil reserves is concentrated. Its new strength and wealth and control of oil would have forced the rest of the world to pay court to the ambitions of Saddam Hussein. The result would have been a dramatic shift in the international balance of power. In short, mastery itself was once more the prize.

Over the previous several years, it had become almost fashionable to say that oil was no longer "important." Indeed, in the spring of 1990, just a few months before the Iraqi invasion, the senior officers of America's Central Command, which would be the linchpin of the U.S. mobilization, found themselves lectured to the effect that oil had lost its strategic significance. But the invasion of Kuwait stripped away the illusion. Oil was still central to security, prosperity, and the very nature of civilization. This remains true in the twenty-first century.

Though the modern history of oil begins in the latter half of the nineteenth century, it was the twentieth century that was completely transformed by the advent of petroleum. The role of oil—and anxiety about its supply—is a primary consideration of the Internet and the era of globalization that characterizes the first decades of the twenty-first century. In particular, three great themes underlie the story of oil.

The first is the rise and development of capitalism and modern business. Oil

is the world's biggest and most pervasive business, the greatest of the great industries that arose in the last decades of the nineteenth century. Standard Oil, which thoroughly dominated the American petroleum industry by the end of that century, was among the world's very first and largest multinational enterprises. The expansion of the business thereafter—encompassing everything from wildcat drillers, smooth-talking promoters, and domineering entrepreneurs to highly trained scientists and engineers, great corporate bureaucracies, and state-owned companies—embodies the evolution of business, of corporate strategy, of technological change and market development, and indeed of both national and international economies. Throughout the history of oil, deals have been done and momentous decisions have been made—among men, companies, and nations—sometimes with great calculation and sometimes almost by accident. No other business so starkly and extremely defines the meaning of risk and reward—and the profound impact of chance and fate.

As we look forward, it is clear that mastery will certainly come as much from a computer chip as from a barrel of oil. Yet the petroleum industry continues to have enormous impact. Of the top ten companies in the Fortune 500 global ranking in 2008, six are oil companies. Until some alternative source of energy is found in sufficient scale, oil will still have far-reaching effects on the global economy; major price movements can fuel economic growth or, contrarily, drive inflation and help kick-start recessions. Today, oil is the only commodity whose doings and controversies are to be found regularly not only on the business page but also on the front page. And, as in the past, it is a massive generator of wealth—for individuals, companies, and entire nations. In the words of one tycoon, “Oil is almost like money.”²

The second theme is that of oil as a commodity intimately intertwined with national strategies and global politics and power. The battlefields of World War I established the importance of petroleum as an element of national power when the internal combustion machine overtook the horse and the coal-powered locomotive. Petroleum was central to the course and outcome of World War II in both the Far East and Europe. The Japanese attacked Pearl Harbor to protect their flank as they grabbed for the petroleum resources of the East Indies. Among Hitler's most important strategic objectives in the invasion of the Soviet Union was the capture of the oil fields in the Caucasus. But America's predominance in oil proved decisive, and by the end of the war German and Japanese fuel tanks were empty. In the Cold War years, the battle for control of oil between international companies and developing countries was a major part of the great drama of decolonization and emergent nationalism. The Suez Crisis of 1956, which truly marked the end of the road for the old European imperial powers, was as much about oil as about anything else. “Oil power” loomed very large in the 1970s, catapulting states heretofore peripheral to international politics into positions of great wealth and influence, and creating a deep crisis of confidence in the industrial nations that had based their economic growth upon oil. Oil was at the heart of the first post-Cold War crisis—Iraq's 1990 invasion of Kuwait. And oil figured much in the reconfiguration of international relations that came with the dramatic petroleum price increase, 2004–2008, the return of resource politics, and the new importance of China and India in the world market.

Yet oil has also proved that it can be fool's gold. The shah of Iran was granted his most fervent wish, oil wealth, and it destroyed him. Oil built up Mexico's economy, only to undermine it. The Soviet Union—the world's second-largest exporter—squandered its enormous oil earnings in the 1970s and 1980s in a military buildup and a series of useless and, in some cases, disastrous international adventures. And the United States, once the world's largest producer and still its largest consumer, must import between 55 and 60 percent of its oil supply, weakening its overall strategic position and adding greatly to an already burdensome trade deficit—a precarious position for a great power.

With the end of the Cold War, a new world order took shape. Economic competition, regional struggles, and ethnic religious rivalries replaced traditional ideology as the focus of international—and national—conflict, aided and abetted by the proliferation of modern weaponry. A new kind of ideology—religious extremism and jihadism—came to the fore. Yet oil remained the strategic commodity, critical to national strategies and international politics.

A third theme in the history of oil illuminates how ours has become a “Hydrocarbon Society” and we, in the language of anthropologists, “Hydrocarbon Man.” In its first decades, the oil business provided an industrializing world with a product called by the made-up name of “kerosene” and known as the “new light,” which pushed back the night and extended the working day. At the end of the nineteenth century, John D. Rockefeller had become the richest man in the United States, mostly from the sale of kerosene. Gasoline was then only an almost useless by-product, which sometimes managed to be sold for as much as two cents a gallon, and, when it could not be sold at all, was run out into rivers at night. But just as the invention of the incandescent light bulb seemed to signal the obsolescence of the oil industry, a new era opened with the development of the internal combustion engine powered by gasoline. The oil industry had a new market, and a new civilization was born.

In the twentieth century, oil, supplemented by natural gas, toppled King Coal from his throne as the power source for the industrial world. Oil also became the basis of the great postwar suburbanization movement that transformed both the contemporary landscape and our modern way of life. In the twenty-first century, we are so dependent on oil, and oil is so embedded in our daily doings, that we hardly stop to comprehend its pervasive significance. It is oil that makes possible where we live, how we live, how we commute to work, how we travel—even where we conduct our courtships. It is the lifeblood of suburban communities. Oil (and natural gas) are the essential components in the fertilizer on which world agriculture depends; oil makes it possible to transport food to the totally non-self-sufficient megacities of the world. Oil also provides the plastics and chemicals that are the bricks and mortar of contemporary civilization, a civilization that would collapse if the world's oil wells suddenly went dry.

For most of the twentieth century, growing reliance on petroleum was almost universally celebrated as a good, a symbol of human progress. But no longer in the twenty-first century. With the rise of the environmental movement, the basic tenets of industrial society are being challenged; and the oil industry in all its dimensions is at the top of the list to be scrutinized, criticized, and opposed. Efforts are mounting around the world to curtail the combustion of all

fossil fuels—oil, coal, and natural gas—because of the resultant smog and air pollution, acid rain, and ozone depletion, and because of the specter of climate change. The last has now become a central focus of national policies and international negotiation. Oil, which is so central a feature of the world as we know it, is now accused of fueling environmental degradation; and the oil industry, proud of its technological prowess and its contribution to shaping the modern world, finds itself on the defensive, charged with being a threat to present and future generations. This has put a new imperative on technological innovations to mitigate the environmental challenges.

Yet Hydrocarbon Man shows little inclination to give up his cars, his suburban home, and what he takes to be not only the conveniences but the essentials of his way of life. The peoples of the developing world give no indication that they want to deny themselves the gains of an oil-powered economy, whatever the environmental questions. Any notion of scaling back the world's consumption of oil will be influenced by the extraordinary population growth ahead—with more and more of the world's people demanding the “right” to the benefits that come from consumption. Total world oil consumption grew almost 30 percent between 1990 and 2008—from 67 million to 86 million barrels per day. Over the same time, oil demand in India more than doubled and in China, more than tripled. Thus, the stage has been set for a great balancing between, on the one hand, environmental protection and reduction of carbon and, on the other, economic growth, the benefits of Hydrocarbon Society, and energy security.

These, then, are the three themes that animate the story that unfolds in these pages. The canvas is global. The story is a chronicle of epic events that have touched all our lives. It concerns itself both with the powerful, impersonal forces of economics and technology and with the strategies and cunning of businessmen and politicians. Populating its pages are the tycoons and entrepreneurs of the industry—Rockefeller, of course, but also Henri Deterding, Calouste Gulbenkian, J. Paul Getty, Armand Hammer, T. Boone Pickens, and many others. Yet no less important to the story are the likes of Churchill, Adolf Hitler, Joseph Stalin, Ibn Saud, Mohammed Mossadegh, Dwight Eisenhower, Anthony Eden, Henry Kissinger, George H. W. Bush and his son George W. Bush, and Saddam Hussein.

Yet for all its conflict and complexity, there has often been a “oneness” to the story of oil, a contemporary feel even to events that happened long ago and, simultaneously, profound echoes of the past in recent and current events. At one and the same time, this is a story of individual people, of powerful economic forces, of technological change, of political struggles, of international conflict and, indeed, of epic change. It is the author's hope that this exploration of the economic, social, political, and strategic consequences of our world's reliance on oil will illuminate the past, enable us better to understand the present, and help to anticipate the future.

P A R T I

THE
FOUNDERS

C H A P T E R I

Oil on the Brain: The Beginning

THERE WAS THE MATTER of the missing \$526.08.

A professor's salary in the 1850s was hardly generous, and in the quest for extra income, Benjamin Silliman, Jr., the son of a great American chemist and himself a distinguished professor of chemistry at Yale University, had taken on an outside research project for a fee totaling \$526.08. He had been retained in 1854 by a group of promoters and businessmen, but, though he had completed the project, the promised fee was not forthcoming. Silliman, his ire rising, wanted to know where the money was. His anger was aimed at the leaders of the investor group, in particular, at George Bissell, a New York lawyer, and James Townsend, president of a bank in New Haven. Townsend, for his part, had sought to keep a low profile, as he feared it would look most inappropriate to his depositors if they learned he was involved in so speculative a venture.

For what Bissell, Townsend, and the other members of the group had in mind was nothing less than hubris, a grandiose vision for the future of a substance that was known as "rock oil"—so called to distinguish it from vegetable oils and animal fats. Rock oil, they knew, bubbled up in springs or seeped into salt wells in the area around Oil Creek, in the isolated wooded hills of northwestern Pennsylvania. There, in the back of beyond, a few barrels of this dark, smelly substance were gathered by primitive means—either by skimming it off the surface of springs and creeks or by wringing out rags or blankets that had been soaked in the oily waters. The bulk of this tiny supply was used to make medicine.

The group thought that the rock oil could be exploited in far larger quantities and processed into a fluid that could be burned as an illuminant in lamps. This new illuminant, they were sure, would be highly competitive with the "coal-oils" that were winning markets in the 1850s. In short, they believed that, if they could obtain it in sufficient quantities, they could bring to market

the inexpensive, high-quality illuminant that mid-nineteenth-century man so desperately needed. They were convinced that they could light up the towns and farms of North America and Europe. Almost as important, they could use rock oil to lubricate the moving parts of the dawning mechanical age. And, like all entrepreneurs who became persuaded by their own dreams, they were further convinced that by doing all of this they would grow very rich indeed. Many scoffed at them. Yet, persevering, they would succeed in laying the basis for an entirely new era in the history of mankind—the age of oil.

To “Assuage Our Woes”

The venture had its origins in a series of accidental glimpses—and in the determination of one man, George Bissell, who, more than anybody else, was responsible for the creation of the oil industry. With his long, towering face and broad forehead, Bissell conveyed an impression of intellectual force. But he was also shrewd and open to business opportunity, as experience had forced him to be. Self-supporting from the age of twelve, Bissell had worked his way through Dartmouth College by teaching and writing articles. For a time after graduation, he was a professor of Latin and Greek, then went to Washington, D.C., to work as a journalist. He finally ended up in New Orleans, where he became principal of a high school and then superintendent of public schools. In his spare time, he studied to become a lawyer and taught himself several more languages. Altogether, he became fluent in French, Spanish, and Portuguese and could read and write Hebrew, Sanskrit, ancient and modern Greek, Latin and German. Ill health forced him to head back north in 1853, and passing through western Pennsylvania on his way home, he saw something of the primitive oil-gathering industry with its skimmings and oil-soaked rags. Soon after, while visiting his mother in Hanover, New Hampshire, he dropped in on his alma mater, Dartmouth College, where in a professor’s office he spied a bottle containing a sample of this same Pennsylvania rock oil. It had been brought there a few weeks earlier by another Dartmouth graduate, a physician practicing as a country doctor in western Pennsylvania.

Bissell knew that amounts of rock oil were being used as patent and folk medicines to relieve everything from headaches, toothaches, and deafness to stomach upsets, worms, rheumatism, and dropsy—and to heal wounds on the backs of horses and mules. It was called “Seneca Oil” after the local Indians and in honor of their chief, Red Jacket, who had supposedly imparted its healing secrets to the white man. One purveyor of Seneca Oil advertised its “wonderful curative powers” in a poem:

The Healthful balm, from Nature’s secret spring,
The bloom of health, and life, to man will bring;
As from her depths the magic liquid flows,
To calm our sufferings, and assuage our woes.

Bissell knew that the viscous black liquid was flammable. Seeing the rock oil sample at Dartmouth, he conceived, in a flash, that it could be used not as a

medicine but as an illuminant—and that it might well assuage the woes of his pocketbook. He could put the specter of poverty behind him and become rich from promoting it. That intuition would become his guiding principle and his faith, both of which would be sorely tested during the next six years, as disappointment consistently overwhelmed hope.¹

The Disappearing Professor

But could the rock oil really be used as an illuminant? Bissell aroused the interest of other investors, and in late 1854 the group engaged Yale's Professor Silliman to analyze the properties of the oil both as an illuminant and lubricant. Perhaps even more important, they wanted Silliman to put his distinguished imprimatur on the project so they could sell stock and raise the capital to carry on. They could not have chosen a better man for their purposes. Heavysset and vigorous, with a "good, jolly face," Silliman carried one of the greatest and most respected names in nineteenth-century science. The son of the founder of American chemistry, he himself was one of the most distinguished scientists of his time, as well as the author of the leading textbooks in physics and chemistry. Yale was the scientific capital of mid-nineteenth-century America, and the Sillimans, father and son, were at the center of it.

But Silliman was less interested in the abstract than in the decidedly practical, which drew him to the world of business. Moreover, while reputation and pure science were grand, Silliman was perennially in need of supplementary income. Academic salaries were low and he had a growing family; so he habitually took on outside consulting jobs, making geological and chemical evaluations for a variety of clients. His taste for the practical would also carry him into direct participation in speculative business ventures, the success of which, he explained, would give him "plenty of sea room . . . for science." A brother-in-law was more skeptical. Benjamin Silliman, Jr., he said, "is on the constant go in behalf of one thing or another, and alas for Science."

When Silliman undertook his analysis of rock oil, he gave his new clients good reason to think they would get the report they wanted. "I can promise you," he declared early in his research, "that the result will meet your expectations of the value of this material." Three months later, nearing the end of his research, he was even more enthusiastic, reporting "unexpected success in the use of the distillate product of *Rock Oil* as an illuminator." The investors waited eagerly for the final report. But then came the big hitch. They owed Silliman the \$526.08 (the equivalent of about \$5,000 today), and he had insisted that they deposit \$100 as a down payment into his account in New York City. Silliman's bill was much higher than they had expected. They had not made the deposit, and the professor was upset and angry. After all, he had not taken on the project merely out of intellectual curiosity. He needed the money, badly, and he wanted it soon. He made it very clear that he would withhold the study until he was paid. Indeed, to drive home his complaint, he secretly handed over the report to a friend for safe-keeping until satisfactory arrangements were made, and took himself off on a tour of the South, where he could not easily be reached.

The investors grew desperate. The final report was absolutely essential if

they were to attract additional capital. They scrounged around, trying to find the money, but with no success. Finally, one of Bissell's partners, though complaining that "these are the hardest times I ever heard of," put up the money on his own security. The report, dated April 16, 1855, was released to the investors and hurried to the printers. Though still appalled by Silliman's fee, the investors, in fact, got more than their money's worth. Silliman's study, as one historian put it, was nothing less than "a turning point in the establishment of the petroleum business." Silliman banished any doubts about the potential new uses for rock oil. He reported to his clients that it could be brought to various levels of boiling and thus distilled into several fractions, all composed of carbon and hydrogen. One of these fractions was a very high-quality illuminating oil. "Gentlemen," Silliman wrote to his clients, "it appears to me that there is much ground for encouragement in the belief that your Company have in their possession a raw material from which, by simple and not expensive processes, they may manufacture very valuable products." And, satisfied with the business relationship as it had finally been resolved, he held himself fully available to take on further projects.

Armed with Silliman's report, which proved a most persuasive advertisement for the enterprise, the group had no trouble raising the necessary funds from other investors. Silliman himself took two hundred shares, adding further to the respectability of the enterprise, which became known as the Pennsylvania Rock Oil Company. But it took another year and a half of difficulties before the investors were ready to take the next hazardous step.

They now knew, as a result of Silliman's study, that an acceptable illuminating fluid could be extracted from rock oil. But was there enough rock oil available? Some said that it was only the "drippings" from underground coal seams. Certainly, a business could not be built from skimming oil stains off the surfaces of creeks or from wringing out oil-soaked rags. The critical issue, and what their enterprise was all about, was proving that there was a sufficient and obtainable supply of rock oil to make for a substantial paying proposition.²

Price and Innovation

The hopes pinned on the still mysterious properties of oil arose from pure necessity. Burgeoning populations and the spreading economic development of the industrial revolution had increased the demand for artificial illumination beyond the simple wick dipped into some animal grease or vegetable fat, which was the best that most could afford over the ages, if they could afford anything at all. For those who had money, oil from the sperm whale had for hundreds of years set the standard for high-quality illumination; but even as demand was growing, the whale schools of the Atlantic had been decimated, and whaling ships were forced to sail farther and farther afield, around Cape Horn and into the distant reaches of the Pacific. For the whalers, it was the golden age, as prices were rising, but it was not the golden age for their consumers, who did not want to pay \$2.50 a gallon—a price that seemed sure to go even higher. Cheaper lighting fluids had been developed. Alas, all of them were inferior. The most popular was camphene, a derivative of turpentine, which produced a good light but had the

unfortunate drawback of being highly flammable, compounded by an even more unattractive tendency to explode in people's houses. There was also "town gas," distilled from coal, which was piped into street lamps and into the homes of an increasing number of middle- and upper-class families in urban areas. But "town gas" was expensive, and there was a sharply growing need for a reliable, relatively cheap illuminant. There was that second need as well—lubrication. The advances in mechanical production had led to such machines as power looms and the steam printing press, which created too much friction for such common lubricants as lard.

Entrepreneurial innovation had already begun to respond to these needs in the late 1840s and early 1850s, with the extraction of illuminating and lubricating oils from coal and other hydrocarbons. A lively cast of characters, both in Britain and in North America, carried the search forward, defining the market and developing the refining technology on which the oil industry would later be based. A court-martialed British admiral, Thomas Cochrane—who, it was said, provided the model for Lord Byron's *Don Juan*—became obsessed with the potential of asphalt, sought to promote it, and, along the way, acquired ownership of a huge tar pit in Trinidad. Cochrane collaborated for a time with a Canadian, Dr. Abraham Gesner. As a young man, Gesner had attempted to start a business exporting horses to the West Indies, but, after being shipwrecked twice, gave it up and went off to Guy's Hospital in London to study medicine. Returning to Canada, he changed careers yet again and became provincial geologist for New Brunswick. He developed a process for extracting an oil from asphalt or similar substances and refining it into a quality illuminating oil. He called this oil "kerosene"—from *Keros* and *elaion*, the Greek words, respectively, for "wax" and "oil," altering the *elaion* to *ene*, so that his product would sound more like the familiar camphene. In 1854 he applied for a United States patent for the manufacture of "a new liquid hydrocarbon, which I denominate Kerosene, and which may be used for illuminating or other purposes."

Gesner helped establish a kerosene works in New York City that by 1859 was producing five thousand gallons a day. A similar establishment was at work in Boston. The Scottish chemist James Young had pioneered a parallel refining industry in Britain, based on cannel coal, and one also developed in France, using shale rock. By 1859, an estimated thirty-four companies in the United States were producing \$5 million a year worth of kerosene or "coal-oils," as the product was generically known. The growth of this coal-oil business, wrote the editor of a trade journal, was proof of "the impetuous energy with which the American mind takes up any branch of industry that promises to pay well." A small fraction of the kerosene was extracted from Pennsylvania rock oil that was gathered by the traditional methods and that would, from time to time, turn up at the refineries in New York.³

Oil was hardly unfamiliar to mankind. In various parts of the Middle East, a semisolid oozy substance called bitumen seeped to the surface through cracks and fissures, and such seepages had been tapped far back into antiquity—in Mesopotamia, back to 3000 B.C. The most famous source was at Hit, on the Euphrates, not far from Babylon (and the site of modern Baghdad). In the first century B.C., the Greek historian Diodor wrote enthusiastically about the ancient

bitumen industry: “Whereas many incredible miracles occur in the Babylonian country, there is none such as the great quantity of asphalt found there.” Some of these seepages, along with escaping petroleum gases, burned continuously, providing the basis for fire worship in the Middle East.

Bitumen was a traded commodity in the ancient Middle East. It was used as a building mortar. It bound the walls of both Jericho and Babylon. Noah’s ark and Moses’ basket were probably caulked, in the manner of the time, with bitumen to make them waterproof. It was also used for road making and, in a limited and generally unsatisfactory way, for lighting. And bitumen served as a medicine. The description by the Roman naturalist Pliny in the first century A.D. of its pharmaceutical value was similar to that current in the United States during the 1850s. It checked bleeding, Pliny said, healed wounds, treated cataracts, provided a liniment for gout, cured aching teeth, soothed a chronic cough, relieved shortness of breath, stopped diarrhea, drew together severed muscles, and relieved both rheumatism and fever. It was also “useful for straightening out eyelashes which inconvenience the eyes.”

There was yet another use for oil; the product of the seepages, set aflame, found an extensive and sometimes decisive role in warfare. In the *Iliad*, Homer recorded that “the Trojans cast upon the swift ship unwearied fire, and over her forthwith streamed a flame that might not be quenched.” When the Persian king Cyrus was preparing to take Babylon, he was warned of the danger of street fighting. He responded by talking of setting fires, and declared, “We also have plenty of pitch and tow, which will quickly spread the flames everywhere, so that those upon the house-tops must either quickly leave their posts or quickly be consumed.” From the seventh century onward, the Byzantines had made use of *oleum incendiarum*—Greek fire. It was a mixture of petroleum and lime that, touched with moisture, would catch fire; the recipe was a closely guarded state secret. The Byzantines heaved it on attacking ships, shot it on the tips of arrows, and hurled it in primitive grenades. For centuries, it was considered a more terrible weapon than gunpowder.⁴

So the use of petroleum had a long and varied history in the Middle East. Yet, in a great mystery, knowledge of its application was lost to the West for many centuries, perhaps because the known major sources of bitumen, and the knowledge of its uses, lay beyond the boundaries of the Roman Empire, and there was no direct transition of that knowledge to the West. Even so, in many parts of Europe—Bavaria, Sicily, the Po Valley, Alsace, Hannover, and Galicia, to name a few—oil seepages were observed and commented upon from the Middle Ages onward. And refining technology was transmitted to Europe via the Arabs. But, for the most part, petroleum was put to use only as the all-purpose medicinal remedy, fortified by learned disquisitions on its healing properties by monks and early doctors. But, well before George Bissell’s entrepreneurial vision and Benjamin Silliman’s report, a small oil industry had developed in Eastern Europe—first in Galicia (which was variously part of Poland, Austria, and Russia) and then in Rumania. Peasants dug shafts by hand to obtain crude oil, from which kerosene was refined. A pharmacist from Lvov, with the help of a plumber, invented a cheap lamp suited to burning kerosene. By 1854, kerosene was a staple of commerce in Vienna. By 1859, Galicia had a thriving kerosene

oil business, with over 150 villages involved in oil mining, led by such families as Backenroth-Bronicki. Altogether, European crude production in 1859 had been estimated at thirty-six thousand barrels, primarily from Galicia and Rumania. What the Eastern European industry lacked, more than anything else, was the technology for drilling.

In the 1850s, the spread of kerosene in the United States faced two significant barriers: There was as yet no substantial source of supply, and there was no cheap lamp well suited to burning what kerosene was available. The lamps that did exist tended to become smoky, and the burning kerosene gave off an acrid smell. Then a kerosene sales agent in New York learned that a lamp with a glass chimney was being produced in Vienna to burn Galician kerosene. Based upon the design of the pharmacist and the plumber in Lvov, the lamp overcame the problems of the smoke and the smell. The New York salesman started to import the lamp, which quickly found a market. Though its design was subsequently improved many times over, that Vienna lamp became the basis of the kerosene lamp trade in the United States and was later re-exported around the world.⁵

Thus by the time that Bissell was launching his venture, a cheaper quality illuminating oil—kerosene—had already been introduced into some homes. The techniques required for refining petroleum into kerosene had already been commercialized with coal-oils. And an inexpensive lamp had been developed that could satisfactorily burn kerosene. In essence, what Bissell and his fellow investors in the Pennsylvania Rock Oil Company were trying to do was discover a new source for the raw material that went into an existing, established process. It all came down to price. If they could find rock oil—petroleum—in sufficient abundance, it could be sold cheaply, capturing the illuminating oils market from products that were either far more expensive or far less satisfactory.

Digging for oil would not do it. But perhaps there was an alternative. Salt “boring,” or drilling, had been developed more than fifteen hundred years earlier in China, with wells going down as deep as three thousand feet. Around 1830, the Chinese method was imported into Europe and copied. That, in turn, may have stimulated the drilling of salt wells in the United States. George Bissell was still struggling to put his venture together when, on a hot day in New York in 1856, he took refuge from the burning sun under the awning of a druggist’s shop on Broadway. There in the window, he caught sight of an advertisement for a rock oil medicine that showed several drilling derricks—of the kind used to bore for salt. The rock oil for the patent medicine was obtained as a by-product of drilling for salt. With that coincidental glimpse by Bissell—following on his earlier ones in western Pennsylvania and at Dartmouth College—the last piece fell into place in his mind. Could not that technique of drilling be applied to the recovery of oil? If the answer was yes, here at last was the means for achieving his fortune.

The essential insight of Bissell—and then of his fellow investors in the Pennsylvania Rock Oil Company—was to adapt the salt-boring technique directly to oil. Instead of digging for rock oil, they would drill for it. They were not alone; others in the United States and Ontario, Canada, were experimenting with the same idea. But Bissell and his group were ready to move. They had Professor Silliman’s report, and because of the report they had the capital. Still, they

were not taken very seriously. When the banker James Townsend discussed their idea of drilling, many in New Haven derided it: “Oh Townsend, oil coming out of the ground, pumping oil out of the earth as you pump water? Nonsense! You’re crazy.” But the investors were intent on going ahead. They were convinced of the need and the opportunity. But to whom would they now entrust this lunatic project?⁶

The “Colonel”

Their candidate was one Edwin L. Drake, who was chosen mainly by coincidence. He certainly brought no outstanding or obvious qualifications to the task. He was a jack-of-all-trades and a sometime railroad conductor, who had been laid up by bad health and was living with his daughter in the old Tontine Hotel in New Haven. By chance, James Townsend, the New Haven banker, lived in the same hotel. It was the sort of hotel where men gathered to exchange news and shoot the breeze, a perfect setting for the thirty-eight-year-old Drake, who was friendly, jovial, and loquacious, and had nothing else to do. So he would pass the evenings entertaining his companions with stories drawn from his varied life. He had a vivid imagination, and his stories tended to be dramatic, exaggerated tales, in all of which Drake himself played a central, heroic role. He and Townsend talked frequently about the rock oil venture. Townsend even persuaded Drake to buy some stock in the company. Townsend then recruited Drake himself to the scheme. He was out of work and thus available, and since he was on leave as a conductor, he had a railroad pass and could travel for free, which was most helpful to the financially pinched speculative venture. He had another attribute that would be of great value: He could be very tenacious.

Dispatching Drake to Pennsylvania, Townsend gave him what turned out to be a valuable send-off. Concerned about the frontier conditions and the need to impress the “backwoodsmen,” the banker sent ahead several letters addressed to “Colonel” E. L. Drake. Thus was “Colonel” Drake invented, though a “colonel” he certainly was not. The stratagem worked. For a warm and hospitable welcome was received by “Colonel” E. L. Drake, when, in December of 1857, he arrived, after an exhausting journey through a sea of mud, on the back of the twice-weekly mail wagon, in the tiny, impoverished village of Titusville, population 125, tucked into the hills of northwestern Pennsylvania. Titusville was a lumber town, whose inhabitants were deeply in debt to the local lumber company’s store. It was generally expected that the village would die when the surrounding hills had all been logged and that the site would then be reclaimed by the wild.

Drake’s first job was simply to perfect the title to the prospective oil land, which was on a farm. This he quickly accomplished. He returned to New Haven, intent on the much more daunting next step, drilling for oil. “I had made up my mind,” he later said, that oil “could be obtained in large quantities by Boreing as for Salt Water. I also determined that I should be the one to do it. But I found that no one with whom I conversed upon the subject agreed with me, all maintaining that oil was the drippings of an extensive Coal field or bed.”

But Drake was not to be dissuaded or diverted. He was back in Titusville in the spring of 1858 to commence work. The investors had established a new com-

pany, the Seneca Oil Company, with Drake as its general agent. He set up operations about two miles down Oil Creek from Titusville, on a farm that contained an oil spring, from which three to six gallons of oil a day were collected by the traditional methods. After several months back in Titusville, he wrote Townsend, "I shall not try to dig by hand any more, as I am satisfied that boring is the cheapest." But he begged the New Haven banker to send additional funds immediately. "Money we must have if we are to make anything. . . . Please let me know at once. Money is very scarce here." After some delay, Townsend managed to send a thousand dollars, and with it Drake tried to hire the "salt borers"—or drillers—that he needed if he were to proceed. But salt drillers had a reputation for extreme partiality to whiskey and frequent drunkenness, and he wanted to be very careful whom he hired. So he would tie compensation to successful completion at the rate of one dollar per foot drilled. The first couple of drillers he engaged simply disappeared or begged off. In truth, though they dared not tell Drake so to his face, they thought he was insane. Drake knew only that he had nothing to show for his first year in Titusville, and the bleak winter was at hand. So he devoted himself to erecting the steam engine that would power the drill bit, while the investors back in New Haven fretted and waited.

Finally, in the spring of 1859, Drake found his driller, a blacksmith named William A. Smith—"Uncle Billy" Smith—who came with his two sons. Smith knew something about what needed to be done, for he made the tools for the salt water drillers, and the little team now proceeded to build the derrick and assemble the necessary equipment. They assumed they would have to go several hundred feet into the earth. The work was slow, and the investors in New Haven were becoming more and more restive at the lack of progress. Still, Drake stuck to his plan. He would not give up. Eventually, Townsend was the only one of the promoters who still believed in the project, and, when the venture ran out of money, he began paying the bills out of his own pocket. In despair, he at last sent Drake a money order as a final remittance and instructed him to pay his bills, close up the operation, and return to New Haven. That was toward the end of August 1859.

Drake had not yet received the letter when, on Saturday afternoon, August 27, 1859, at sixty-nine feet, the drill dropped into a crevice and then slid another six inches. Work was called off for the rest of the weekend. The next day, Sunday, Uncle Billy came out to see the well. He peered down into the pipe. He saw a dark fluid floating on top of the water. He used a tin rain spout to draw up a sample. As he examined the heavy liquid, he was overcome by excitement. On Monday, when Drake arrived, he found Uncle Billy and his boys standing guard over tubs, washbasins, and barrels, all of which were filled with oil. Drake attached a common hand pump and began to do exactly what the scoffers had ridiculed—pump up the liquid. That same day he received the money order from Townsend and the command to close up shop. A week earlier, with the last of the funds in hand, he would have done so. But not anymore. Drake's single-mindedness had paid off. Just in time. He had hit oil. Farmers along Oil Creek rushed into Titusville shouting, "The Yankee has struck oil." The news spread like wildfire and started a mad rush to acquire sites and drill for oil. The population of tiny Titusville multiplied overnight, and land prices shot up instantaneously.

Success with the drill did not, however, guarantee financial success. It meant new problems. What were Drake and Uncle Billy to do with the flow of oil? They got hold of every whiskey barrel they could scrounge in the area, and when all the barrels were filled, they built and filled several wooden vats. Unfortunately, one night the flame from a lantern ignited the petroleum gases, causing the entire storage area to explode and go up in fierce flames. Meanwhile, other wells were drilled in the neighborhood, and more rock oil became available. Supply far outran demand, and the price plummeted. With the advent of drilling, there was no shortage of rock oil. The only shortage now was of whiskey barrels, and they soon cost almost twice as much as the oil inside them.⁷

“The Light of the Age”

It did not take long for Pennsylvania rock oil to find its way to market refined as kerosene. Its virtues were immediately clear. “As an illuminator the oil is without a figure: It is the light of the age,” wrote the author of America’s very first handbook on oil, less than a year after Drake’s discovery. “Those that have not seen it burn, may rest assured its light is no moonshine; but something nearer the clear, strong, brilliant light of day, to which darkness is no party . . . rock oil emits a dainty light; the brightest and yet the cheapest in the world; a light fit for Kings and Royalists and not unsuitable for Republicans and Democrats.”

George Bissell, the original promoter, was among those who had wasted no time in getting to Titusville. He spent hundreds of thousands of dollars frantically leasing and buying farms in the vicinity of Oil Creek. “We find here an unparalleled excitement,” he wrote to his wife. “The whole population are crazy almost . . . I never saw such excitement. The whole western country are thronging here and fabulous prices are offered for lands in the vicinity where there is a prospect of getting oil.” It had taken Bissell six years to get to this point, and the ups and downs of his journey gave him reason to reflect. “I am quite well, but very much worn down. We have had a hard time of it, very. Our prospects are most brilliant that’s certain. . . . We ought to make an immense fortune.”

Bissell did indeed become very wealthy. And, among his many philanthropies, he donated the money for a gymnasium to Dartmouth, where first he had seen the bottle of rock oil that inspired his vision. He insisted that the gym be equipped with six bowling alleys “in remembrance of disciplinary troubles into which he had fallen as an undergraduate because of his indulgence in this sinful sport.” It was said of Bissell in his later years “that his name and fame is a ‘household word’ among oil men from end to end of the continent.” James Townsend, the banker who had taken the greatest financial risk, was denied the credit he thought he deserved. “The whole plan was suggested by me, and my suggestions were carried out,” he later wrote bitterly. “The raising of the money and sending it out was done by me. I do not say it egotistically, but only as a matter of truth, that if I had not done what I did in favor of developing Petroleum it would not have been developed at that time.” Yet he added, “the suffering and anxiety I experienced I would not repeat for a fortune.”

As for Drake, things did not go well at all. He became an oil buyer, then a partner in a Wall Street firm specializing in oil shares. He was improvident, not

a good businessman, indeed a gambler of sorts when it came to commerce. By 1866, he had lost all his money, then became a semi-invalid, racked with pain, living in poverty. "If you have any of the milk of human kindness left in your bosom for me or my family, send me some money," he wrote to one friend. "I am in want of it sadly and am sick." Finally, in 1873, the state of Pennsylvania granted him a small lifetime pension for his service, bringing him some measure of relief in his final years from his financial difficulties, if not his physical pain.

Toward the end of his life, Drake sought to stake out his place in history. "I claim that I did invent the driving Pipe and drive it and without that they could not bore on bottom lands when the earth is full of water. And I claim to have bored the first well that ever was bored for Petroleum in America and can show the well." He was emphatic. "If I had not done it, it would have not been done to this day."⁸

The First Boom

Indeed, all the other elements—refining, experience with kerosene, and the right kind of lamp—were in place when Drake proved, through drilling, the final requirement for a new industry, the availability of supply. And with that, man was suddenly given the ability to push back the night. Yet that was only the beginning. For Drake's discovery would, in due course, bequeath mobility and power to the world's population, play a central role in the rise and fall of nations and empires, and become a major element in the transformation of human society. But all that, of course, was still to come.

What followed immediately was like a gold rush. The flats in the narrow valley of Oil Creek were quickly leased, and by November of 1860, fifteen months after Drake's discovery, about seventy-five wells were producing, with many more dry holes scarring the earth. Titusville "is now the rendezvous of strangers eager for speculation," a writer had already observed by 1860. "They barter prices in claims and shares; buy and sell sites, and report the depth, show, or yield of wells, etc. etc. Those who leave today tell others of the well they saw yielding 50 barrels of pure oil a day. . . . The story sends more back tomorrow. . . . Never was a hive of bees in time of swarming more astir, or making a greater buzz."

Down at the bottom of Oil Creek, where it flowed into the Allegheny River, a small town called Cornplanter, named after a Seneca Indian chief, was renamed Oil City and became the major center, along with Titusville, for the area now known as the Oil Regions. Refineries to turn the crude into kerosene were cheap to build, and by 1860, at least fifteen were operating in the Oil Regions, with another five in Pittsburgh. A coal-oil refiner visited the oil fields in 1860 to see the competition for himself. "If this business succeeds," he said, "mine is ruined." He was right; by the end of 1860, the coal-oil refiners either were out of business or had moved quickly to turn themselves into crude-oil refiners.

Yet all the wells thus far were modest producers and had to be pumped. That changed in April 1861, when drillers struck the first flowing well, which gushed at the astonishing rate of three thousand barrels per day. When the oil from that well shot into the air, something ignited the escaping gases, setting off a great

explosion and creating a wall of fire that killed nineteen people and blazed on for three days. Though temporarily lost in the thunderous news of the week before—that the South had fired on Fort Sumter, the opening shots of the Civil War—the explosion announced to the world that ample supplies for the new industry would be available.

Production in western Pennsylvania rose rapidly—from about 450,000 barrels in 1860 to 3 million barrels in 1862. The market could not develop quickly enough to match the swelling volume of oil. Prices, which had been \$10 a barrel in January 1861, fell to 50 cents by June and, by the end of 1861, were down to 10 cents. Many producers were ruined. But those cheap prices gave Pennsylvania oil a quick and decisive victory in the marketplace, swiftly capturing consumers and driving out coal-oils and other illuminants. Demand soon caught up with available supply, however, and by the end of 1862 prices rose to \$4 a barrel and then, by September 1863, to as high as \$7.25 a barrel. Despite the wild fluctuation of prices, the stories of instant wealth continued to draw the throngs to the Oil Regions. In less than two years one memorable well generated \$15,000 of profit for every dollar invested.⁹

The Civil War hardly disrupted the frantic boom in the Oil Regions; on the contrary, it actually gave a major stimulus to the development of the business. For the war cut off the shipment of turpentine from the South, creating an acute shortage of camphene, the cheap illuminating oil derived from turpentine. Kerosene made from Pennsylvania oil quickly filled the gap, developing markets in the North much more quickly than might otherwise have been the case. The war had an even more significant impact. When the South seceded, the North no longer benefited from the foreign revenues from cotton, one of America's major exports. The rapid growth of oil exports to Europe helped compensate for that loss and provided a significant new source of foreign earnings.

The end of the war, with all its turbulence and dislocations, released thousands and thousands of veterans who poured into the Oil Regions to start their lives again and seek their fortunes in a new speculative boom that was fueled by the incentive of prices, which rose as high as \$13.75 a barrel. The effects of the frenzy were felt up and down the East Coast, as hundreds of new oil companies were floated. Office space for those new companies ran short in the financial district of New York, and shares were sold so rapidly that one new company disposed of its entire issue in just four hours. A British banker was amazed by the "hundreds of thousands of provident working men, who prefer the profits of petroleum to the small rates of interest afforded by savings banks." Washington, D.C., was no more immune to the craze than New York. Congressman James Garfield, who became a substantial investor in oil lands—and, later, president of the United States—reported to an oil-lease salesman that he had discussed oil with a number of other members of Congress, "who are in the business, for you must know the fever has assailed Congress in no mild form."¹⁰

Nothing revealed the feverish pitch of speculation better than the strange story of the town of Pithole, on Pithole Creek, some fifteen miles from Titusville. A first well was struck in the dense forest land there in January 1865; by June, there were four flowing wells, producing two thousand barrels per day—one-third of the total output of the Oil Regions—and people fought their way in

on the roads already clogged with the barrel-laden wagons. “The whole place,” said one visitor, “smells like a corps of soldiers when they have the diarrhoea.” The land speculation seemed to know no bounds. One farm that had been virtually worthless a few months earlier was sold for \$1.3 million in July 1865, and then resold for two million dollars in September. In that same month, production around Pithole Creek reached six thousand barrels per day—two-thirds of all the production in the Oil Regions. And, by that same September, what had once been an unidentifiable spot in the wilderness had become a town of fifteen thousand people. The *New York Herald* reported that the principal businesses of Pithole were “liquor and leases”; and *The Nation* added, “It is safe to assert that there is more vile liquor drunk in this town than in any of its size in the world.” Yet Pithole was already on the road to respectability, with two banks, two telegraph offices, a newspaper, a waterworks, a fire company, scores of boarding houses and businesses, more than fifty hotels—at least three of which were up to elegant metropolitan standards—and a post office that handled more than five thousand letters a day.

But then, a couple of months later, the oil production abruptly gave out—just as quickly as it had begun. To the people of Pithole, this was a calamity, like a biblical plague, and by January 1866, only a year from the first discovery, thousands had fled the town for new hopes and opportunities. The town that had sprung up overnight from the wilderness was totally deserted. Fires ravaged the buildings, and the wooden skeletons that were left were torn down to be used for building again elsewhere or burned as kindling by the farmers in the surrounding hills. Pithole returned to silence and to the wilderness. A parcel of land in Pithole that sold for \$2 million in 1865 was auctioned for \$4.37 in 1878.

Even as Pithole died, the speculative boom was exploding elsewhere and engulfing neighboring areas. Production in the Oil Regions jumped to 3.6 million barrels in 1866. The enthusiasm for oil seemed to know no limits, and it became not only a source of illumination and lubrication, but also part of the popular culture. Americans danced to the “American Petroleum Polka” and the “Oil Fever Gallop,” and they sang such songs as “Famous Oil Firms” and “Oil on the Brain.”

There’s various kind of oil afloat, Cod-liver, Castor, Sweet;
Which tend to make a sick man *well*, and set him on his *feet*.
But our’s a curious *feat* performs: We just a *well* obtain,
And set the people crazy with “Oil on the brain.”

There’s neighbor Smith, a poor young man, Who couldn’t raise a dime;
Had clothes which boasted many rents. And took his “nip” on time.
But now he’s clad in dandy style, Sports diamonds, kids, and cane;
And his success was owing to “Oil on the brain.”¹¹

Boom and Bust

The race to find the oil was swiftly followed by another race to produce it as quickly and in as much volume as possible. The drive for “flush production”

often damaged the reservoirs, leading to premature exhaustion of gas pressure, and thus far less recovery than would otherwise have been the case. Yet there were several reasons why this became the standard practice. One was the lack of geological knowledge. Another was the large and quick rewards that were to be attained. A third was the nature of leasing terms, which put a premium on producing as quickly as possible.

But, most important in shaping the legal context of American oil production, and the very structure of the industry from the earliest days, was the “rule of capture,” a doctrine based on English common law. If a game animal or bird from one estate migrated to another, the owner of the latter estate was perfectly within his rights to kill the game on his land. Similarly, owners of land had the right to draw out whatever wealth lay beneath it; for, as one English judge had ruled, no one could be sure of what was actually going on “through these hidden veins of the earth.”

As applied to oil production, the rule of capture meant that the various surface owners atop a common pool could take all the oil they could get, even if they disproportionately drained the pool or reduced the output of nearby wells and neighboring producers. Inevitably, therefore, the owners of adjacent wells were in heated competition to produce as much as they could as swiftly as possible, to avoid having the pool drained by another. The impetus to rapid production contributed to the instability of both production and prices. Oil was not the same as game birds, and the rule of capture led to considerable waste and damage, to the detriment of ultimate production from a given pool. But there was another side to the rule’s effects. It created room for many more people to enter the industry and to master the required skills than would have been the case under more restrictive rules. And, by building up production more quickly, it also helped to make possible a wider market.¹²

Fueled by the rule of capture—and the race for riches—the wild drive to produce created in the Oil Regions a chaotic scene of heaving populations, of shacks and quick-built wooden buildings, of hotels with four or five or six straw mattresses crowded into a single room, of derricks and storage tanks, with everyone energized by hope and rumor and the acrid scent of oil. And, everywhere, there was one inescapable factor—the perennial mud. “Oil Creek mud attained a fame in the earlier and subsequent years, that will ever be fresh in the memory of those who saw and were compelled to wade through it,” two writers observed at the time. “Mud, deep, and indescribably disgusting, covered all the main and by-roads in wet weather, while the streets of the towns composing the chief shipping points, had the appearance of liquid lakes or lanes of mud.”

There were some who looked at all the boom and hustle, and at the “sharps” who came for the quick dollar, and remembered the quiet Pennsylvania hills and villages before oil burst on the scene. They asked what had happened and marveled that human nature could be so transformed—and debased—by the specter of riches. “The oil and land excitement in this section has already become a sort of epidemic,” wrote a local editor in 1865. “It embraces all classes and ages and conditions of men. They neither talk, nor look, nor act as they did six months ago. Land, leases, contracts, refusals, deeds, agreements, interests, and all that sort of talk is all they can comprehend.

Strange faces meet us at every turn, and half our inhabitants can be more readily found in New York or Philadelphia than at home. . . . The court is at a standstill; the bar is demoralized; the social circle is broken; the sanctuary is forsaken; and all our habits, and notions, and associations for half a century are turned topsy-turvy in the headlong rush for riches. Some poor men become rich; some rich men become richer; some poor men and some rich men lose all they invest. So we go.”

The editor had a final thought. “The big bubble will burst sooner or later.”¹³

The bubble did burst—the inevitable reaction to the speculation and frantic overproduction. Depression engulfed the industry in 1866 and 1867; the price of oil dropped as low as \$2.40 a barrel. Yet, while many stopped drilling, some did not, and new fields were opened up beyond Oil Creek. Moreover, innovation and organization were being imposed upon the industry.

From the first discoveries, teamsters, lashing their horses, had clogged the roads of the Oil Regions with their loads of barrels. They were more than just a physical bottleneck. Holding a monopoly position, they charged exorbitant rates; it cost more to move a barrel over a few miles of muddy road to a railway stop than to transport it by rail from western Pennsylvania all the way to New York. The teamsters’ stranglehold on transportation led to an ingenious effort to develop an alternative—transportation by pipeline. Between 1863 and 1865, despite much scoffing and public ridicule, wooden pipelines proved that they could carry oil much more efficiently and cheaply. The teamsters, seeing their position challenged, responded with threats, armed attacks, arson, and sabotage. But it was too late. By 1866, pipelines were hooked up to most of the wells in the Oil Regions, feeding into a larger pipeline gathering system that connected with the railroads.

The refiners needed to acquire oil and that, too, was chaotic. Purchasing of oil had first been done on a hit-or-miss basis by buyers on horseback, riding from well to well. But, as the industry grew, a more orderly marketing system emerged. Informal oil exchanges, where buyers and sellers could meet and agree on prices, developed in a hotel in Titusville and at a curbside exchange, near the railway tracks, in Oil City. Beginning in the early 1870s, more formal oil exchanges emerged in Titusville, in Oil City, elsewhere in the Oil Regions, and in New York. Oil was bought and sold on three bases. “Spot” sales called for immediate delivery and payment. A “regular” sale required the transaction to be completed within ten days. And the sale of “futures” established that a certain quantity would be sold at a certain price within a specified time in the future. The futures prices were the focus for speculation, and oil became “the favorite speculative commodity of the time.” The buyer was bound either to take the oil and pay the contracted price—or to pay or receive the difference between the contracted price and the “regular” price at the time of settlement. Thus, buyers could make a handsome profit—or suffer a devastating loss—without even taking possession of the oil.

By the time the Titusville Oil Exchange opened in 1871, oil was already on its way to becoming a very big business, one that would transform the everyday lives of millions. Altogether, the decade of the 1860s had been one of dizzy

advance from Drake's lunatic experiment. Here was truly the lasting proof of "the impetuous energy with which the American mind takes up any branch of industry that promises to pay well." George Bissell's intuition and Edwin Drake's discovery and the perseverance of both these men had opened a turbulent era—a time of ingenuity and innovation, of deals and frauds, of fortunes made, fortunes lost, fortunes never made, of grueling hard work and bitter disappointments, and of astonishing growth.¹⁴

And what might be expected of oil's future? There were those who looked at what had happened so quickly in western Pennsylvania and saw much greater opportunities ahead. They envisioned the industry on a scale that few in the Oil Regions could begin to imagine, and yet at the same time they were also repelled and disgusted by the chaos and disorder, the fluctuations and the frenzy. They had their own very strong ideas about how the oil business ought to be organized and proceed. And they were already at work, according to their own plans.

C H A P T E R 2

“Our Plan”: John D. Rockefeller and the Combination of American Oil

A CURIOUS AUCTION took place one February day in 1865 in Cleveland, Ohio, then a bustling city that had profited from both the Civil War and the oil boom and now stood to prosper from the great era of America's industrial expansion. The two senior partners in one of the city's most successful oil refineries had fallen into yet another of their chronic disputes over the speed of expansion. Maurice Clark, the more cautious partner, threatened dissolution. This time, the other partner, John D. Rockefeller, surprised him by accepting. The two men subsequently agreed that a private auction should be held between the two of them, the highest bidder to get the company; and they decided to hold the auction immediately, right there in the office.

The bidding began at \$500, but climbed quickly. Maurice Clark was soon at \$72,000. Rockefeller calmly went to \$72,500. Clark threw up his hands. "I'll go no higher, John," he said. "The business is yours." Rockefeller offered to write out a check on the spot; Clark told him, no, he could settle at his convenience. On a handshake they parted.

"I ever point to that day," Rockefeller said a half century later, "as the beginning of the success I have made in my life."

That handshake also signaled the beginning of the modern oil industry, which brought order out of the chaos of the wild Pennsylvania boom. The order would take the form of Standard Oil, which, as it sought total dominance and mastery over the world oil trade, grew into a complex global enterprise that carried cheap illumination, the "new light," to the farthest corners of the earth. The company operated according to the merciless methods and unbridled lust of late-nineteenth-century capitalism; yet it also opened a new era, for it developed into one of the world's first and biggest multinational corporations.¹

“Methodical to an Extreme”

The mastermind of Standard Oil was the young man who won that auction in Cleveland in 1865. Even then, at the age of twenty-six, John D. Rockefeller already made a forbidding impression. Tall and thin, he struck others as solitary, taciturn, remote, and ascetic. His unbending quietness—combined with the cold, piercing blue eyes set in an angular face with a sharp chin—made people uneasy and fearful. Somehow, they felt, he could look right through them.

Rockefeller was the single most important figure in shaping the oil industry. The same might arguably be said for his place in the history of America’s industrial development and the rise of the modern corporation. Admired by some as a genius of management and organization, he also came to rank as the most hated and reviled American businessman—in part because he was so ruthless and in part because he was so successful. His lasting legacy would be strongly felt, in terms of his profound influence on the petroleum industry and on capitalism itself, as well as the continuing impact of his vast philanthropy—and in terms of the darker images and shadows he would cast permanently into the mind of the public.

Rockefeller was born in 1839 in rural New York State, and lived almost a full century, until 1937. His father, William Rockefeller, traded in lumber and salt and then, moving the family to Ohio, turned himself into “Dr. William Rockefeller,” who sold herbal remedies and patent medicines. The father was often away on long absences from the family; the reason, some have suggested, was that he maintained another wife and family in Canada.

The son’s character was already set at a young age—pious, single-minded, persistent, thorough, attentive to detail, with both a gift and a fascination for numbers, especially numbers that involved money. At the age of seven, he launched his first successful venture—selling turkeys. His father sought to teach him and his brothers mercantile skills early. “I trade with the boys,” the father was reported to have boasted, “and skin ’em and I just beat ’em every time I can. I want to make ’em sharp.” Mathematics was the young Rockefeller’s best subject in high school. The school stressed mental arithmetic—the ability to do calculations quickly in one’s head—and he excelled at it.

Intent on achieving “something big,” Rockefeller went to work at age sixteen in Cleveland for a produce-shipping firm. In 1859, he formed his own partnership with Maurice Clark to trade produce. The firm prospered from demand generated both by the Civil War and by the opening of the West. Maurice Clark would later testily recall that Rockefeller was “methodical to an extreme.” As the firm grew, Rockefeller stuck to his habit of holding “intimate conversations” with himself, counseling himself, repeating homilies, warning himself to beware of pitfalls, moral as well as practical. The firm dealt in Ohio wheat, Michigan salt, and Illinois pork. Within a couple of years of Colonel Drake’s discovery, Clark and Rockefeller were also dealing in, and making money from, Pennsylvania oil.

Oil and the stories of instant wealth had already captured the imagination of entrepreneurial men in Cleveland, when, in 1863, a new railroad link placed Cleveland in a position to compete in the business. Refinery after refinery sprang

into existence along the railway tracks into Cleveland. Many of the refineries were desperately undercapitalized, but this was never true of the one owned by Rockefeller and Clark. At the beginning, Rockefeller thought that refining would merely be a sideline to the produce business, but within a year, as the refinery became quite profitable, he became convinced otherwise. Now, in 1865, with the auction and Clark out of the way, Rockefeller, already a moderately wealthy young man, was the master of his own business, which was the largest of Cleveland's thirty refineries.²

The Great Game

Rockefeller won this, his first victory in refining, at a perfect time. For the end of the Civil War in that same year, 1865, inaugurated in the United States an era of massive economic expansion and rapid development, of fiery speculation and fierce competition, and of combination and monopoly. Large-scale enterprises rose in conjunction with technological advances in industries as diverse as steel, meat packing, and communication. Heavy immigration and the opening of the West made for rapidly growing markets. Indeed, in the last three and a half decades of the nineteenth century, as at no other time in American history, the business of America was truly business, and it was to this magnet that the energies, ambitions, and brains of young men were irresistibly drawn. They were caught up in what Rockefeller called "the Great Game"—the struggle to accomplish and build, and the drive to make money, both for its own sake and as a register of achievement. That game, played with new inventions and new techniques of organization, turned an agrarian republic, so recently torn by a bloody civil war, into the world's greatest industrial power.

As the oil boom progressed, Rockefeller, throwing himself wholeheartedly into the Great Game, continued to pour both profits and borrowed money into his refinery. He built a second one. He needed new markets for his growing capacity, and in 1866 organized another firm in New York to manage both the Atlantic Coast trade and the export of kerosene. He put his brother William in charge. In that year, his sales exceeded two million dollars.

Yet, while the markets for kerosene and lubricants had grown, they were not growing fast enough to match the growth in refinery capacity. Too many companies were competing for the same customers. It didn't take much in terms of capital or skills to set oneself up as a refiner. As Rockefeller later recalled, "All sorts of people went into it: the butcher, the baker, and the candlestick-maker began to refine oil." In fact, Rockefeller and his associates became quite concerned when they learned that a German baker they liked had foolishly traded his bakery for a low-quality refinery. They bought him out in order to get him back to baking.

Rockefeller devoted himself to strengthening his business—by expanding facilities and striving to maintain and improve quality, and yet always controlling costs. He took the first steps toward integration, the process of bringing supply and distribution functions inside the organization, in order both to insulate the overall operation from the volatility of the market and to improve its competitive position. Rockefeller's firm acquired its own tracts of land on which grew

the white oak timber to make its own barrels; it also bought its own tank cars, and its own warehouses in New York, and its own boats on the Hudson River. At the beginning, Rockefeller also established another principle, which he religiously stuck to thereafter—to build up and maintain a strong cash position. Already, before the end of the 1860s, he had built up sufficient financial resources so that his company would not have to depend upon the bankers, financiers, and speculators on whom the railways and other major industries had come to rely. The cash not only insulated the company from the violent busts and depressions that would drive competitors to the wall, but also enabled it to take advantage of such downturns.

One of Rockefeller's great talents could already be discerned; he had a vision of where his company and the overall industry were going, and yet at the same time he persisted in commanding the critical daily details of its operations. "As I began my business life as a bookkeeper," he later said, "I learned to have great respect for figures and facts, no matter how small they were." Rockefeller immersed himself in all details and aspects of the business, even the unpleasant ones, and literally so. He kept an old suit that he would wear whenever he went out to the Oil Regions to tramp around in the muddy fields, buying oil. The result of his single-minded enterprise was that, by the latter part of the 1860s, Rockefeller owned what was probably the largest refinery in the world.³

In 1867, Rockefeller was joined by a young man, Henry Flagler, whose influence in the creation of Standard Oil was almost as great as Rockefeller's. Going to work at age fourteen as a clerk in a general store, Flagler had succeeded, by his mid-twenties, in making a small fortune distilling whiskey in Ohio. He had sold out in 1858 because of moral scruples about alcohol—if not his own, then at least those of his parson father. He then threw himself into salt manufacturing in Michigan. But, in circumstances of chaotic competition and oversupply, he went broke. It was a sobering experience for a man to whom making money had, initially, come so easily.

Still, Flagler was an eternally buoyant man, determined to rebound, though now matured by his hard-won lessons. His bankruptcy left him with a deep-seated belief in the value of "cooperation" among producers and a no less deep-seated aversion to what he later called "unbridled competition." Cooperation and combination, he had concluded, were necessary to minimize the risks in the uncertain world of capitalism. He had also learned another lesson; as he later said, "Keep your head above water and bet on the growth of your country." Flagler was ready and eager to wager on post-Civil War America.

Flagler was to become the closest colleague Rockefeller ever had, and one of his closest friends. His relationship with the remote Rockefeller was to lead Flagler to another adage: "A friendship founded on business is better than a business founded on friendship." Energetic and striving, Flagler was well matched to the dour, careful Rockefeller, who was delighted to acquire a partner so "full of vim and push." To a critic, however, Flagler looked somewhat different—"a bold, unscrupulous self-seeker [who] made no bones about conscience. He did whatever was necessary to success." Many years later, after having made one great fortune with Rockefeller, Flagler set off on a second conquest, the develop-

ment of the state of Florida. He would build the railways down the east coast of Florida, all the way to the Keys, in order to open up what he called the “American Riviera,” and was to found both Miami and West Palm Beach.

But that was well into the future. Now, in these building years, Rockefeller and Flagler worked in close harness. They sat in the same office, with their desks back to back, passing drafts of letters to customers and suppliers back and forth to each other until the missives said exactly what they wanted to say. Their friendship was the business, which they were constantly and obsessively discussing—in the office, during lunch at the Union Club, or as they walked between the office and their nearby homes. “On those walks,” Rockefeller said, “when we were away from the office interruptions, we did our thinking, talking, and planning together.”

Flagler devised and ran the transportation arrangements, which would prove central to the success of Standard Oil. For they gave the company a decisive power against all competitors, and it was on this base that the company’s position and formidable prowess were built. Without Flagler’s expertise and aggressiveness in this realm, there might well have been no Standard Oil as the world came to know it.

The size, efficiency, and economies of scale of Rockefeller’s organization enabled it to extract rebates—discounts—on railway freight rates, which lowered its transportation costs below what competitors paid, providing it with a potent advantage in terms of pricing and profit. These rebates would later be a source of great controversy. Many charged that Standard forced the rebates to enable it to undercut competitors unfairly. But so intense was the competition among railroads for freight that rebates and discounts of one kind or another became common practice across the nation, especially for anyone who could guarantee large, regular shipments. Flagler, with the strength of the Standard Oil organization behind him, was very good at driving the best deal possible.

Standard, however, did not stop with rebates. It also used its prowess to win “drawbacks.” A competing shipper might pay a dollar a barrel to send his oil by rail to New York. The railroad would turn around and pay twenty-five cents of that dollar back, not to the shipper, but to the shipper’s rival, Standard Oil! That, of course, gave Standard, which was already paying a lower price on its own oil, an additional enormous financial advantage against its competitors. For what this practice really meant was that its competitors were, unknowingly, subsidizing Standard Oil. Few of its other business practices did as much to rouse public antipathy toward Standard Oil as these drawbacks—when eventually they became known.⁴

“Now Try Our Plan”

While the market for oil was growing at an extraordinary rate, the amount of oil seeking markets was growing even more rapidly, resulting in wild price fluctuations and frequent collapses. Toward the end of the 1860s, as overproduction caused prices to plummet again, the new industry went into a depression. The reason was simple—too many wells and too much oil. The refiners were hit no

less than the producers. Between 1865 and 1870, the retail price of kerosene fell by more than half. It was estimated that refining capacity was three times greater than the market's needs.

The costs of overcapacity were obvious to Rockefeller, and it was in these circumstances, with most refiners losing money, that he launched his effort to consolidate the industry in his own grasp. He and Flagler wanted to bring in more capital, but without jeopardizing control. The technique they used was to turn their partnership into a joint stock company. On January 10, 1870, five men, led by Rockefeller and Flagler, established the Standard Oil Company. The name was chosen to indicate a "standard quality of product" on which the consumer could depend. At the time, kerosene of widely varying quality was sold. If the kerosene contained too much flammable gasoline or naphtha, as sometimes happened, the purchaser's attempt to light it could be his last act on this earth. Rockefeller held a quarter of the stock in the new company, which, at that time, already controlled a tenth of the American refining industry. But that was only the beginning. Many years later, Rockefeller would look back on the early days and muse: "Who would ever have thought it would grow to such a size?"

Newly constituted, armed with more capital, Standard used its strength to pursue even more vigorously the railroad rebates that gave it further advantage against its competition. But overall business conditions continued to deteriorate, and by 1871 the refining industry was in a complete panic. Profit margins were disappearing altogether, and most refiners were losing money. Even Rockefeller, though head of the strongest company, was worried. By this time, he was a leading business figure in Cleveland, and a pillar of the Euclid Avenue Baptist Church. He had married Laura Celestia Spelman in 1864. In her high school graduation essay, "I Can Paddle My Own Canoe," she had written, "The independence of *woman* in thought, deed, or will is one of the problems of the age." While giving up her dream of paddling her own canoe upon marrying Rockefeller, she became his closest confidante, even reviewing his important business letters. Once in their bedroom, he had earnestly promised her that if he ever had fears about business, he would tell her first. Now, in 1872, in the midst of the refinery depression, he was sufficiently concerned to feel that he had to reassure her. "You know," he said, "we are independently rich outside of investments in oil."

It was at this anxious time that Rockefeller conceived his bold vision of consolidating nearly all oil refining into one giant combination. "It was desirable to do something to save the business," he later said. An actual combination would do what a mere pool or association could not: eliminate excess capacity, suppress wild fluctuations of price—and, indeed, save the business. That was what Rockefeller and his colleagues meant when they talked of "our plan." But the plan was Rockefeller's, and he guided its execution. "The idea was mine," he said much later. "The idea was persisted in, too, in spite of the opposition of some who became faint-hearted at the magnitude of the undertaking, as it constantly assumed larger proportions."

Standard Oil geared up for the campaign; it increased its capitalization to facilitate takeovers. But events were moving in another direction as well. In February 1872, a local railway official in Pennsylvania became confused and

abruptly put up rates, suddenly doubling the cost of carrying crude from the Oil Regions to New York. Word leaked out that the increase was the doing of an unknown entity called the South Improvement Company. What was this mysterious company? Who was behind it? The independent producers and refiners in the Oil Regions were aroused and alarmed.⁵

The South Improvement Company was the embodiment of another scheme for stabilization of the oil industry and would become the symbol of the effort to achieve monopoly control. Rockefeller's name was to be ever more associated with it, but though he was one of the principal implementers of the scheme, the idea actually belonged to the railroads, which were trying to find a way out of bitter rate wars. Under the scheme, railroads and refiners would band together in cartels and divide markets. The refiners would not only get rebates on their shipments, but also receive those drawbacks—rebates from the full rates paid by nonmember refiners. "Of all the devices for the extinction of competition," one of Rockefeller's biographers has written, "this was the cruelest and most deadly yet conceived by any group of American industrialists."

Though still cloaked in mystery, the South Improvement Company enraged the Oil Regions. A Pittsburgh newspaper warned that it would create "but one buyer of oil in the whole oil region," while the Titusville paper said it was nothing less than a threat to "dry up Titusville." At the end of February, three thousand angry men trooped with banners into the Titusville Opera House to denounce the South Improvement Company. Thus was launched what became known as the Oil War. The railroads, Rockefeller, the other refiners—these were the enemy. Producers marched from town to town to denounce "the Monster" and "the Forty Thieves." And now, united against monopoly, they launched a boycott of the refiners and the railroads that was so effective that the Standard refineries in Cleveland, which normally employed up to twelve hundred men, had only enough crude to occupy seventy. But Rockefeller had absolutely no doubts about what he was doing. "It is easy to write newspaper articles but we have other business," he told his wife during the Oil War. "We will do right and not be nervous or troubled by what the papers say." At another point in the battle, in a letter to his wife he set down one of his lasting principles: "It is not the business of the public to change our private contracts."

By April 1872, however, both the railroads and the refiners, including Rockefeller, had decided that it was time to disown and scuttle the South Improvement Company. The Oil War was over, apparently won by the producers. Later, Rockefeller would say that he had always expected the South Improvement Company to fail, but went along for his own purposes. "When it failed, we would be in a position to say, 'Now try our plan.'" But Rockefeller had not even waited for the South Improvement Company to fail. By the spring of 1872, he had already won control over most of Cleveland's refining and some of the most important refiners in New York City—making him the master of the largest refinery group in the world. He was ready to take on the entire oil industry.

The 1870s were to be marked by ever-rising production. Producers repeatedly tried to restrict production, but to no avail. Storage tanks overflowed, covering the land with black scum. The gluts became so large and prices fell so low that crude oil was run out into streams and onto farms because there was

nowhere else to put it. At one point, the price dropped to forty-eight cents a barrel—three cents less a barrel than housewives in the Oil Regions were paying for drinking water. The recurrent efforts to organize shutdown movements always failed. New territories were continually being opened by the drill, which undermined any stability in the industry. Moreover, there were far, far too many producers to organize any meaningful restraints. Estimates of producing firms in the Oil Regions in the last quarter of the nineteenth century ranged as high as sixteen thousand. Many of the producers were speculators, others were farmers, and many of them, whatever their backgrounds, were highly individualistic and unlikely to take “a long view” and think of the common good, even if a workable plan had presented itself. Rockefeller, with his passion for order, looked with revulsion at the chaos and scramble among the producers. “The Oil Regions,” he later said with acid disdain, “was a mining camp.” His target was the refiners.⁶

“War or Peace”

The objective of Rockefeller’s audacious and daring battle plan was, in his words, to end “that cut-throat policy of making no profits” and “make the oil business safe and profitable”—under his control. Rockefeller was both strategist and supreme commander, directing his lieutenants to move with stealth and speed and with expert execution. It was no surprise that his brother William categorized relations with other refiners in terms of “war or peace.”

Standard began, in each area, by attempting to buy out the leading refiners, the dominant firms. Rockefeller and his associates would approach their targets with deference, politeness, and flattery. They would demonstrate how profitable Standard Oil was compared with other refiners, many of which were struggling through hard times. Rockefeller himself would use all his own considerable talent for persuasion in the pursuit of a friendly acquisition. If all that failed, Standard would bring a tough competitor to heel by making him “feel sick” or, as Rockefeller put it, by giving him “a good sweating.” Standard would cut prices in that particular market, forcing the competitor to operate at a loss. At one point, Standard orchestrated a “barrel famine” to put pressure on recalcitrant refiners. In another battle, seeking to bring an adversary to heel, Henry Flagler instructed: “If you think the perspiration don’t roll off freely enough, pile the blankets on him. I would rather lose a great deal of money than to yield a pint to him at this time.”

The Standard men, moving in great secrecy, operated through firms that appeared to be independent to the outside world, but had in fact become part of the Standard Group. Many refiners never knew that their local competitors, which were cutting prices and putting other pressures on them, were actually part of Rockefeller’s growing empire. Through all the phases of the campaign, the Standard men communicated in code—Standard Oil itself was “Morose.” Rockefeller never wavered in his defense of the secrecy of his operations. “It is all too true!” he once said. “But I wonder what General of the Allies ever sends out a brass band in advance with orders to notify the enemy that on a certain day he will begin an attack?”

By 1879, the war was virtually over. Standard Oil was triumphant. It con-

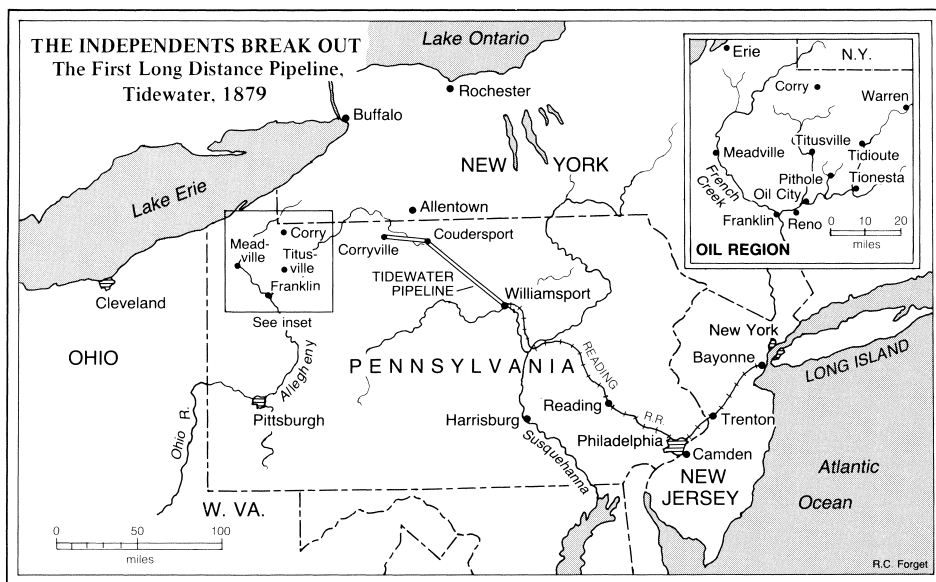
trolled 90 percent of America's refining capacity. It also controlled the pipelines and gathering system of the Oil Regions and dominated transportation. Rockefeller was unemotional in victory. He bore no grudge. Indeed, some of the conquered were brought into the inner councils of Standard's management to become devoted allies in subsequent stages of the campaign. But even as Standard Oil reached its commanding position at the end of the 1870s, unexpected challenges appeared.⁷

New Threats

At the very end of the 1870s, just when Rockefeller thought he had everything virtually tied up, Pennsylvania producers made one last effort to break out of Standard's suffocating embrace with a daring experiment—the world's first attempt at a long-distance pipeline. There was no precedent for the project, named the Tidewater Pipeline, and no guarantee at all that it was technically possible. The oil would travel eastward 110 miles from the Oil Regions to a connection with the Pennsylvania and Reading Railroad. Its construction was carried out with both deception and dispatch. Fake surveys were even taken to throw Standard off as to its route. Many doubted right up to the last moment that the pipeline would work. Yet, by May of 1879, oil was flowing in the pipeline. It was a major technological achievement, comparable to the Brooklyn Bridge four years later. It also introduced a new stage in the history of oil. The pipeline would become a major competitor with the railroad for long-distance transportation.

The clear success of Tidewater, and the revolution it implied in transportation, not only caught Standard by surprise, but also meant that its control of the industry was suddenly again in jeopardy. The producers had an alternative to Standard Oil. The company sprang into action, building in short order four long-distance pipelines from the Oil Regions to Cleveland, New York, Philadelphia, and Buffalo. Within two years, Standard was a minority stockholder in Tidewater itself and had an arrangement to pool shipments with the new pipeline company to manage competition, though Tidewater did retain some independence of operation. The refining consolidation completed, these pipeline developments marked the next major stage of Standard's integration of the oil industry. Very simply, with the partial exception of the Tidewater, Standard controlled almost every inch of pipeline into and out of the Oil Regions.⁸

There remained only one way to hold this giant in check, and that was through the political system and the courts. At the end of the 1870s, producers from the Oil Regions launched a series of legal assaults in Pennsylvania against discriminatory rates. They denounced "the overweening control of the oil business by the Standard Oil Company," castigated it as an "Autocrat" and as "this gang of thieves," and sought the indictment of its principal officers for criminal conspiracy. Meanwhile, legislative hearings in New York State on railroads focused on Standard Oil's rebate system. The investigations and legal proceedings in the two states together marked the first public revelation of the activities of Standard Oil, its reach and extent, and its manipulation of rebates and drawbacks. A Pennsylvania



grand jury indicted Rockefeller, Flagler, and several associates for conspiracy to create a monopoly and injure competitors. A vigorous effort was made to extradite Rockefeller to Pennsylvania. He was alarmed enough to exact a promise from the governor of New York not to approve any extradition order, and the attempt eventually failed.

Still, the cumulative effect on public opinion of the varying exposes was devastating for the company—and lasting. The veil had been lifted, and the public was outraged by what it saw. The charges against Standard were brought together for the first time by Henry Demarest Lloyd, in a series of editorials for the *Chicago Tribune*, and then in an article entitled “The Story of a Great Monopoly,” which was published in the *Atlantic Monthly* in 1881. So great was the attention and interest that the issue went through seven printings. Lloyd declared that the Standard Oil Company had done everything to the Pennsylvania State Legislature except refine it. Yet the article had little immediate impact on Standard’s business. Lloyd’s was the first major exposé of Standard Oil, but it was to be far from the last. The mysterious figure of John D. Rockefeller could no longer maintain his invisibility. In the Oil Regions, mothers would warn their children, “Rockefeller will get you if you don’t mind.”⁹

The Trust

While the courts and public opinion had to be kept at bay, an ingenious internal order and control was created in the vast empire that Rockefeller had conquered. To begin with, there was no clear legal basis for the association of these various refineries around the country. Thus, in an affidavit, Rockefeller could later say, with a straight face and without perjuring himself, that Standard Oil itself did not own or control a host of companies that it manifestly did control. One exec-

utive from the group could explain to a committee of the New York State Legislature that relations among 90 percent or so of the refineries in the country were “pleasant” and that they just happened to work together “in harmony.” And another could assure the same committee that his own firm had no connection to Standard Oil and that his only personal relationship was as “a clamorer for dividends.” That was the real clue to the organization. It was the *stockholders* of Standard Oil, not Standard Oil itself, who owned shares in the other firms. At that time, corporations themselves could not own stock in other corporations. The shares were held in “trust,” not for the Standard Oil Company of Ohio, but on behalf of the stockholders of that corporation.

The legal concept of the “trust” was refined and formalized in the Standard Oil Trust Agreement, which was signed on January 2, 1882. It was a response to the judicial and political attacks of the late 1870s and early 1880s. There was a more personal reason, as well. Rockefeller and his partners had begun to think about mortality and inheritance, and they had concluded that the death of one of them would likely lead, under the existing system, to confusion, controversy over values, litigation, and bitterness. A trust would get the ownership organized and clarified, with little left to future debate.

In preparing the trust, “every foot of pipeline was measured, every particle of brickwork was estimated.” A board of trustees was set up, and in the hands of those trustees was placed the stock of all the entities controlled by Standard Oil. Shares in turn were issued in the trust; out of the 700,000 total shares, Rockefeller held 191,700 and Flagler, next, had 60,000. The trustees held the shares in the individual companies on behalf of the forty-one shareowners of the Standard Oil Trust, and were charged with “general supervision” of the fourteen wholly owned and twenty-six partly owned companies. Their responsibilities included the selection of directors and officers—among whom they might include themselves. It was the first great “trust,” and it was perfectly legal. But this was also why the “trust,” formerly a device for protecting widows and orphans, became a term of derogation and hatred. Meanwhile, separate Standard Oil organizations were set up in each state to control the entities in those states. The trust agreement made possible the establishment of a central office to coordinate and rationalize the activities of the various operating entities—a task made more urgent by the growing scale of the business. And the trust gave Rockefeller and his associates “the shield of legality and the administrative flexibility they needed to operate effectively what had become virtually global properties.”

That took care of the legal form. But what of the practical problem of managing the new entity? How to integrate into the new trust so many independent entrepreneurs and so many enterprises producing so many products—kerosene and fuel oil, plus some three hundred by-products? What evolved was a system of management and coordination by committee. There was a Domestic Trade Committee, an Export Trade Committee, a Manufacturing Committee, a Staves and Heading Committee, a Pipe Line Committee, a Case Committee, a Lubricating Committee, and later a Production Committee. Daily reports flowed into the committees from around the country. On top of it all was the Executive Committee, composed of the top managers, which set the overall policies and directions. The Executive Committee did not issue orders so much as requests,

suggestions, and recommendations. But no one doubted its authority or control. The relationship between headquarters and the field was suggested by a comment Rockefeller made in a letter: “You gentlemen on the ground can judge better than we about the matter, but let us not drift into arrangements where we cannot control the policy.”¹⁰

A basic strategy that had governed Standard in the 1870s became even more explicit in the 1880s—to be the low-cost producer. This required efficiency in operations, mastery of costs, a drive for scale and volume, constant attention to technology, and a ceaseless striving for ever-larger markets. Refining operations were consolidated in the quest for efficiency; by the middle 1880s, just three Standard refineries—in Cleveland, Philadelphia, and Bayonne, New Jersey—produced upward of a quarter of the world’s total supply of kerosene. The focus on costs, sometimes calculated to the third decimal place, never wavered. “It has always been my rule in business to make everything count,” Rockefeller once said. Using its superior communications, the company took advantage of the arbitrage and played the spreads among prices in the Oil Regions, Cleveland, New York, and Philadelphia, as well as in Antwerp and elsewhere in Europe. The company also used an extraordinary system of corporate intelligence and espionage to keep track of market conditions and competitors. It maintained a card catalog of practically every buyer of oil in the country, showing where virtually every barrel shipped by independent dealers went—and where every grocer, from Maine to California, obtained his kerosene.

A central theme underlay Rockefeller’s management; he *believed* in oil, and his faith never wavered. Any drop in the price of crude was not a reason for anxiety, but an opportunity to buy. “Hope if crude oil goes down again . . . our Executive Committee will not allow any amount of statistics or information . . . to prevent their buying,” he instructed in 1884. “We must try and not lose our nerve when the market gets to the bottom as some people almost always do.” Shortly after, he added, “*We will surely make a great mistake if we do not buy.*”

The senior management included Rockefeller, his brother William, Henry Flagler, and two others who altogether controlled four-sevenths of the stock. But it also extended to perhaps a dozen others as well, virtually all of them willful, assertive individuals who had been successful entrepreneurs—and, originally, competitors of Rockefeller. “It is not always the easiest of tasks to induce strong, forceful men to agree,” Rockefeller later said. The only way such a grouping could work was by consensus. Choices and decisions were debated and argued, but action was taken only when, as Rockefeller insisted, the problems had been turned around and around, the various contingencies anticipated, and, finally, agreement formed about the right direction. “It is always, I presume, a question in every business just how fast it is wise to go, and we went pretty rapidly on those days, building and expanding in all directions,” Rockefeller recalled. “We were being confronted with fresh emergencies constantly. . . . How often we discussed those trying questions! Some of us wanted to jump at once into big expenditures, and others to keep to more moderate ones. It was usually a compromise but one at a time we took these matters up and settled them, never going as fast as the most progressive ones wished, nor quite so carefully as the conservatives desired.” He added that they “always made the vote unanimous in the end.”

The senior managers were frequently to be found shuttling back and forth on the day and night trains between Cleveland and New York and Pittsburgh and Buffalo and Baltimore and Philadelphia. In 1885, the trust itself moved into new headquarters, a nine-story office building at 26 Broadway, in lower Manhattan, which soon became a landmark of sorts. From there the entire enterprise was directed, starting with the Executive Committee, its membership being whoever was in town that day. The senior executives lunched together daily in a private dining room at the top of the building. Over the meal, vital information was exchanged, ideas examined, and consensus built. And under Rockefeller's leadership, these former competitors built a company whose activities and scale were unprecedented—a new type of organization, and one that had evolved with astonishing rapidity. The men around the lunch table at 26 Broadway were an unusually talented group. "These men are smarter than I am a great deal," William Vanderbilt of the New York Central Railroad told the New York State Legislature. "They are very enterprising and smart men. I never came into contact with any class of men so smart and able as they are in their business."¹¹

"The Wise Old Owl"

But the smartest was certainly John D. Rockefeller. At the time the trust was formed, he was in his early forties, already one of the half-dozen richest men in America. He was the guiding force of the company, single-minded in his devotion to its growth and the cause of combination, scathing in his disdain for the "waste" of unbridled competition—and with no shortage of self-righteousness about his purpose. He was also strangely, and deliberately, inaccessible. Later in life, he recited a little rhyme from memory:

A wise old owl lived in an oak,
The more he saw the less he spoke,
The less he spoke, the more he heard,
Why aren't we all like that old bird?

He had resolved from the beginning of his business career to "expose as little surface as possible." He was analytical and suspicious, and he kept his distance from people. His remoteness and icy, penetrating stare were unnerving. On one occasion, Rockefeller met in Pittsburgh with a group of refiners. After the meeting, several of the refiners went off to dinner. The talk centered on the taciturn, ungregarious, menacing man from Cleveland. "I wonder how old he is," a refiner said. Various other refiners offered their guesses. "I've been watching him," one finally said. "He lets everybody else talk, while he sits back and says nothing. But he seems to remember everything, and when he does begin he puts everything in its proper place . . . I guess he's 140 years old—for he must have been 100 years old when he was born."

Many years later, one who worked for Rockefeller described him as "the most unemotional man I have ever known." Yet, of course, there was a man behind the mask. The 1870s and 1880s were years when "our plan" reached its fruition. But those years of consolidation and integration, of unexpected

political and press attacks, were also years of great strain and tension. “All the fortune that I have made has not served to compensate me for the anxiety of that period,” Rockefeller once said. His wife, too, would remember that time as “days of worry,” and he himself would recall that he seldom got “an unbroken night’s sleep.”

He sought relaxation and relief in different ways. Late in the day, during business meetings, he would lie down on a couch, tell his colleagues to continue, and participate in the discussions while stretched out on his back. He kept a primitive muscle extender in his office. He had a special love for horses, fast horses, and he would take them out for a carriage ride at the end of the day. An hour’s fast driving—“trot, pace, gallop, everything”—followed by a rest and dinner would rejuvenate him. “I was able to take up the evening’s mail and get ten letters off.”¹²

In Cleveland, outside of business, his life centered on his Baptist church. He was superintendent of the Sunday school, where he left an indelible impression on one of the students, a friend of his children. Many years later, she recalled: “I can see Mr. Rockefeller yet as he led the exercises in Sunday School, his long sharp nose, and long sharp pointed chin pointed out over the childish audience, his pale blue eyes never changing in expression. He spoke with such deliberation always that he seemed to drawl, yet that he really enjoyed his position no one could doubt. Take away his piety and you remove his greatest avocation.”

Rockefeller loved his Forest Hill estate, outside Cleveland, and devoted himself to its details—the building of a fireplace, constructed of special red-glazed bricks; the planting of trees; the cutting of new roads through the woods. He continued his hobby on a grander scale when he moved to his vast new estate in the Pocantico hills, north of New York City. There he directed the landscaping, constructed views, and worked at laying out new roads himself with stakes and flags, sometimes until he was exhausted. His passion for landscaping drew on the same talents for organization and conceptualization that had made him so formidable in business.

Yet even while becoming the richest man in America, he maintained a curious frugality. He insisted, to the distress of his family, on wearing the same old suits until finally they became so shiny that they had to be replaced. One of his favorite dishes remained bread and milk. Once, in Cleveland, he invited a prominent local businessman and his wife to stay at his Forest Hill estate for the summer. The couple spent a pleasant six weeks. They were, however, surprised afterward to receive a bill of six hundred dollars from Rockefeller for board.

He was not without a sense of humor, even of playfulness, though he displayed it only in the most restricted circles. “Have been in the dentist’s chair,” he once reported to his colleague Henry Flagler. “Think would have preferred to write you, or even read your letters, but could not help myself!” He would entertain his own family at dinner by singing, or by putting a cracker on his nose and then catching it in his mouth, or even by balancing a plate on his nose. He loved to sit with his children and their friends on the front porch and play a game called “Buzz.” You began to count and every time you came to a number with a seven in

it, you were supposed to say “Buzz” instead; otherwise, you were out. Somehow, Rockefeller, despite his gift for mathematics, just could never get beyond 71. The children always found this hilarious.

Rockefeller had begun making small donations to his church as soon as he started earning money. As time went on, the donations swelled, and he devoted increasing efforts to giving away a significant part of the wealth he had accumulated. He applied to philanthropy the same kind of methodical investigation and careful consideration that he brought to business; eventually, his donations would extend through the sciences, medicine, and education. In the nineteenth century, however, much of his philanthropy was oriented to the Baptist church, whose most powerful layman he had become.

At the end of the 1880s, he committed himself to the creation of a great Baptist university, and, in that cause, he provided the endowment, as well as the organizational focus, for the establishment of the University of Chicago. He continued to be by far its largest donor. Though he paid keen attention to its development, he did not interfere in its academic workings, save to insist that it stay within its budget. He refused to allow any buildings to be named after him so long as he was alive, and visited the university only twice in its first ten years. The initial visit was in 1896, on its fifth anniversary. “I believe in the work,” he told a university convocation. “It is the best investment I ever made in my life. . . . The good Lord gave me the money, and how could I withhold it from Chicago?” He listened as a group of students serenaded him:

John D. Rockefeller, wonderful man is he
Gives all his spare change to the U. of C.

By 1910, the “spare change” that Rockefeller had given to the university added up to \$35 million, compared to \$7 million from all other sources. And, altogether, to all his causes, he was to give away some \$550 million.

He carried over his habits of business to his private life. These were the decades of the Gilded Age, when the “robber barons” made immense fortunes and created extravagant and riotous lifestyles. His New York townhouse and his Pocantico estate were opulent indeed, but Rockefeller and his family somehow stood apart from the garishness, ostentation, and vulgarity of the age. He and his wife sought to inculcate their own values of probity into their children and so avoid having them ruined by inherited riches. Thus, the children would have only one tricycle among them so that they might learn to share. In New York City, young John D. Rockefeller, Jr., would be made to walk to and from school even as other children of the rich were carried back and forth in rigs, accompanied by grooms, and he earned pocket money working on his father’s estates for the same wages as the laborers.

In 1888, Rockefeller packed himself off, with his family and two Baptist ministers, to Europe for three months. Though he did not know French, he would scrutinize each item on every bill. “Poulets!” he would exclaim. “What are poulets?” he asked his son John Junior. Told that they were chickens, he would go on, reading the next item, asking what it was. “Father,” John Junior

would later recall, “was never willing to pay a bill which he did not know to be correct in all its items. Such care in small things might seem penurious to some people, yet to him it was the working out of a life principle.”¹³

A Marvel to the Eye

The company Rockefeller founded and guided to unparalleled prosperity continued to expand during the 1880s and into the 1890s. Scientific research was incorporated into the business. Great attention was devoted both to the quality of the product and to the neatness and cleanliness of the operations, from refinery to the local distributor. The growth of the marketing system—down to the final consumer—was an imperative of the business. The company needed markets to match its huge capacity, which forced it to seek aggressively “the utmost market in all lands,” as Rockefeller put it. “We needed volume.” And it surely and steadily moved to ever-higher volumes. For the growth in the use of oil, largely in the form of kerosene, was stupendous.

Oil and the kerosene lamp were changing American life—and the clock by which Americans lived. Whether living in the towns and cities of the East or the farms of the Midwest, consumers usually bought their kerosene either from their grocer or from their druggist, both of whom were supplied by a wholesaler, most of whom, in turn, were supplied by Standard Oil. As early as 1864, a New York chemist described the impact of this new illuminating oil. “Kerosene has, in one sense, increased the length of life among the agricultural population,” he wrote. “Those who, on account of the dearness or inefficiency of whale oil, were accustomed to go to bed soon after the sunset and spend almost half their time in sleep, now occupy a portion of the night in reading and other amusements; and this is more particularly true of the winter seasons.”

Practical advice on the use of kerosene—showing its quick and widening acceptance—was provided in 1869 by the author of *Uncle Tom’s Cabin*, Harriet Beecher Stowe, who assisted her sister with a book entitled *American Woman’s Home or Principles of Domestic Science*. “Good kerosene gives a light which leaves little to be desired,” they wrote, as they advised their readers what type of lamps to buy. But they warned against poor quality and impure oils, which were responsible for “those terrible explosions.” In the mid-1870s, five to six thousand deaths a year were attributed to such accidents. Regulation was spotty and slow in coming, which is why Rockefeller insisted on consistency and quality control, and why he had chosen the name Standard.¹⁴

In larger urban areas, kerosene still faced competition from manufactured or “town” gas, now extracted from coal or naphtha, another fraction of crude oil. But kerosene still had a considerable cost advantage. According to one publication, in New York, in 1885, kerosene could supply a family’s needs for about ten dollars a year, while “it was not uncommon for the gas bill of the more well-to-do householders to run that much per month.” In rural life, there was no such competition. “A look at the stock of a good, lively country store at the time of the Philadelphia Centennial in 1876 would have been enough to convert any citizen to a belief in progress,” a student of the country store has written. “Lamps and lamp chimneys, and the whole class of merchandise known as ‘kerosene goods’

would seem to be a marvel to eyes that had strained to see at night by means of a lighted rag, soaked in beef tallow and draped over the edge of a dish.”

Kerosene was by far the most important product coming out of refineries, but not the only one. The other products included naphtha; gasoline, used as a solvent or turned into a gas for illuminating individual buildings; fuel oil; and lubricants for the moving parts in train engines and railway cars, agricultural implements, cotton spindles, and later bicycles. Other products were petroleum jelly, trademarked as “Vaseline” and made into a base for pharmaceutical products, and paraffin, which was used not only for candle making and food preservation, but also for “paraffin chewing gum,” which was “highly recommended for constant use in ladies in sewing circles.”

In its effort to reach the consumer, Standard Oil moved to gain control over the marketing side of the business. By the mid-1880s, its control of marketing must have been almost equivalent to its control of refining—in the 80 percent range. And its tactics in acquiring that huge market share were just as ruthless. Its salesmen would “make a fist” and seek to intimidate both rivals and errant retailers who dared to carry competing products. Standard pushed a series of innovations to make its marketing more efficient and lower costs. Much effort was made to do away with the bulky, leaky, awkward, and expensive barrel. One innovation was the railway tank car, which eliminated the need to pile barrels into boxcars. Standard also replaced barrels on the streets of America with horse-drawn tank cars, which could disburse to a retailer anything from a pint to five gallons of kerosene. Wooden barrels—though they were to continue to define the measurement of oil—were eventually reserved only for the hinterlands, from which it was assumed they would not return.¹⁵

“Buy All We Can Get”

But Standard had stayed out of one critical part of the business—the production of oil. It was too risky, too volatile, too speculative. Who knew when any particular well might go dry? Better to let the producers carry that risk and stick to what could be rationally organized and managed—refining, transportation, and marketing. As one of the members of the Executive Committee wrote Rockefeller in 1885, “Our business is that of manufacturers, and it is in my judgment, an unfortunate thing for any manufacturer or merchant to allow his mind to have the care and friction which attends speculative ventures.”

But a sense of precariousness underlay Standard’s great globe-girdling system. There was always the fear that the oil would run out. This gift that came from the earth might disappear with the suddenness with which it had appeared. Flush production quickly exhausted the capability of wells to produce. Insofar as American oil production was concerned, Pennsylvania was the entire game, the only game; and perhaps what had happened in different areas of the state might be the fate of the entire Oil Regions. The rise and fall of Pithole was a stark warning of what could come. And who knew when? Could the industry survive even another decade? And, without crude, what value would there be to all the hardware and all the capital investment—the refineries, the pipelines, the tanks, the ships, the marketing systems? Various experts cautioned that the Oil Regions would soon

be depleted. In 1885, the state geologist of Pennsylvania warned that “the amazing exhibition of oil” was only “a temporary and vanishing phenomenon—one which young men will live to see come to its natural end.”

That same year, John Archbold, a top executive of Standard, was told by one of the company’s specialists that decline in American production was almost inevitable and that the chances of finding another large field “are at least one hundred to one against it.” These warnings were sufficiently persuasive to Archbold that he sold some of his shares in Standard Oil at seventy-five to eighty cents on the dollar. Around the same time, Archbold was also told about signs of oil in Oklahoma. “Are you crazy?” he replied. “Why, I’ll drink every gallon produced west of the Mississippi!”

But, just at that moment, the industry was about to break out of Pennsylvania—and with dramatic suddenness. The scene was northwestern Ohio, where flammable gas springs in the vicinity of Findlay had been known since the earliest settlements. In the mid-1880s, oil was discovered there, igniting a great boom in the region, which straddled the border with Indiana and became known as the Lima-Indiana fields. The newly discovered fields were so prolific that, by 1890, they accounted for a third of United States oil production!¹⁶

Rockefeller was poised to make his last great strategic decision—to go directly into oil production. No less than his colleagues, he had great antipathy for oil producers. Yes, they were speculators, they were unreliable, they behaved like greedy miners in a gold rush. Yet here, in Lima, was an opportunity for Standard to gain control of its raw materials on a very large scale, to apply its rational management to the production of oil, to balance supplies and inventories against its market needs. In short, Standard would be able to insulate itself to a considerable degree against the fluctuations and volatility of the oil market—and against the disorder of the “mining camp.” And that was the direction in which Rockefeller very definitely wanted Standard to go.

The signs of depletion in Pennsylvania were a warning that it was time to be bold, and Lima offered the indisputable evidence that the oil industry had a future beyond Pennsylvania. But there were two major obstacles. One was the quality of the petroleum. It had very different properties from that of Pennsylvania, including a most unappealing sulfuric odor, like rotten eggs. Some called the Lima crude “skunk juice.” There was no known way to remove the odor, and until such a way was found, the Ohio oil had only a very limited market.

The second obstacle was located at 26 Broadway—the obstinacy of Rockefeller’s more cautious colleagues. They thought the risk much too great. As a starting point, Rockefeller argued that the company should buy up all the oil it could and store it in tanks all over the region. The oil was flowing in such huge volumes out of the Ohio ground that the price dropped from forty cents a barrel in 1886 to fifteen cents a barrel in 1887. But many of Rockefeller’s colleagues strongly opposed the policy of buying oil for which there was not yet any good use. “Our conservative brethren on the Board,” as Rockefeller called them, “held up their hands in holy terror and desperately fought a few of us.” Eventually, however, Rockefeller prevailed, and Standard Oil put more than 40 million barrels of Lima oil in storage. Then, in 1888 and 1889, Herman Frasch, a German chemist employed by Standard, figured out that, if the crude oil were refined in

the presence of copper oxide, the sulfur could be removed, eliminating the problem of the rotten-eggs smell and thus making Lima oil an acceptable source of kerosene. Rockefeller's Lima gamble proved to be well worth it; after Frasch's breakthrough, the price of Lima oil immediately doubled from the fifteen cents a barrel at which Standard had acquired it to thirty cents, and continued to climb.

Rockefeller pushed the company toward the final step of buying up a large number of producing properties. The most rowdy, disorderly participants of the new industry were the producers—both in the way they managed their fields and in their business relationships. Here was a chance to impose a more orderly, more stable structure. His colleagues were, as before, reluctant, even opposed. Rockefeller was insistent. He carried the day. Of the leases available for purchase he simply ordered “Buy all we can get.” By 1891, though virtually absent from production a few years earlier, Standard was itself responsible for a quarter of America's total output of crude oil.¹⁷

Standard committed itself to building the world's largest refinery at a place called Whiting, amidst desolate sand dunes on the shore of Lake Michigan in Indiana, to process the Lima crude. There, as everywhere, Standard's cult of secrecy—which would ultimately help undermine the entire organization—was at work. It was completely obvious that Standard was building a refinery. Still, a reporter from the *Chicago Tribune* found it impossible to get any information out of a Mr. Marshall, the close-mouthed manager of the construction project. “As to what was being done at Whiting he was entirely ignorant,” the reporter wrote. “They might be erecting a \$5 million dollar oil refinery or they might be putting up a pork packing establishment. He didn't think it was a pork packing establishment, but he wasn't sure.”

Then there was the matter of the price itself. For many years, prices had reflected the often-feverish trading in oil certificates on the various oil exchanges in the Regions and New York. Through the 1880s, the Joseph Seep Agency, the buying arm of Standard Oil, bought oil on the open market like everyone else, by acquiring “certificates” on these exchanges. When the Seep Agency did buy directly at the wellhead, it averaged the day's highest and lowest prices from the exchanges. Increasingly, however, Seep bought directly from producers, and the independent refiners followed suit. Transactions on the exchanges fell steadily over the early 1890s.

Finally, in January 1895 Joseph Seep closed down the era of the oil exchanges with a historic “Notice to Oil Producers.” He announced that “dealing” on the exchanges was “no longer a reliable indication of the value of the product.” From then on, he declared, in all purchases “the price paid will be as high as the markets of the world will justify, but will not necessarily be the price bid on the exchange for certificate oil.” He added, “Daily quotations will be furnished you from this office.” As either purchaser or owner of between 85 and 90 percent of the oil in Pennsylvania and Lima-Indiana, Seep and Standard Oil now effectively determined the purchase price for American crude oil, though always bound by supply and demand. Said one of Rockefeller's colleagues: “We have before us daily the best information obtainable from all the world's markets. And we make from that the best possible consensus of prices, and that is our basis for arriving at the current price.”¹⁸

The Upbuilder

In every dimension, the scale of Standard's operations was awesome, overwhelming competitors. Yet it was not a complete monopoly, not even in refining. Somewhere around 15 to 20 percent of oil was sold by competitors, and the directors of Standard were willing to live with that. Control of upwards of 85 percent of the market was sufficient for Standard to maintain the stability it cherished. Reflecting upon his landscaping and tree growing, Rockefeller observed in old age, "In nursery stock, as in other things, the advantage of doing things on a large scale reveals itself." Standard Oil could certainly be numbered at the top of the list of "other things." Rockefeller created the vertically integrated petroleum company. Many years later, one of Rockefeller's successors at Standard Oil of Ohio, who had, as a young lawyer, worked with him, mused on one of Rockefeller's great achievements. "He instinctively realized that orderliness would only proceed from a centralized control of large aggregations of plant and capital, with the one aim of an orderly flow of products from the producer to the consumer. That orderly, economical, efficient flow was what we now, many years later, call 'vertical integration.'" He added, "I do not know whether Mr. Rockefeller ever used the word 'integration.' I only know he conceived the idea."

Some commentators were puzzled by Rockefeller's accomplishments. The United States government's authoritative *Mineral Resources* declared in 1882: "There seems to be little doubt that the company has done a great work, and that through its instrumentality oil refining has been reduced to a business, and transportation has been greatly simplified; but as to how much evil has been mixed with this good, it is not practicable to make a definite statement."

For others—Standard's competitors and a good part of the public—the judgment was incontestable and completely negative. To many producers and independent refiners Standard Oil was the Octopus, out to grasp all competitors, "body and soul." And to those throughout the oil industry who suffered from Rockefeller's machinations—from the ceaseless commercial pressures and the "good sweatings," from the duplicity and secret arrangements—he was a bloodless monster, who hypocritically invoked the Lord as he methodically set about destroying people's livelihoods and even their lives in his pursuit of money and mastery.

Some of Rockefeller's colleagues were grieved by the drumbeat of criticism. "We have met with a success unparalleled in commercial history, our name is known all over the world, and our public character is not one to be envied," one wrote to Rockefeller in 1887. "We are quoted as the representative of all that is evil, hard hearted, oppressive, cruel (we think unjustly). . . . This is not pleasant to write, for I had longed for an honored position in commercial life."¹⁹

Rockefeller himself was not so troubled. He was, he thought, only operating in the spirit of capitalism. He even sought to enlist Protestant evangelists and Social Gospel clergy in the defense of Standard Oil. Mostly he ignored the criticism; he remained confident and absolutely convinced that Standard Oil was an instrument for human betterment, replacing chaos and volatility with stability, making possible a major advance in society, and delivering the gift of the "new light" to the world of darkness. It had provided the capital and organization and

technology and had taken the big risks required to create and service a global market. “Give the poor man his cheap light, gentlemen,” Rockefeller would tell his colleagues in the Executive Committee. As far as he was concerned, Standard Oil’s success was a bold step into the future. “The day of combination is here to stay,” Rockefeller said after he had stepped aside from active management of the company. “Individualism has gone, never to return.” Standard Oil, he added, was one of the greatest, perhaps even the greatest, of “upbuilders we ever had in this country.”

Mark Twain and Charles Dudley Warner, in their novel, *The Gilded Age*, grasped the character of the decades after the Civil War—a time of “the manufacture of giant schemes, of speculations of all sorts . . . [and of] inflamed desire for sudden wealth.” Rockefeller was in some ways the true embodiment of his age. Standard Oil was a merciless competitor that would “cut to kill,” and he became the wealthiest of all. Yet, whereas many of the other robber barons amassed their wealth by speculation, stock and financial manipulation, and outright fraud—cheating their stockholders—Rockefeller built his fortune by taking on a youthful, wild, unpredictable, and unreliable industry, and relentlessly transforming it according to his own logic into a highly organized, far-flung business that satisfied the basic hunger for light around the world.²⁰

“Our plan” was to succeed even beyond Rockefeller’s boldest visions, but it would ultimately fail. In the United States, public opinion and the political process would revolt against combination and monopoly, and what came to be seen as unacceptable arrogance and immoral business behavior. At the same time, new individuals and new companies—operating beyond Rockefeller’s reach in the United States and in faraway places like Baku, Sumatra, Burma, and later Persia—would rise up to prove themselves hardy and persistent competitors. And some would do more than survive; they would flourish.

C H A P T E R 3

Competitive Commerce

THOUGH THE REST OF THE WORLD was waiting for the “new light” from America, it had been no easy thing to get the first shipment of oil off to Europe. Sailors were terrified about the possibility of explosions and fires that might result from carrying kerosene as a cargo. Finally, in 1861, a Philadelphia shipper obtained a crew by getting the potential recruits drunk and virtually shanghaiing them aboard the sailing ship. That cargo made its way safely to London. The door to global trade was opened, and American oil quickly won markets throughout the world. People everywhere would begin to enjoy the benefits of kerosene. So, virtually from the very beginning, petroleum was an international business. The American oil industry could not have grown to the size it did and become what it was without its foreign markets. In Europe, the rapid increase in the demand for American oil products was stimulated by industrialization, economic growth, and urbanization, and by a shortage of fats and oils that had afflicted Continental Europe for more than a generation. The development of the various markets was speeded by United States consuls in Europe, who were eager to push this new “Yankee invention,” as one put it, and who, in some instances, purchased oil out of their own pockets to distribute to potential customers.

Consider what the global demand meant. The substance for the popular form of lighting worldwide was provided not merely by one country, but, for the most part, by one state, Pennsylvania. Never again would any single region have such a grasp on supply of the raw material. Almost overnight, the export business became immensely important to the new American oil industry and to the national economy. In the 1870s and 1880s, kerosene exports accounted for over half of total American oil output. Kerosene was the fourth-largest U.S. export in value; the first among manufactured goods. And Europe was by far the largest market.

By the end of the 1870s, not only was one state dominant, but so was one company—Standard Oil. Eventually, at least 90 percent of the exported kerosene passed through Standard's hands. Standard was satisfied with a system in which its role ended in an American port. It was confident in its overwhelming position and was prepared to conquer the planet from its American base. John D. Rockefeller would, indeed, be able to impose "our plan" on the entire world. At the same time, the company took enormous pride in its product. Petroleum, said Standard Oil's chief foreign representative, has "forced its way into more nooks and corners of civilized and uncivilized countries than any other product in business history emanating from a single source."

There was, of course, a danger—the potential of foreign competition. But the men at 26 Broadway discounted that possibility. The only way such competition could arise was on the basis of some new source of cheap and abundant crude. The Pennsylvania Geological Report of 1874 proudly commented on how thoroughly the state's oil dominated the markets of the world. It mentioned in passing that there was a question whether "the drill in other countries . . . would find oil." But this was only an issue "that some day may interest us." The authors of the report were so sure of America's dominant role that they saw no purpose in further pursuing the question at the time. Yet they were already in error.¹

"The Walnut Money"

Among the most promising markets for the "new light" was the vast Russian Empire, which was beginning to industrialize, and for which artificial light had a special importance. The capital city, St. Petersburg, was so far north that, in the winter, it had barely six hours of daylight. As early as 1862, American kerosene reached Russia, and in St. Petersburg, it quickly won wide acceptance, with kerosene lamps swiftly replacing the tallow on which the populace had almost entirely depended. The United States consul at St. Petersburg reported happily in December 1863 that it was "safe to calculate upon a large annual increase of the demand from the United States for several years to come." But his calculations could not take into account future developments in a distant and inaccessible part of the empire, which would not only foreclose the Russian market to American oil but would also spell the undoing of Rockefeller's global plans.

For many centuries, oil seepages had been noted on the arid Aspheron Peninsula, an outgrowth of the Caucasus Mountains projecting into the landlocked Caspian Sea. In the thirteenth century, Marco Polo reported hearing of a spring around Baku that produced oil, which, though "not good to use with food," was "good to burn" and useful for cleaning the mange of camels. Baku was the territory of the "eternal pillars of fire" worshiped by the Zoroastrians. Those pillars were, more prosaically, the result of flammable gas, associated with petroleum deposits, escaping from the fissures in porous limestone.

Baku was part of an independent duchy that was annexed to the Russian Empire only in the early years of the nineteenth century. By then, a primitive oil industry had already begun to develop, and by 1829 there were eighty-two hand-dug pits. But output was tiny. The development of the industry was severely

restricted both by the region's backwardness and its remoteness and by the corrupt, heavy-handed, and incompetent czarist administration, which ran the minuscule oil industry as a state monopoly. Finally, at the beginning of the 1870s, the Russian government abolished the monopoly system and opened the area to competitive private enterprise. The result was an explosion of entrepreneurship. The days of hand-dug oil pits were over. The first wells were drilled in 1871–72; and by 1873, more than twenty small refineries were at work.

Shortly after, a chemist named Robert Nobel arrived in Baku. He was the eldest son of Immanuel Nobel, a clever Swedish inventor who had immigrated in 1837 to Russia, where the military establishment excitedly took up his invention of the underwater mine. Immanuel built up a considerable industrial company, only to have it fail when the Russian government made one of its periodic swings from domestic to foreign procurement. One son, Ludwig, built upon the ruins of his father's business a new company, a great armaments concern; he also developed the "Nobel wheel," which was uniquely suited to the wretched Russian roads. Another son, Alfred, gifted in both chemistry and finance, and picking up on a suggestion from his tutor in St. Petersburg about nitroglycerine, created a worldwide dynamite empire, which he ran from Paris. But the eldest son, Robert, had no such good fortune; he was unsuccessful in a variety of businesses, and finally returned to St. Petersburg to work grudgingly for Ludwig.

Ludwig obtained a huge contract to manufacture rifles for the Russian government. He needed wood for the rifle stocks, and in the quest for a domestic supply, he dispatched Robert south to the Caucasus to search for Russian walnut. In March 1873, Robert's journey took him to Baku. Though a great polyglot trading emporium between East and West, Baku was still very much a part of Asia with the minarets and the old mosque of the Persian shahs, and with its population of Tatars, Persians, and Armenians. But the recent oil development had begun to bring great change; and Robert, immediately on his arrival in Baku, was caught up in the fever. Without consulting his brother—after all, he was the eldest and, therefore, held certain prerogatives—Robert took the twenty-five thousand rubles that Ludwig had entrusted to him for buying wood—the "walnut money"—and instead bought a small refinery. The Nobels were in the oil business.²

The Rise of Russian Oil

Robert quickly set about modernizing and making more efficient the refinery he had bought with Ludwig's money. With additional funds from his brother, he established himself as the most competent refiner in Baku. In October 1876, the first shipment of Nobel's illuminating oil arrived in St. Petersburg. In that same year, Ludwig came to Baku, to see for himself. Skilled in dealing with the imperial system, Ludwig won the blessing of the grand duke, brother of the czar and the viceroy of the Caucasus. But Ludwig Nobel was also a great industrial leader, capable of conceiving a plan on the scale of Rockefeller. He set about analyzing every phase of the oil business; he learned everything he could about the American oil experience; he harnessed science, innovation, and business planning to efficiency and profitability; and he gave the entire venture his personal

leadership and attention. In a very few years, Russian oil was to take on and even surpass American oil, at least for a time; and this Swede, Ludwig Nobel, would become “the Oil King of Baku.”

Long-distance transit was a critical problem. The oil was shipped in wooden barrels from Baku over an inefficient and lengthy route—carried by boat six hundred miles north on the Caspian Sea to Astrakhan, then transferred to barges for the long journey up the Volga River, eventually reaching one or another rail line to which it was transferred for further shipment. Handling costs were enormous. Even the barrels were costly. No local wood was available in sufficient quantity, and wood was brought from a distant part of the empire or imported from America, or secondhand American barrels were bought in Western Europe. Ludwig conceived a solution to the barrel problem that would have far-reaching implications. It was to ship the oil in “bulk”—that is, in large tanks built into the ships.

The idea had great merit, but in practice it faced considerable ballast and safety problems. The captain of a ship that had been wrecked while carrying oil in bulk explained: “The difficulty was that the oil seemed to move quicker than water, and in rough weather, when the vessel was pitched forward, the oil would rush down and force the vessel into the waves.” Ludwig figured out how to solve the ballast problem and commissioned the first successful bulk tanker, the *Zoroaster*, which was put into service in 1878 on the Caspian. By the middle 1880s, Ludwig’s conception had also proved itself on the Atlantic, launching a major revolution in oil transport. Meanwhile Ludwig was constantly pushing his Baku refinery to be among the most scientifically advanced in the world. His was the first company anywhere in the world to have a permanent staff position for a professional petroleum geologist.

The great, highly integrated oil combine built by Ludwig soon dominated the Russian oil trade. The evidence of the Nobel Brothers Petroleum Producing Company could be found throughout the empire: wells, pipelines, refineries, tankers, barges, storage depots, its own railroad, a retail distribution network—and a multinational workforce that was treated better than virtually any other working group in Russia, and whose members proudly called themselves “Nobelites.” The rapid development of Ludwig Nobel’s oil empire in the first ten years of its existence has been described as “one of the greatest triumphs of business enterprise in the entire nineteenth century.”³

Russian crude production, which was less than six hundred thousand barrels in 1874, reached 10.8 million a decade later, equivalent to almost a third of American production. By the early 1880s almost two hundred refineries were at work in the new industrial suburb of Baku that was, appropriately enough, known as Black Town. They emitted so dense a cloud of dark, smelly oil smoke that life in Black Town was compared by one visitor to “confinement in a chimney-pot.” This was the expanding industry that the Nobels dominated. Their company was producing half of all Russian kerosene, and triumphantly telling its stockholders that “American kerosene has now been completely forced out of the Russian market.”

But the company suffered from discord among the Nobel brothers themselves. Robert resented Ludwig’s intrusion into his preserve, and eventually

went back to Sweden. Ludwig was a builder, constantly seeking to expand, which meant that Nobel Brothers was continuously hungry for new capital. Alfred, well remembering how their father had failed through overexpansion and overcommitment, was much more cautious. “The main point of criticism,” Alfred scolded Ludwig, “is that you build first and then look around for the where-withal.” He advised Ludwig to speculate with company shares on the stock market as a way to generate additional capital. In reply, Ludwig told Alfred to “give up market speculation as a bad occupation and leave it to those who are not suited for really useful work.” Despite their disagreements, Alfred provided crucial assistance both in the form of his own money and in his help in arranging loans elsewhere, including a major borrowing from the *Crédit Lyonnais*. That transaction set a significant precedent in that it may have been the first loan for which future petroleum production was used as collateral.

While Nobel Brothers dominated distribution of oil within the Russian Empire, beyond those borders Russian oil was hardly a factor. Geography locked the oil into the empire. For example, to reach a Baltic port meant “2,000 miles, intermittent water and rail transportation through western Russia.” To make matters worse, severe winter weather precluded the shipment of kerosene on the Caspian between October and March, with the result that many refiners simply shut down for half the year. Even parts of the empire were inaccessible; in the city of Tiflis (now Tbilisi), it was cheaper to import kerosene from America, 8,000 miles away, than from Baku, 341 miles to the east.

There were also limits to the market within the Russian Empire; illumination was far from a necessity for the vast peasantry and not something they could afford in any event. Ever-growing production forced the producers of Baku to look hungrily beyond the borders of the empire. Seeking an alternative to the northern route dominated by Nobel, two other producers—Bunge and Palashkovsky—won government approval to begin building a railroad that would go west from Baku over the Caucasus to Batum, a port on the Black Sea that had been incorporated into Russia in 1877 as the result of a war with Turkey. But in the midst of construction, the price of oil dropped, and Bunge and Palashkovsky ran out of money. They were in desperate straits.

Their rescue came from the French branch of a family that, among the wars and governments and industries it had bankrolled, had also already financed many of Europe’s new railroads. They owned a refinery at Fiume, on the Adriatic, and were interested in acquiring lower-priced Russian crude for it. They loaned the money to complete the railroad that Bunge and Palashkovsky had begun, acquiring in exchange a package of mortgages on Russian oil facilities. They also arranged guaranteed shipments of Russian oil to Europe at attractive prices. They were the Rothschilds.

This was a time of fervent anti-Semitism in Russia. An 1882 Imperial Decree had forbidden Jews to own or rent any more land within the empire; and, after all, the Rothschilds were the most famous Jews in the world. But in their case, the decree did not seem to matter. Russian oil was a project of the Paris Rothschilds. That meant, in particular, of Baron Alphonse—who had organized France’s reparations payments after its defeat by Prussia in 1871, was considered one of the best-informed men in all of Europe, and was said to own the best

pair of mustaches on the Continent—and of his younger brother, Baron Edmond, who sponsored Jewish settlement in Palestine. The Rothschild loan allowed the railroad from Baku to be completed in 1883, turning Batum almost overnight into one of the world's most important oil ports. In 1886, the Rothschilds formed the Caspian and Black Sea Petroleum Company, known ever after by its Russian initials—"Bnito." They built up their storage and marketing facilities in Batum; the Nobel Brothers quickly followed suit. The Baku-Batum railroad opened a door to the West for Russian oil; it also initiated a fierce, thirty-year struggle for the oil markets of the world.⁴

The Challenge to Standard Oil

With the arrival of the Rothschilds on the scene, the Nobels were suddenly faced with a major competitor, soon to become the second-largest Russian oil group. Though these two competitive groups discussed amalgamation, they could find no common ground beyond expressions of friendly intent, and their rivalry remained intense. There were others whose intentions were decidedly hostile. Standard Oil could not afford to ignore the Russian oil industry. Russian kerosene was now competing with American illuminating oils in many countries in Europe. In response, Standard Oil stepped up its intelligence-gathering effort about foreign markets and the new competitors. Reports began to flow into 26 Broadway from all over the world, including some from American consuls who were also on the Standard payroll. The intelligence was disturbing. No longer could Standard complacently count on its overwhelming dominance.

Standard Oil's management figured that the czarist government would never allow it to buy out Ludwig Nobel altogether. But it could try instead to acquire a substantial number of Nobel shares, and retain the invaluable Ludwig in the management—just as it had retained the best of the competitors it had bought out in the United States. In 1885, W. H. Libby, Standard's top business-diplomat and ambassador-at-large, opened talks with the Nobels in St. Petersburg. Ludwig Nobel was not interested. Instead he concentrated on strengthening his own marketing network and building up his sales—in Europe. He had no choice. The spectacular increase of Russian oil production forced Nobel, and the other Russian oil men, to seek new markets beyond the empire. Baku was characterized by a series of astonishing oil "fountains" or gushers, with such names as "Kormilitza" (the Wet Nurse) and Golden Bazaar and Devil's Bazaar. One called "Droozba" (Friendship) gushed for five months at the rate of forty-three thousand barrels per day, most of it wasted. By 1886, there were eleven fountains, then a host of new ones in a newly opened field. Altogether Russian oil production rose tenfold between 1879 and 1888, reaching 23 million barrels, which was equivalent to more than four-fifths of American production. As the flood of oil rapidly rose in the 1880s, it needed to find its way to markets.

Faced with the aggressive Nobel's new sales campaign in Europe, and deeply alarmed by the growing production from Baku, Standard concluded that it would have to take actions beyond mere discussions. In November of 1885, it dropped its prices in Europe—just as it would when attacking a competitor in

the United States. Its local agents started rumor campaigns in various European countries about the quality and safety of Russian kerosenes. They also resorted to sabotage and bribery. Despite the ferocity of the Standard assault, Nobel and the Rothschilds fought back fiercely and successfully, and Standard's executives watched with dismay as the region of what they ominously labeled "Russian competition" broadened across the map.⁵

At 26 Broadway in New York City, some members of Standard's Executive Committee had been pushing for Standard to set up its own marketing companies in foreign countries, rather than sell to independent local merchants, so that it could compete more aggressively. Moreover, the development of bulk shipment in tankers brought new economies of scale to the business. John D. Rockefeller himself, exasperated with the slowness of decision, even wrote a chiding poem to the Executive Committee in 1885:

We are neither old nor sleepy and must "Be up and
doing, with a heart for any fate;
Still achieving, still pursuing, learn to labor and
to wait."

In 1888, the Rothschilds took a new step in the competition; they established their own importing and distributing companies in Britain. Nobel Brothers did likewise. Finally galvanized into action, Standard set up its first foreign "affiliate," the Anglo-American Oil Company, just twenty-four days after the official organization of the Rothschilds' new enterprise in Britain. It also established new affiliates on the Continent—joint ventures in which it shared ownership with leading local distributors. Standard Oil had become a true multinational enterprise.

Still its competitors could not be stayed. The Rothschilds lent money to smaller Russian producers, in turn tying up rights to their production at advantageous prices. The Baku-Batum railroad suffered from a great bottleneck; the seventy-eight-mile stretch over the three-thousand-foot peak was so difficult that only half a dozen cars could be hauled over at any given time. In 1889, the Nobel Brothers completed a forty-two-mile pipeline through the mountain. What made all the difference was the use of four hundred tons of Alfred's dynamite. In this new era of what Libby, Standard's roving ambassador, called "competitive commerce," America's share of the world export trade in illuminating oil fell from 78 percent in 1888 to 71 percent in 1891, while the Russian share rose from 22 percent to 29 percent.

The prolific Baku fields continued to throw up new petroleum fountains and ever more oil. But there had been one dramatic change in the Russian oil industry. While Ludwig Nobel's patience and determination did not abate in the face of the never-ending obstacles, physically he was worn out. In 1888 at the age of fifty-seven, the Oil King of Baku died of a heart attack while vacationing on the French Riviera.

Some of the European newspapers confused the Nobel brothers and instead reported the death of Alfred. Reading his own premature obituaries, Alfred was distressed to find himself condemned as a munitions maker, the "dynamite

king,” a merchant of death who had made a huge fortune by finding new ways to maim and kill. He brooded over these obituaries and their condemnations, and eventually rewrote his will, leaving his money for the establishment of the prizes that would perpetuate his name in a way that would seem to honor the best in human endeavor.⁶

The Son of the Shell Merchant

Still, there was the Russian kerosene, flowing out of Batum in ever-increasing quantities, in search of markets. The Nobels, at least, had a firm grip on the internal Russian market. But for the others, especially for the Rothschilds, the problem of “disposal” was growing with each passing year. Somehow, the Rothschilds had to find their way around Standard Oil and into the world market. They looked with special interest to the East, to Asia, where they saw hundreds of millions of potential customers for the “new light.” But how to get the oil to them?

The Rothschilds in Paris knew a shipping broker in London named Fred Lane, who watched out for their oil interests there, and they shared their problem with him. Though always a backstage figure, Lane was to be one of the important oil pioneers. He was a big, burly man of great intelligence and with a talent for making friends and mediating interests. He was willing to back up his friendships and business alliances, which were usually one and the same, with his own capital. A “go-between *par excellence*,” he was eventually to be known as “Shady Lane,” not because he was crooked, for he was not, but because he sometimes appeared to be representing so many different interested parties simultaneously in a transaction that it was hard to know for whom he was really working.

Lane was truly expert in shipping; and now he had a solution to offer the Rothschilds. For he, in turn, knew a certain merchant of rising prominence, Marcus Samuel. He put the Rothschilds in touch with Samuel. The result would be an audacious scheme that might not only solve the problem of Russian oil, but also take the form of a veritable worldwide coup that, if successful, would loosen the iron grip of Rockefeller and Standard Oil on the kerosene trade of the world.

By the end of the 1880s, Marcus Samuel had already gained some prominence in the City of London. It was no mean achievement for a Jew—and a Jew not from one of the old Sephardic families, but from the East End of London, a descendant of immigrants who had come to Britain in 1750 from Holland and Bavaria. Samuel had the same name as his father, Marcus Samuel, most unusual for a professing Jew. The elder Marcus Samuel had begun his own business career trading on the East London docks, buying curios from returning sailors. In the census of 1851, he was listed as a “shell merchant”; among his most popular products were the little knickknack boxes covered with seashells, known as a “Gift from Brighton,” which were sold to girls and young ladies at English seaside resorts in the mid-Victorian years. By the 1860s, the elder Marcus had accumulated some wealth and, in addition to seashells, was importing everything from ostrich feathers and partridge canes to bags of pepper and slabs of tin. He

was also exporting an expanding list of manufactures, including the first mechanical looms sent to Japan. In addition, in what was to prove of great importance to his son, the elder Samuel had built up a network of trusted relationships with some of the great British trading houses—run mainly by expatriate Scots—in Calcutta, Singapore, Bangkok, Manila, Hong Kong, and other parts of the Far East.

The younger Marcus was born in 1853. And in 1869, at age sixteen, after some schooling in Brussels and Paris, he went to work on his father's ledgers. At that very moment in America, John Rockefeller, fourteen years older than Samuel, was about to begin his decade-long campaign to consolidate the oil industry. Throughout the entire world, new technology was radically transforming trading and international commerce. In 1869, the Suez Canal was opened, knocking four thousand miles off the journey to the Far East. Steamships were taking over from sail. In 1870, the direct telegraph cable from England to Bombay was completed, and shortly after, Japan, China, Singapore, and Australia were all brought into the telegraph network. For the first time, the world was knitted together by global communications through the telegraph wire. Swift information now eliminated the months of waiting and suspense. Shipping was no longer a speculative venture, and explicit deals could be made in advance. These were all tools that the younger Marcus Samuel would use to build his wealth.

After the death of his father, Marcus, in partnership with his brother Samuel Samuel, developed a considerable trading operation. For several years, Samuel Samuel was resident in Japan, and the brothers had two firms—M. Samuel & Co. in London and Samuel Samuel & Co. in Yokohama, later removed to Kobe. The brothers played an important role in the industrialization of Japan, and before he was thirty, Marcus had made his first fortune out of the trade with Japan. The two brothers went on to do business throughout the Far East, in cooperation with those trading houses with which their father had first forged the relationship. At the time, Marcus and Samuel Samuel were the only British Jews prominent in the trade with the Orient.

Marcus Samuel was always the trader, the idea man, and Samuel Samuel, two years younger, always the loyal adherent and sidekick. Marcus was the more complicated, and as the years went by, his considerable charm gave way to a remoteness that almost seemed to be a mask. Short and stout, with heavy eyebrows, he was totally unprepossessing in appearance. But he was capable of bold vision, and he was adventurous, ingenious, quick to act, and single-minded when he chose to be. He talked in a very soft voice, sometimes hardly audible, making people strain to hear him and perhaps making himself all the more persuasive. He also instilled trust in people, so much so that for two decades, he depended for his credit not on bankers but on those Scottish merchants in the Far East. Marcus had more on his agenda than simply accumulating wealth for its own sake. He had a craving for position. As an outsider, as a Jew born in the East End of London, he would put his considerable energies into seeking and winning acceptance for the name Samuel at the highest levels of British society.

Samuel Samuel, in contrast to his brother, was warm-hearted, generous, gregarious, and in addition always late. He had a fondness for silly riddles, some of which he cherished for half a century or more. Let a guest come to lunch on a

sunny day and he would be told by Samuel, "It's a lovely day for the race." What race? "The human race," Samuel would reply triumphantly.

Marcus did not believe in overhead; indeed he profoundly disbelieved in it. He operated out of a small office in Houndsditch in the East End, behind which was his warehouse, crammed to the ceiling with Japanese vases, imported furniture and silks, seashells and feathers, and every other kind of knickknack and curio. The perishable commodities were disposed of immediately on arrival. His operating staff was lean, another way of saying he had virtually no staff at all. He had little capital, depending instead on the credit extended to him by the Far Eastern trading houses. He also used the trading houses as his foreign agents, saving more on organization and administration. And to charter ships, he used the shipping brokerage firm of Lane and Macandrew, whose senior partner, Fred Lane, could frequently be found in the cramped offices, off a narrow alley, that belonged to M. Samuel and Company.⁷

The Coup of 1892

Marcus Samuel's entire business experience had conditioned him to be swift in grasping an opportunity, and here with the Rothschilds was an astonishing one. He moved quickly to lay the groundwork with Lane. The two men made a prospecting trip to the Caucasus in 1890. It was there that Samuel observed a primitive bulk tanker and saw in a flash that bulk tankers—the ship as a floating bottle, like modern tankers—would be much more efficient. Samuel then traveled out to Japan, and back through the Far East, seeking to persuade the Scottish trading houses with which he customarily did business to sign on with his new venture. Without them, he could not go ahead. He needed more than their cooperation; they would also have to finance the enterprise. And they all agreed to join his scheme.

Altogether, Marcus Samuel carried out a study of the opportunity and the requirements of success with a meticulous care that was uncharacteristic of the normally fast-moving trader. But he knew how large were the risks—and the stakes. He recognized that there was no point in trying to break into the market unless he and his partners could undersell Standard Oil—or at least avoid being undersold by Standard Oil. In order to assure that result, the campaign would have to be waged in all markets simultaneously; otherwise, Standard Oil would slash prices in markets where the Samuel group was competing and subsidize the price cuts by raising prices where they were not present. And, finally, speed and—to the greatest extent possible—secrecy were essential. He knew he was girding for a war with a merciless opponent.

But exactly how was Samuel to fight this war? He could tote up a long and daunting list of requirements. He needed tankers, so that the kerosene could be shipped in tanks, rather than cases. The savings on space and weight, and the gain in volume, would greatly reduce shipping costs per gallon. Like Rockefeller with the railroads, Samuel understood the absolute need to master transportation costs. The type of tanker then in operation simply would not do. Samuel needed a new, larger, technologically more advanced type of tanker, and he commissioned the design and construction of such ships. He needed guaranteed

supplies of kerosene from Batum, in sufficient volume and priced to reflect the savings gained by not having to tin the kerosene. He needed access to the Suez Canal, which would cut the voyage by four thousand miles, pulling costs down further and increasing his competitive advantage against Standard, whose oil traveled to the Far East on sailing ships around the Cape of Good Hope. But the Suez Canal was closed to tankers on grounds of safety; indeed, Standard's tankers had already been refused entrance. But that did not deter Samuel. He would batter down the door. Samuel also required large storage tanks in all of the major Asian ports. He needed tank cars or tank wagons to carry the kerosene into the hinterlands. Finally, he and his partners in this venture, the trading houses, would have to establish inland depots where the bulk shipments of kerosene could be broken down and put into receptacles for the local wholesale and retail trade. And this demanding enterprise, involving detailed long-distance organization and coordination of markets, engineering, and politics, had to be kept as secret as possible!

Samuel found it difficult to work out the actual deal with the Rothschilds and Bnito. The Rothschilds were of two minds: They were never quite sure whether they wanted to compete with Standard or reach an accommodation. To M. Aron, the Rothschilds' chief oil man, Standard was always "*cette puissante compagnie*" ("this powerful company")—not to be trifled with. But finally, in 1891, after long negotiations and in the face of falling prices, Samuel won his contract with the Rothschilds, which gave him the exclusive rights for nine years, until 1900, to sell Bnito's kerosene east of Suez. That contract was what he wanted, he had always been sure he would get it, and he had been proceeding at full speed on the other fronts.

The tankers that he had already ordered represented a significant technological advance. In order to further reduce costs, his tankers would be capable of being steam-cleaned and then filled for the return trip with goods from the Orient, including food that would by definition have to be untainted by the taste of oil. The tankers also had to meet the safety requirements of the Suez Canal Company. Fear of explosions, fully justified by the early experience with tankers, made safety a major concern. Unlike the tankers that Standard used between the East Coast of the United States and Europe, Samuel's were to be designed with a host of new safety features, such as tanks that allowed for expansion and contraction of kerosene at different temperatures, thus minimizing the risk of fire and explosion.

Opposition quickly arose to allowing Samuel's tankers into the Suez Canal. Already, by the summer of 1891, the press was darkly reporting rumors of a "powerful group of financiers and merchants" under "Hebrew influence" who were trying to take tankers through the Suez Canal. Then, one of the most eminent firms of solicitors in the City of London, Russell and Arnholz, launched a strong lobbying campaign against granting permission to Samuel, including a lengthy correspondence with the foreign secretary himself. The solicitors were very concerned, ever so concerned, about safety in the canal. What might happen to ships, what might happen on hot days, what might happen during sandstorms? There were so many things to worry about, one hardly knew where to begin. They refused to reveal who their client was, even when the foreign secretary

inquired what *British* interest they were representing. But there was hardly any question that the client was Standard Oil. Soon, Russell and Arnholz was hastily alerting the British government to a new danger: If British merchants were permitted to put tankers into the canal, Russian shipping concerns would surely also win the same right. And if the Russian naval officers and seamen, who would undoubtedly man these vessels, got into the canal, they were very likely to undertake all kinds of mischief, including seeking “to block the navigation of the Canal” and “destroy all the shipping in it.”

But Samuel had powerful allies both in the Rothschild family, whose English branch had financed Benjamin Disraeli’s purchase of the Suez Canal shares in 1875, and in the influential French Banque Worms. Moreover, the foreign secretary saw the passage of British tankers through the canal as very much in Britain’s interest, and he was not going to let a firm of solicitors, however eloquent, sway him. Lloyds of London rated Samuel’s new tanker design safe.⁸

Meanwhile, M. Samuel & Co. had already embarked upon a campaign to build storage tanks throughout Asia to receive the oil. The Samuel brothers sent out their nephews, Mark and Joseph Abrahams, to find the sites and supervise the construction of the tanks, and to work with the trading houses to set up the distribution systems. Joseph had India and Mark the Far East. Mark was paid five pounds a week and was further rewarded by constant long-range interference, carping, criticism, and insults from his uncles. They hammered at him both about keeping costs down and about speeding up work—two quite contrary objectives. They showed no sympathy for him in his lengthy negotiating and haggling with an endless series of consular officials, harbormasters, merchants, and Asian potentates. When Mark purchased his own secondhand rickshaw to keep costs down, he could not win his uncles’ approval. And to make matters even more difficult, as if he did not have enough to do, they also hounded him to keep busy, on the side, selling coal they were trying to export from Japan. Yet, through it all, Mark was buying the sites and building storage tanks throughout the Far East, including a new site on Freshwater Island, off Singapore, and thus outside the jurisdiction of an obstructionist harbormaster.

On January 5, 1892, despite all the objections of the eminent solicitors from the City of London, the Suez Canal gave its official approval to passage for tankers built according to M. Samuel’s new design. “The new scheme is one of singular boldness and great magnitude,” the *Economist* commented four days later. “Whether it is true, as its opponents insinuate, that it is purely of Hebrew inspiration, we are not concerned to inquire; nor does it appear why such a circumstance should count against it. . . . If simplicity is an element of success, the scheme certainly seems full of promise. For instead of sending out cargoes of oil in cases costly to make, expensive to handle, easy to be damaged, and always prone to leak, the promoters intend to ship the commodity in tank-steamers *via* the Suez Canal, and to discharge it wherever the demand is greatest into reservoirs, from which it can be readily supplied to consumers.”

Mark had already made progress in the Far East. He acquired an excellent site in Hong Kong, and he hurried to buy a site in Shanghai before the Chinese New Year since “it can be got cheaper because the Chinese have to pay all their debts contracted during the past year & they are requiring money.” Having

traveled constantly back and forth among the other ports of the Far East, he finally returned to Singapore in March 1892 to find yet another scolding letter from his uncles, insisting on haste and greater haste. The clock was ticking. One never knew when or how Standard Oil would launch a counterstrike.

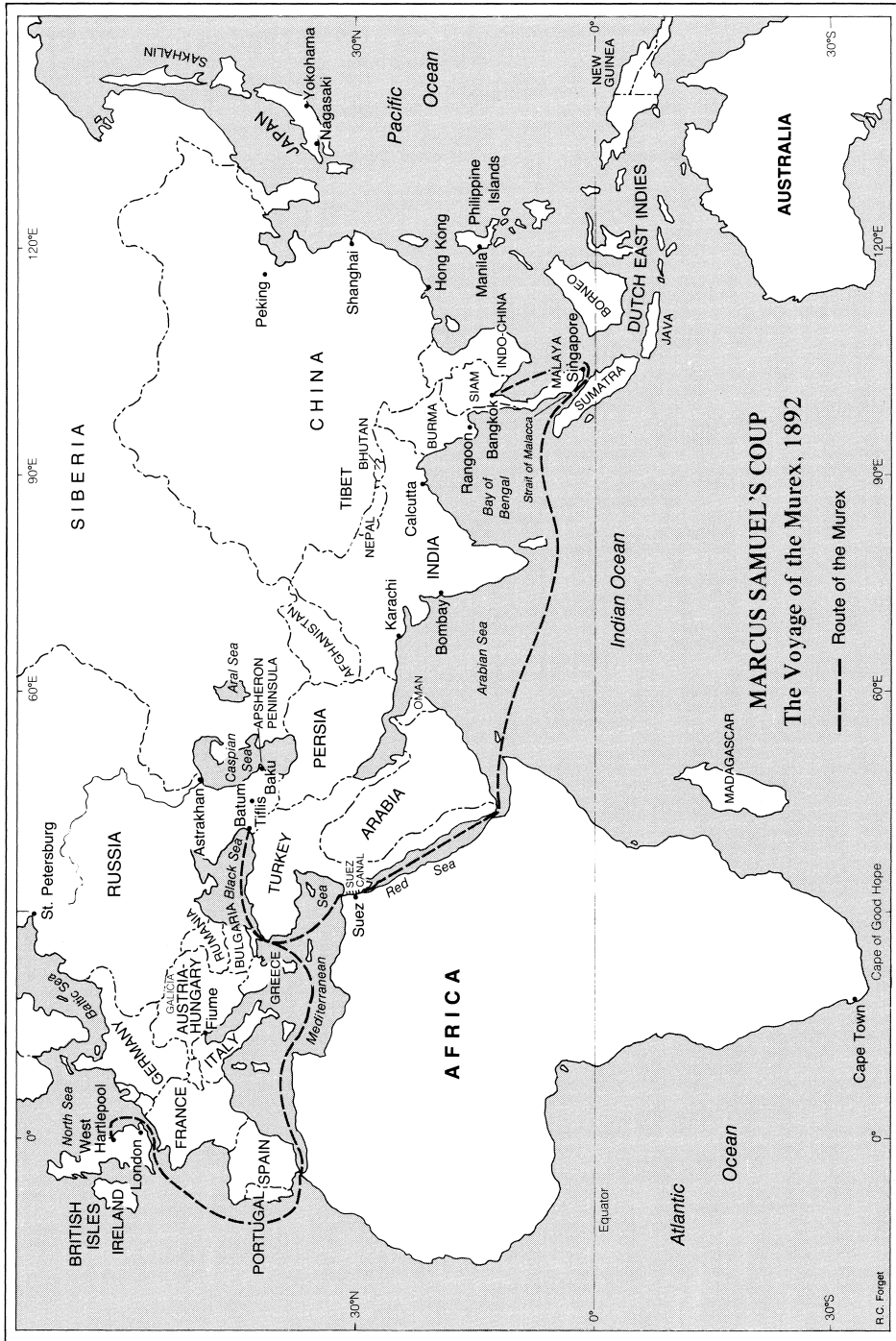
The first tanker was nearing completion at West Hartlepool. It was called the *Murex*—named for a type of seashell, as were all of Samuel's subsequent tankers. It was a memorial to the elder Marcus, the shell merchant. On July 22, 1892, the *Murex* sailed from West Hartlepool for Batum, where it filled its tanks with Bnito's kerosene. On August 23, it passed through the Suez Canal, headed for the East. It discharged part of its cargo at Freshwater Island, Singapore; then, its load sufficiently lightened to allow it to pass over a difficult sand bar, it sailed on to Mark's new installation in Bangkok. The coup was launched.

Taken by surprise by the swiftness with which Samuel had moved, Standard's shocked representatives rushed to the Far East to assess the dangers. The implications were enormous, for, as the *Economist* noted, "If the sanguine anticipations of the promoters are realized, the Eastern case-oil trade must needs become obsolete." Standard Oil's agents were too late; Samuel's kerosene was everywhere. Thus, Standard could not cut prices in one market and subsidize them by raising prices elsewhere.

The coup was indeed brilliant and the execution superb—with one exception. For Samuel and the Far Eastern trading houses had committed a small oversight, and yet one that almost destroyed their venture. They had assumed that they would deliver the kerosene in bulk to various localities, and that the eager customers would line up with their own receptacles to be filled. The customers were expected to use old Standard Oil tin cans. But they did not. Throughout the Far East, Standard's blue oil tins had become a prized mainstay of the local economies, used to construct everything from roofing to birdcages to opium cups, hibachis, tea strainers, and egg beaters. They were not about to give up such a valuable product. The whole scheme was now threatened—not by the machinations of 26 Broadway or by the politics of the Suez Canal, but by the habits and predilections of the peoples of Asia. A local crisis was created in each port, as the kerosene went unsold, and despairing telegrams began to flow into Houndsditch.

In the quickness and ingenuity of his response to the crisis, Marcus proved his entrepreneurial genius. He sent out a chartered ship, filled with tinplate, to the Far East, and simply instructed his partners in Asia to begin manufacturing tin receptacles for the kerosene. No matter that no one knew how to do so; no matter that no one had the facilities. Marcus persuaded them they could do it. "How do *you* stick on the wire handles?" the agent in Singapore wrote to Samuel's representative in Japan. Instructions were sent. "What color do you suggest?" cabled the agent in Shanghai. Mark gave the answer—"Red!"

All the trading houses in the Far East quickly established local factories to make the tin containers, and throughout Asia, Samuel's bright and shiny red receptacles, fresh from the factory, were soon competing with Standard's blue ones, battered and chipped after the long voyage halfway around the world. Perhaps some customers were buying Samuel's kerosene more for the useful red can than for its contents. In any case, red roofs and red birdcages—as well as



red opium cups, hibachis, tea strainers, and egg beaters—began to replace the blue.

And so the day was saved. Samuel's coup had worked, and in record time. By the end of 1893, Samuel had launched ten more ships, all of them named for seashells—the *Conch*, the *Clam*, the *Elax*, the *Cowrie*, and so on. By the end of 1895, sixty-nine tanker passages had been made through the Suez Canal, all but four in ships owned or chartered by Samuel. By 1902, of all the oil to pass through the Suez Canal, 90 percent belonged to Samuel and his group.⁹

The Alderman

Marcus Samuel was not only on the edge of a great success in business, he was also beginning to achieve some station in British life. In 1891, in the midst of planning for his global coup, he had taken time off to stand for and win election as an alderman of the City of London. Though it was largely honorific, he savored the post. But then in 1893, the year after the coup, all—both business and social—seemed for naught. Samuel became seriously ill; his physician diagnosed cancer and gave him no more than six months to live. The prediction was to prove slightly off the mark—by some thirty-four years. Still, the threat of imminent death did motivate Samuel to put his business affairs into a somewhat more orderly form. The result was the creation of a new entity, the Tank Syndicate, composed of the Samuel brothers, Fred Lane, and the trading houses of the Far East. They shared all profits and losses on a global basis; such an arrangement was necessary if they were to be able to fight Standard Oil in whatever market it chose and absorb the resulting losses. The Tank Syndicate grew quickly and became increasingly successful.

Marcus Samuel's fortune was accumulating rapidly, not only from oil and tankers, but also from the longer-standing trade links with the Far East, principally Japan. The Samuel brothers made money as the principal provisioners of weapons and supplies to Japan during its 1894–95 war with China. And so it happened that within a very few years of the *Murex*'s first passage through the Suez Canal, Marcus Samuel, a Jew from the East End, had become a very rich man, one who went riding every morning in Hyde Park, who owned a splendid country house in Kent called the Mote, with its own five-hundred-acre deer park, and who had one son at Eton and another already entered.

Samuel had, however, one serious fault as a businessman. Unlike his rival, Rockefeller, he lacked talent for organization and administration. Where Rockefeller had an instinct for order, Samuel had an addiction to improvisation. For him, organization was an afterthought; he ran everything out of his hat, which made his continuing success all the more astonishing. He was operating, among other things, a large steamship line as part of his oil enterprise, and yet he had no one in his office with any knowledge or experience of actually managing such an organization. He simply depended upon Fred Lane. The day-to-day operations of the fleet were run out of a small room in Houndsditch that contained nothing but a table, two chairs, a small wall map of the world, and two clerks.

And compare Rockefeller's owl-like unfathomability, his masklike face, his quiet deliberation, his drawing out of judgment and consensus from the gentlemen

in Room 1400, to the violent quarrels—the combat, anger, and recriminations—by which Marcus and Samuel arrived at decisions. Sometimes a clerk would be summoned to bring a piece of information to Samuel’s office and while he waited, as one employee would recall, “the two brothers would always go to the window, their backs to the room, huddled together close, their arms around each other’s shoulders, heads bent, talking in low voices, until suddenly they would burst apart in yet another dispute, Mr. Sam with loud and furious cries, Mr. Marcus speaking softly, but both calling each other fool, idiot, imbecile, until suddenly, for no apparent reason, they were in agreement again. There would be a quick, decisive exchange of final views. Then Mr. Marcus would say: ‘Sam, speak to him on the telephone,’ and would stand at his brother’s shoulder while the telephoning took place.” And that was how their deals were done.¹⁰

“This Struggle to the Death”

The rapid rise of Russian production, the towering position of Standard Oil, the struggle for established and new markets at a time of increasing supplies—all were factors in what became known as the Oil Wars. In the 1890s, there was a continuing struggle involving four rivals—Standard, the Rothschilds, the Nobels, and the other Russian producers. At one moment, they would be battling fiercely for markets, cutting prices, trying to undersell one another; at the next, they would be courting one another, trying to make an arrangement to apportion the world’s markets among themselves; at still the next, they would be exploring mergers and acquisitions. On many occasions, they would be doing all three at the same time, in an atmosphere of great suspicion and mistrust, no matter how great the cordiality at any given moment. And, at each juncture, there was the Standard Oil Trust, that remarkable organism that was always ready to absorb generously its fiercest rivals—or, as Standard executives put it, “assimilate” them.

In 1892 and 1893, the Nobels, Rothschilds, and Standard came close to bringing virtually all oil production into one system, dividing the world among them. “In my opinion,” noted M. Aron, who represented the Rothschilds’ interests in the negotiations, “the crisis has reached its end, for everybody, in America and Russia, is exhausted by this struggle to the death that has gone on so long.” Baron Alphonse, the head of the French Rothschilds, was himself keen to get matters settled; but, mortally afraid of publicity, he resisted an invitation that Standard was pressing on him to come to New York. Finally, Libby of Standard Oil assured Baron Alphonse that, with so many foreigners visiting America on account of the Chicago World’s Fair, the arrival of the Rothschild group would not be much noted. Reassured, the baron made it to New York and to 26 Broadway. After the meeting, a Standard Oil executive reported to Rockefeller that the baron was very courteous and remarkably fluent in English, adding that the Rothschilds would “immediately begin the steps toward control in Russia, and are quite confident of their ability to accomplish it.” But the baron had also gently but firmly insisted that Standard Oil bring the American independents into the contract. With great effort, slowed not only by rivalries but by a cholera epidemic that gripped Baku, the Rothschilds, joined by the Nobels, did succeed in

getting all the Russian producers to agree to form a common front, as a prelude to a grand negotiation with Standard. But despite its 85 to 90 percent control of American oil, Standard could not deliver the critical missing element, the independent American refiners and producers, to the grand scheme, and the proposed agreement collapsed.

In response, in the autumn of 1894, Standard launched another worldwide price-cutting campaign. The Rothschilds regarded Samuel as a tool with which to improve their bargaining position with Standard, and were very tough in their interpretation of their contract with him. Understandably, Samuel complained bitterly and loudly—loudly enough for Standard Oil to hear. Suspecting that the dissatisfied Samuel could be the weak link in the Rothschilds' position, Standard opened negotiations with him. It presented a proposal much like those it had made to competitors in America who had left the fray and joined the fraternity, save that the offer to Samuel was on a far grander scale. He would be bought out for a great deal of money, his enterprise would become part of Standard Oil, and he would become a director of Standard, though free to pursue his civic interests. Altogether, it was a very attractive offer. But Samuel rejected it. He wanted to keep the independent identity of his enterprise and his fleet, flying the flag of M. Samuel and Company, and he wanted it all to remain British. For it was British success on British terms on which he was intent, not integration into an American entity.

Standard Oil immediately returned again to the Russian producers, and on March 14, 1895, it signed the long-sought grand alliance with the Rothschilds and the Nobels "on behalf of the petroleum industry of the U.S." and "on behalf of the petroleum industry of Russia." The Americans were to get 75 percent of the world export sales, the Russians 25 percent. But the agreement never came into force. The specific reason would seem to have been the opposition of the Russian government. Once again, the would-be grand alliance had collapsed. Standard responded with new price-cutting campaigns.

If Standard Oil could not regain control over the world oil market and its international competitors through a grand alliance with the Russian producers, there was an alternative, a way to beat the Russians at their own game. A significant part of the Russian advantage came from the fact that Batum was 11,500 miles from Singapore, compared to Philadelphia's 15,000 miles. But Standard could turn the tables if it could acquire access to crude much closer to the Asian market, or, indeed, in Asia itself. Thus, Standard's attention turned to Sumatra, in the Dutch East Indies, from which the steaming time to Singapore, across the Strait of Malacca, could be measured in hours. And its eyes fell, in particular, on a Dutch company that, after years of struggle, had successfully carved out a profitable business from the jungles of Sumatra. This company was now beginning to make a sizeable impact on markets throughout Asia with its own brand, Crown Oil, and in so doing, it was opening up the world's third major producing province. It was called Royal Dutch.¹¹

Royal Dutch

Seepages had been commented upon in the Dutch East Indies for hundreds of years, and small amounts of “earth oil” had been used for relief of “stiffness in the limbs” and other traditional medicinal purposes. By 1865, no fewer than fifty-two oil seepages had been identified through the archipelago. But there matters languished, while American kerosene went on to capture the world.

One day in 1880, Aeilko Jans Zijlker, a manager of the East Sumatra Tobacco Company, happened to be visiting a plantation in the marshy coastal strip of Sumatra. The youngest son of a Groningen farming family, Zijlker had come out to the lonely life of the East Indies two decades earlier, after a failed love affair. Now, while he was traipsing around the plantation, a powerful storm came up, and he took refuge for the night in a darkened, unused tobacco shed. With him was a *mandur*, or native overseer, who lit a torch. Its bright flame caught the drenched Zijlker’s attention. He thought the fire must be the product of an unusually resinous wood. How had the *mandur* acquired the torch? Zijlker asked. The *mandur* replied that the torch had been daubed over with a kind of mineral wax. For longer than anyone could remember, the locals had been skimming this wax from the surface of small ponds, and then putting it to many uses, including caulking boats.

The next morning, Zijlker had the *mandur* take him to one of the ponds. He recognized the smell; imported kerosene had been introduced a few years earlier into the islands. The Dutchman collected a little of the muddy substance and sent it off to Batavia for analysis. The results enthused Zijlker, for the sample yielded between 59 and 62 percent kerosene. Zijlker made up his mind to develop the resource and threw himself wholeheartedly into the venture. His new obsession would demand his every ounce of devotion over the next decade.

His first step was to win a concession from the local sultan of Langkat. The concession, which became known as Telaga Said, was in northeast Sumatra, six miles of jungle away from the Balaban River, which emptied into the Straits of Malacca. It was not until 1885 that the first successful well was drilled. The drilling technology itself was backward and ill-suited to the terrain, and progress continued to be very slow over the next few years. Zijlker was continually strapped for cash. But he finally gained prestigious sponsorship at home, in the Netherlands, from the former head of the central bank of the East Indies and the former governor general. Moreover, as a result of the efforts of these powerful sponsors, the Dutch king himself, William III, was willing to grant the use of the title “Royal” in the name of this speculative enterprise, a license normally reserved for established, proven companies. That imprimatur was to have lasting value. The Royal Dutch company was launched in 1890, and the first flotation of its stock was oversubscribed four and a half times.

Zijlker was triumphant. Ahead, he could see vindication of the labors of ten years. “What won’t bend must break,” he wrote in a letter. “Throughout the entire exploration, my motto was: whoever is not with me is against me, and I shall treat him accordingly. I know well enough that this motto earns me enemies, but I know also that had I not acted as I did, I should never have accomplished the business.” Those words might well have stood as the epitaph of Aeilko Jans

Zijlker. For, returning to the Far East in the autumn of 1890, a few months after the launching of the company, he stopped at Singapore, and there he died suddenly, his vision still unrealized. His grave was marked with an inconspicuous monument.

The leadership of the enterprise in the inhospitable, swampy jungles of Sumatra passed to Jean Baptiste August Kessler. Born in 1853, Kessler had established himself in a successful trading career in the Dutch East Indies. He ran into serious business reverses that sent him back to Holland, broken and in poor health. Royal Dutch offered him a chance to begin again, and he took it. Kessler was a born leader, with an iron will, and with the ability to concentrate all his own energy and that of those around him on a single objective.

When he arrived at the drilling site in 1891, he found the entire enterprise in chaos, with everything, from the equipment shipped from Europe and America to the local finances, in total disarray. "I do not feel very cheerful about this business," he wrote to his wife. "An enormous amount of money has been lost by precipitate action." The working conditions were awful. After days of nonstop rain, the men sometimes labored in water up to their waists. The site ran out of rice, and a team of eighty Chinese workmen had to wade and swim to a village fifteen miles away to bring back a few sacks. There were also the inevitable pressures from Holland to speed things up, to stick to schedules, to keep the investors happy. Somehow, working both day and night, often racked with fever, the obsessed Kessler forced the pace.

In 1892, a six-mile pipeline linking the wells in the jungle to the refinery on the Balaban River was completed. On February 28, the entire crew gathered to wait nervously for the oil to arrive at the refinery. They had calculated how long it would take, and now, watches in hand, they counted the minutes. The moment came, and it went, but there was no oil. Depression settled over the anxious on-lookers. Kessler, fearing that defeat was at hand, turned away. But then suddenly they all froze. A "roar as of a mighty storm" announced the arrival of the oil, and it quickly poured "with incredible driving force" into the first still of the Royal Dutch refinery. The crowd burst into cheers, the Dutch flag was raised, and Kessler and the crew toasted the future prosperity of Royal Dutch.

The company was now in business. By April of 1892—while Marcus Samuel was preparing to send his first cargo through the Suez Canal—Kessler himself had delivered to market the first few cases of kerosene, christened Crown Oil. Still, prosperity was hardly at hand. Royal Dutch's financial resources were quickly strained by the continuing requirements, and its very existence was threatened by its inability to raise working capital. Kessler left for Holland and Malaysia in the frantic search for new funds. Though the company was selling twenty thousand cases of kerosene a month, it was still losing money.

Kessler managed to secure the capital. He returned to Telaga Said in 1893, where he found the entire operation in a deplorable state. "Half-heartedness, ignorance, indifference, dilapidation, disorder, and vexation are everywhere apparent," he reported. "And it is in these circumstances that we have to expand the enterprise if we wish to make ends meet." He pushed the operation as hard as he

could, summing up the danger in a few pithy words: “To stagnate means to liquidate.”

All sorts of obstacles had to be overcome, including the arrival of almost three hundred marauding pirates from another part of Sumatra, who temporarily cut communications between the drilling site and the refinery and then set fire to some of the outbuildings with, ironically, the traditional oil torches that had first caught the eye of Zijlker more than a decade earlier. Yet, no matter what the difficulty, Kessler kept pushing. “If things go wrong,” he wrote his wife, “my job and my name are gone and perhaps my sacrifices and my extraordinary exertions will be repaid with censure into the bargain. Heaven preserve me from all that misery.”

Kessler persevered and succeeded. Within two years, he had increased production sixfold, and Royal Dutch had finally become profitable. It was even able to pay a dividend. Yet being a producer was not enough; if Royal Dutch were to survive, it needed to establish its own marketing organization throughout the Far East, independent of middlemen. Royal Dutch also began to use tankers and to build its own storage tanks near its markets. The immediate danger was that Samuel’s Tank Syndicate would move too swiftly ahead and gain a hammerlock on the business. But, in a timely piece of protectionist intervention, the Dutch government excluded the Tank Syndicate from the ports of the East Indies, telling its own producers that the Tank Syndicate thus “need not be for the time being an object of terror” to the local industry.

Royal Dutch’s business was growing at an astonishing pace; between 1895 and 1897, its production increased fivefold. Yet neither Kessler nor the company wanted to crow too loudly about its success. Kessler warned at one point that, until Royal Dutch could obtain additional concessions, “we must pretend to be poor.” For, he explained, he did not want to draw other European and American interests to the East Indies, or to Royal Dutch. His principal worry was, of course, Standard Oil, which if too aroused, would wield its potent weapon—price cutting—and push Royal Dutch to the wall.¹²

“Dutch Obstacles”

But Royal Dutch could hardly remain invisible to its competitors. Its rapid growth, along with that of other producers in Asia, created a new distress for Standard Oil, matching that already created by the Russian producers. Standard Oil investigated all possible options. Early on, it began negotiating for a concession in Sumatra, but quickly gave that up in the wake of a native revolt. It searched for production opportunities in every corner of the Pacific, from China and Sakhalin to California.

In 1897, Standard dispatched two representatives to Asia to assess what could be done in the face of the Royal Dutch threat. In the East Indies, they met Royal Dutch’s local manager and visited the company’s installations; they called on Dutch government officials; they gathered intelligence from homesick American drillers. The representatives warned 26 Broadway against a “promiscuous search through such an enormous expanse” of steaming jungle. Much better,

they told New York, to buy existing production and establish a partnership with an authentic Dutch enterprise—not only because “the ways of the Dutch Colonial Government are past finding out,” but also because “you will always find it difficult to keep enough Americans here, of good business ability to make the management.” Standard’s objective, they insisted, should be to “assimilate” the successful companies. And that meant, above all, Royal Dutch.

To the Dutch, Standard Oil may have looked like a terrifying competitor. But Standard, for its part, had no lack of respect for the intrepid Dutch company. Standard’s agents were impressed by everything from Kessler’s leadership to Royal Dutch’s favorable economics to its new marketing system. “In the whole history of the oil business,” they reported, “there has never been anything more phenomenal than the success and rapid growth of the R. D. Co.” When the Standard Oil men said good-bye to the Royal Dutch managers in Sumatra, there was something almost wistful in their farewell. “Would not it be a pity that two such big concerns as you and we own should not go together,” one said.

To complicate matters further, it soon became apparent that Samuel’s syndicate was also hungrily eyeing Royal Dutch. In late 1896 and early 1897, intense discussions were taking place between the two groups. But their objectives were quite different. Royal Dutch was looking for a joint marketing arrangement in Asia. Marcus and Samuel Samuel wanted more; they wanted to buy out Royal Dutch. Much was said of mutual interest, but that was about it. After one visit to the Dutch directors in The Hague, a visit characterized mostly by silence and stone coldness, Sam wrote back to Marcus: “A Dutchman sits and says nothing till he gets what he wants but of course in this case he won’t.” There was no progress. Yet, despite their competition, Marcus and Kessler maintained a friendly relationship. “We are still open to negotiate with you, if you think there is a possibility of coming to business,” Marcus wrote cordially to Kessler in April 1897. “We feel quite certain that in the long run terms must be arranged between us, or ruinous competition to both will take place.”

Standard Oil knew such discussions were going on, and could not be confident that they would not eventually lead to some kind of powerful combination arrayed against the company. One executive warned, “Every day makes the situation more serious and dangerous to handle. If we don’t get control of the situation soon, the Russians, Rothschilds, or some other party may.” Standard had already tried and failed to acquire Ludwig Nobel’s and Marcus Samuel’s companies. Now, in the summer of 1897, W. H. Libby, Standard Oil’s chief foreign representative, presented Kessler and Royal Dutch with a formal proposal. The capital of Royal Dutch would be quadrupled, with Standard Oil taking all the additional shares. Standard Oil, Libby stressed, had no intention at all of getting Royal Dutch “into its power.” Its objectives, he assured Kessler, were modest; it was “only seeking a favorable capital investment.” Kessler could hardly believe Libby or the sincerity of his pledge. On Kessler’s strong recommendation, Royal Dutch’s board rejected the offer.

Standard Oil, disappointed, began discussions about acquiring another concession in the Dutch East Indies, but both Dutch government officials and Royal Dutch successfully intervened. “Dutch obstacles are about the most difficult in the World for Americans to remove,” a Standard Oil official declared, “for

Americans are always in a hurry and Dutchmen never.” Still, Royal Dutch did not feel secure. Its directors and management knew how Standard Oil had operated in America—buying up shares in offending competitors quietly, and then putting them out of action. To forestall such a stratagem, the directors of Royal Dutch created a special class of preference stock, the holders of which controlled the board. To make acquisition even more difficult, admission to this exclusive rank was by invitation only. One of Standard’s agents unhappily reported that Royal Dutch would never merge with the American company. It was not merely a “sentimental barrier” on the part of the Dutch that blocked the way, he said; there was a practical matter, as well. The managers of Royal Dutch greatly enjoyed receiving 15 percent of the company’s profits.¹³

C H A P T E R 4

The New Century

THE “OLD HOUSE” was what some independent producers called Standard Oil among themselves. It rose up as a vast and imposing structure, casting its shadow in all directions, dominating every inch of the oil landscape in the United States. While foreign competitors were challenging the “Old House” abroad, there was a certain resignation throughout the United States; it seemed inevitable that Standard would end up owning or controlling everything. Yet developments in the 1890s and the first decade of the new century would pose threats to the pre-eminence of the Old House. The markets on which the oil industry was based were about to shift drastically. At almost exactly the same time, the producing map of the United States would also change dramatically, and significant new American competitors would emerge to challenge Standard’s dominance. Not only was the world becoming too large even for Standard Oil, so was the United States.¹

Markets Lost and Gained

At the end of the nineteenth century, demand for artificial light was met mostly by kerosene, gas, and candles, where it was met by anything at all. The gas was derived by local utilities from coal or oil or by direct production and transport of natural gas. All three of those sources—kerosene, gas and candles—had the same serious problems; they produced soot, dirt, and heat; they consumed oxygen; and there was always the danger of fire. For that last reason, many buildings, including Gore Hall, the library of Harvard College, were not illuminated at all.

The dominance of kerosene, gas, and candles would not last. The polymath inventor Thomas Alva Edison—among whose major innovations were the

mimeograph, the stock ticker, the phonograph, storage batteries, and motion pictures—had turned to the problem of electric illumination in 1877. Within two years, he had developed the heat-resistant incandescent light bulb. For him, invention was not a hobby, it was a business. “We have got to keep working up things of commercial value—that is what this laboratory is for,” he once wrote. “We can’t be like the old German professor who as long as he can get his black bread and beer is content to spend his whole life studying the fuzz on a bee!” Edison immediately applied himself to the question of commercializing his invention, and in the process, created the electric generation industry. He even worked very carefully to price electricity so that it would be highly competitive—at exactly the equivalent of the town gas price of \$2.25 per thousand cubic feet. He built a demonstration project in Lower Manhattan, whose territory just happened to include Wall Street. In 1882, standing in the office of his banker, J. P. Morgan, Edison threw a switch, starting the generating plant and opening the door not only on a new industry but on an innovation that would transform the world. Electricity offered superior light, it needed no attention from its user, and it was hardly resistible where available. By 1885, 250,000 light bulbs were in use; by 1902, 18 million. The “new light” was now derived from electricity, not kerosene. The natural gas industry had to shift its markets to heating and cooking, while the United States market for kerosene, the staple of the oil industry, leveled out and was increasingly restricted to rural America.

The new technology of electricity was quickly transferred to Europe as well. An electric light system was installed in the Holborn Viaduct Station in London in 1882. So swiftly and so thoroughly did electricity—and the electrical industries—penetrate Berlin that the city was called *Elektropolis*. The development of electricity in London was more haphazard and disorganized. In the early twentieth century, London was served by sixty-five different electric utilities. “Londoners who could afford electricity toasted bread in the morning with one kind, lit their offices with another, visited associates in nearby office buildings using still another variety, and walked home along streets that were illuminated by yet another kind.”

To those who had access to it, electricity was a great boon. But its rapid development was deeply threatening to the oil industry, and, in particular, to the Old House. What kind of future could Standard Oil—with its massive investment in production, refineries, pipelines, storage facilities, and distribution—look toward if it were to lose its major market, illumination?²

Yet just as one market was about to slip away, another was opening—that of the “horseless carriage,” otherwise known as the automobile. Some of those vehicles were powered by the internal combustion engine, which harnessed a channeled explosion of gasoline for propulsion. It was a noisy, noxious, and none too reliable means of transportation, but vehicles powered by internal combustion gained credibility in Europe after a Paris–Bordeaux–Paris race in 1895, in which the remarkable speed of fifteen miles per hour was achieved. The next year, the first auto track race was held in Narragansett, Rhode Island. It was so slow and so boring that there was first heard the cry, “Get a horse!”

Nevertheless, in the United States, as well as in Europe, the horseless carriage quickly captured the minds of entrepreneurial inventors. One such person

was the chief engineer of the Edison Illuminating Company in Detroit, who quit his job so that he could design, manufacture, and sell a gasoline-powered vehicle that he named after himself—the Ford. Henry Ford's first car was sold to one man, who in turn sold it to another, one A. W. Hall, who told Ford that he had caught "the Horseless Carriage fever." Hall would deserve a special place in the hearts of all future motorists as the first recorded purchaser of a used car.

By 1905 the gasoline-powered car had defeated its competitors for automotive locomotion—steam and electricity—and had established total suzerainty. Still, there were doubts about the ruggedness and reliability of the car. Those questions were laid to rest, once and for all, by the San Francisco earthquake of 1906. Two hundred private cars were pressed into service for rescue and relief, fueled by fifteen thousand gallons of gasoline donated by Standard Oil. "I was skeptical about the automobile previous to the disaster," said the acting chief of the San Francisco fire department, who commanded three cars for round-the-clock work, "but now give it my hearty endorsement." That same year a leading journalist wrote that the automobile "is no longer a theme for jokers, and rarely do we hear the derisive expression, 'Get a horse!'" Even more than that, the car had become a status symbol. "The automobile is the idol of the modern age," said another writer. "The man who owns a motorcar gets for himself, besides the joys of touring, the adulation of the walking crowd, and . . . is a god to the women." The growth of the automobile industry was phenomenal. Registrations in the United States rose from 8,000 in 1900 to 902,000 in 1912. In a decade, the automobile went from a novelty to a familiar practicality, changing the face and mores of modern society. And it was all based on oil.

Heretofore, gasoline had been an insignificant part of the output of the refining process, with some small value for solvents and as a fuel for stoves, but with little other use. In 1892, an oil man had congratulated himself for managing to sell gasoline for as much as two cents a gallon. That changed with the motorcar, which turned gasoline into an increasingly valuable product. In addition to gasoline, a second major new market for petroleum was developing with the growth in use of fuel oil in the boilers of factories, trains, and ships. Yet even as the worrying question of future markets for oil was swiftly being resolved, a new question was asked with increasing pessimism: How were these exploding markets going to be supplied? Pennsylvania was clearly in decline. The Lima field in Ohio and Indiana was inadequate. Were new oil reserves to be found? And where? And who would control them?³

Breakouts

Standard's hold on the oil industry had begun to erode even before the end of the nineteenth century. Some producers and suppliers were at last able to escape the trust's vise of gathering systems and pipelines and refineries to win some measure of real independence. In the early 1890s, a group of independent oil men in Pennsylvania, teaming up with refiners, organized the Producers' and Refiners' Oil Company. Recognizing that they had no real chance against the Old House if they could not find a way to get their petroleum out of the Oil Regions and to the seaboard at competitive cost, they undertook to construct their own pipeline.

The construction workers were forced to brave armed attacks from railway men, as well as steam, hot water, and hot coals poured over them from locomotives. Such may have been the “gloved hand” of Standard Oil at work. Nevertheless, the pipeline got built.

In 1895, these various independent interests formed the Pure Oil Company to organize marketing overseas and on the East Coast. Pure Oil was set up as a trust, with the trustees designated “champions of independence.” Standard Oil, as was its wont, persistently tried to buy out and gain control of Pure’s constituent parts; but, despite some close calls, it failed to do so; and within a few years, Pure turned itself into a fully integrated company, with significant export markets. While Pure was small compared to the mammoth Standard Oil, the independent producers and refiners had at last realized their dream: They had successfully challenged Standard Oil and had managed to insulate themselves from it. And Standard Oil, though certainly through no choice of its own, was now forced to accustom itself to the distasteful reality of significant and lasting domestic competition.⁴

But Pure was entirely based in Pennsylvania. The conventional wisdom remained that oil was a phenomenon of the Eastern United States, and pessimism continued to be the order of the day when it came to new supplies. Yet new oil fields were being discovered farther west across the continent—in Colorado and Kansas.

There was another land even farther west, across the Rockies—California. Asphalt seepages and tarpits had signaled to some the possible presence of oil. A heavily promoted boomlet had developed north of Los Angeles in the 1860s. The distinguished Yale professor Benjamin Silliman, Jr., who had provided the imprimatur for George Bissell’s and Colonel Drake’s venture in the 1850s, and who was always interested in extra work, took on a job as a consultant to various of the California oil promotions. He did not hold back in his enthusiasm. The value of one ranch “is its almost fabulous wealth in the best of oil,” he wrote, and of another, “the amount of oil capable of being produced here is almost without limit.” Silliman’s research, however, was not exactly overwhelming. While he had visited some of the areas on which he had passed judgment, others he had seen only from a horse-drawn stagecoach while traveling to Los Angeles, and one he had not seen at all. The reason that his tests showed such a high kerosene potential was that the sample he analyzed had been salted with a first-rate refined Pennsylvania kerosene taken from the shelves of a general store in Southern California. The Los Angeles boom fizzled by the end of the 1860s, severely tarnishing the prospects for California. Professor Silliman’s reputation was hurt even more. Indeed, so great was the humiliation and disgrace that Silliman, heretofore one of the preeminent figures in American science, was forced to resign his professorship of chemistry at Yale.

Yet, only a decade or so later, Silliman was to be vindicated. Modest production began in the regions that he had praised—in Ventura County and at the northern end of the San Fernando Valley, north of Los Angeles, which was then a town of all of eight thousand. At one point, there was widespread fear that cheap foreign oil would flow in, aided by a removal of the tariff on imported oil,

and so stifle the local California industry. But as the result of adroit political maneuvering, the tariff on foreign oil was not reduced, but indeed was actually doubled. In the early 1890s, the first large find, the Los Angeles field, was discovered, followed by additional major finds in California's San Joaquin Valley. The growth of California production was dramatic—from 470,000 barrels in 1893 to 24 million barrels in 1903—and, for most of the next dozen years, California was to lead the nation in oil production. By 1910, its output would reach 73 million barrels, more than that of any foreign nation, and 22 percent of total world production.

The dominant producer in California was Union Oil (now Unocal), the only major American corporation outside of Standard Oil to have maintained a continuous independent existence since 1890 as a major integrated oil company. Union and the other smaller California companies were kindly disposed toward professional geologists, which contrasted sharply with the attitude in other parts of the country. Indeed, the profession of oil geology in the United States first established itself in California. Between 1900 and 1911, forty geologists and geological engineers were employed by California companies, which was probably more than were employed in the rest of the United States combined, or for that matter, in any other part of the world. Though Union Oil itself eluded its grasp, Standard quickly developed a hammerlock on much of the petroleum marketing and distribution in the West. In 1907, operating as Standard Oil of California, it began to move directly into production. Though California had by the turn of the century emerged as a major oil province, it was far from the rest of the nation, isolated, and its external markets were in Asia and not east of the Rockies where most of the citizens of the United States happened to live. California might as well have been another country from a business point of view. The answer to the growing oil thirst of the rest of the United States would have to be found elsewhere.⁵

Patillo Higgins's Dream

Patillo Higgins, a one-armed mechanic and lumber merchant, and a self-educated man, was possessed by an idea. He was convinced that oil would be found beneath a hill that rose above the flat coastal plain near the little town of Beaumont, in southeast Texas, some nineteen miles inland from Port Arthur on the Sabine Lake, which connected to the Gulf of Mexico. The idea first occurred to him when he took his Baptist Sunday school class for an outing on the hill. He came across a half dozen little springs, with gas bubbling up into them. He poked a cane into the ground in the area and lit the gases that escaped. The children were thoroughly amused; Higgins was puzzled and intrigued. The hill, over which wild bulls roamed, was called Spindletop, after, it was said, a local tree that grew like an inverted cone. Higgins called it the Big Hill, and he simply could not get it out of his mind. Later he said it was something about the small rocks that he lifted out of the springs that told him it was an oil field. He never could quite say what it was about the rocks. But it was something.

Absolutely sure there was oil in the Big Hill, Higgins ordered a book on

geology and read it eagerly. In 1892, he organized the Gladys City Oil, Gas, and Manufacturing Company, named for one of the little girls in his Sunday school class. The company had a most imposing letterhead—a sketch of two dozen oil tanks, the smoking chimneys of a dozen plants, and several brick buildings—but the company's efforts came to nothing. Additional tries by Higgins were equally unsuccessful.

Minor oil production was just beginning elsewhere in Texas. The civic leaders of a little town called Corsicana had concluded that their fervent hopes of promoting commercial development would be frustrated by lack of water. They organized a water company, which began drilling in 1893. To their initial chagrin, they found oil. The chagrin quickly turned to excitement, much drilling followed, and the Texas oil industry was born. In Corsicana a new, more efficient method, rotary drilling, was borrowed from water-well contractors and applied to the search for oil. But Corsicana was still small stuff; by 1900, its production would reach only 2,300 barrels per day. Meanwhile, in Beaumont, Patillo Higgins refused to give up his dream and continued to promote the oil potential of Spindletop. Various geologists descended from the train in Beaumont, reviewed the prospect, and pronounced Higgins's notion nonsense. A member of the Texas Geological Society went even further and published an article in 1898, warning the public against investing in Higgins's dream. Higgins would not relent; he siphoned gas from the hill into a couple of five-gallon kerosene tins and burned it in a lamp at home. His fellow townsmen said that he was hallucinating and might be mad. But Higgins would not give up.

In a last act of desperation, he placed an advertisement in a magazine, seeking someone else to drill. There was only one reply—from a Captain Anthony F. Lucas. Born on the Dalmatian coast of the Austro-Hungarian Empire and educated as an engineer, Lucas had joined the Austrian Navy and then immigrated to the United States. He had had considerable experience prospecting the geological structures known as salt domes in search of both salt and sulfur. And Big Hill was a salt dome.

Lucas and Higgins made a deal, and the captain commenced drilling in 1899. His first efforts failed. More professional geologists ridiculed the concept. They told him that he was wasting his time and money. There was no chance that a salt dome could mean oil. Captain Lucas could not convince them otherwise. He was discouraged by the professionals' rejection of what he called his "visions," and his confidence was shaken. He ran out of money, and he needed new funds if he was to continue. He won a hearing from Standard Oil, but was turned away empty-handed.

With nowhere else to go, Lucas went to Pittsburgh to see Guffey and Galey, the country's most successful firm of wildcatters. They were his last hope. In the 1890s, James Guffey and John Galey had developed that first major oil field in the midcontinent, in Kansas, which they sold to Standard Oil. Galey was the true wildcatter, the explorer. "Petroleum had John Galey bewitched," a business associate would later say. In turn, Galey had an amazing ability to find oil. Though he diligently studied and applied the geological theories of the day, some of his contemporaries thought he could literally smell oil. Quiet and low-key, he was

unstoppable and indefatigable on the hunt. Indeed, the search for the treasure counted for him far more than the treasure itself. As he once said, the only geologist who could tell with certainty whether oil would be found was “Dr. Drill.”

James Guffey was more flamboyant. He had once been chairman of the Democratic party, dressed like Buffalo Bill, and even had long white hair flowing out from underneath his broad-brimmed black hat. “An example of the generally accepted type of an American,” a British visitor said. A contemporary American oil publication saw Guffey somewhat differently. “Dash and push had characterized his operations from the very first and he had not then, nor now, reached the point in life when he was content to travel by freight train if there was an express or flyer to be had.” Guffey was the promoter and dealmaker. In this case, he drove a hard bargain with Lucas; in exchange for the financial backing of Guffey and Galey, Captain Lucas could retain only an eighth of the deal. As for Higgins, Guffey was sorry, but he would get nothing from Guffey and Galey. If Lucas felt sentimental and was so inclined, he could split his share with Higgins.

John Galey went to Beaumont and surveyed the area. As the drilling site, he chose a spot next to the little springs with bubbling gas that Patillo Higgins had found. He drove a stake into the ground to mark the spot. With Captain Lucas out of town at that moment hiring drillers, Galey turned to Mrs. Lucas and said, “Tell that Captain of yours to start that first well right here. And tell him that I know he is going to hit the biggest oil well this side of Baku.”⁶

Drilling began in the autumn of 1900, using the techniques of rotary drilling that had been pioneered in Corsicana. The townspeople in Beaumont had pretty much decided that Lucas and his crew were, like Patillo Higgins, plain crazy and hardly worthy of attention. Just about the only people who came around to see what was happening were boys out shooting rabbits. The drillers fought their way through the hundreds of feet of sand that had frustrated all previous efforts. At about 880 feet, oil showed. Captain Lucas excitedly asked the lead driller, Al Hamill, how much of a well it might be. Easily fifty barrels per day, Hamill replied, thinking of the Corsicana wells he knew that might get up to twenty-two barrels per day.

The drillers took Christmas off and resumed their exhausting work on New Year’s Day, 1901. On January 10, the memorable happened: Mud began to bubble with great force from the well. In a matter of seconds, six tons of drill pipe catapulted out of the ground and up through the derrick, knocking off the top, and breaking at the joints as the pipe shot further upward. Then the world was silent again. The drillers, who had scattered for their lives and were not sure what they had seen, or even if they had actually seen it, sneaked back to the derrick to find a terrible mess, with debris and mud, six inches deep, all over the derrick floor. As they started to clean the mess away, mud began to erupt again from the well, first with the sound of a cannon shot and then with a continuing and deafening roar. Gas started to flow out; and then oil, green and heavy, shot up with ever-increasing force, sending rocks hundreds of feet into the air. It pushed up in an ever-more-powerful stream, twice the height of the derrick itself, before cresting and falling back to the earth.

Captain Lucas was in town when he heard the news. He raced to the hill in

his buckboard, pushing his horse at a dead run. As he got to the hill, he fell out of the buckboard and rolled onto the ground. He stood up, fighting to catch his breath, and ran to the derrick. "Al! Al! What is it?" he shouted through the din.

"Oil, Captain!" replied Hamill. "Oil, every drop of it."

"Thank God," said Lucas, "thank God."

Lucas 1 on Spindletop, as the well became known, was flowing not at fifty barrels per day, but at as much as seventy-five thousand barrels per day. The roar could be heard clearly in Beaumont; some people thought it was the end of the world. It was something never seen before anywhere—except in the "oil fountains" of Baku. The phenomenon came to be called a gusher in the United States. The news flashed across the nation and was soon on its way around the globe. The Texas oil boom was on.

What followed was riotous. The mad scramble for leases began immediately, with some plots traded again and again for ever more astounding prices. A woman garbage collector was thrilled to get \$35,000 for her pig pasture. But, soon, land that had only two years before sold for less than \$10 an acre now went for as much as \$900,000 an acre. Much land was sold and resold on the basis of small, error-ridden maps, and with actual titles totally unclear. The town swelled with sightseers, fortune seekers, dealmakers, and oil field workers; each train disgorged new hordes drawn by the dream of instant wealth embodied in the dark gusher. One Sunday alone, excursion trains dropped off at Beaumont some 15,000 people, who tramped through the mud and slime and oil just to see this new wonder of the world. Upward of 16,000 people were said to be living in tents on the hill. Beaumont's own population ballooned in a matter of months from 10,000 to 50,000.

Tents, lean-tos, shacks, saloons, gambling houses, whorehouses—all sprang up in Beaumont to serve the various needs of the lusting population. According to one estimate, Beaumont drank half of all the whiskey consumed in Texas in those early months. Fighting was a favorite pastime. There were two or three murders a night, sometimes more. Once sixteen bodies were dredged out of a local river, their throats slit, the victims of a night's mayhem. One of the most popular entertainments in the saloons was betting on how long it would take a rattlesnake to eat a bird that was put into its cage. Even more popular were the prostitutes who swarmed into Beaumont, and the names of some of Beaumont's madams—Hazel Hoke, Myrtle Bellvue, and Jessie George—became legendary. At the barbershops, folks stood in line an hour to pay a quarter for the privilege of bathing in a filthy tub. People did not want to waste time when there was oil business to be done, so spaces near the head of the long line at the outdoor conveniences went for as much as one dollar. Some people made forty or fifty dollars a day, standing in line and selling their spaces to those who didn't have time to wait.

There were, of course, many more losers than winners, and there were endless frauds to make sure that money changed hands quickly. The stock salesmen, with shares of dubious value at best, were so numerous and so busy that Spindletop became known to some as "Swindletop." A fortune-teller named Madame la Monte did a brisk business telling her customers where new gushers could be found. Even better was the "boy with the X-ray eyes," who could see through the

earth and find oil. Thousands of shares were bought in the company promoting the talented lad.

Within months, there were 214 wells jammed in on the hill, owned by at least a hundred different companies, including one called the Young Ladies Oil Company. Some of these companies were drilling on postage-stamp-size sites, just large enough for one derrick. As the Spindletop wells continued to flow, a glut of oil developed very quickly. By midsummer of 1901, oil went for as little as three cents a barrel. By comparison, a cup of water cost five cents, providing testament of a sort to the initial prolificacy of Patillo Higgins's Big Hill.⁷

The Deal of the Century

No one needed markets for his oil more than James Guffey, who was the major producer at Spindletop. But he had no intention of being swallowed up by Standard Oil, so he wanted other customers. He soon found a very large one. For among those most electrified by the news from Spindletop was the alderman of the City of London, next in line to be lord mayor, Sir Marcus Samuel. He had recently rechristened his rapidly growing company Shell Transport and Trading—again, like the names of his tankers, in honor of his father's early commerce in seashells. Now, Samuel and his company saw the oil flowing from the Texas plain as a way to diversify away from Shell's dependence on Russian production and to obtain oil that could be exported directly to Europe. Texas production would strengthen Samuel's hand against all competitors. Another factor also riveted Marcus Samuel: The Texas crude, while a poor source for illuminant, was well suited for use as fuel oil for ships. One of his consuming passions was the conversion of coal-burning vessels to oil—his oil. He proudly announced in 1901 that his company “may clearly claim to be the pioneers of ocean consumption of liquid fuel.”

So, when the news from Spindletop reached London, it immediately set off frantic and comical efforts by Shell, first to find out where Beaumont was—it could not to be found in the office atlas at all—and then to make contact with Guffey. The Shell people had never before heard of Guffey, and he took some tracking down. Guffey allowed that, for his part, he had never heard of Shell, which rankled and offended London, and resulted in further cables and letters pointing out that Shell was a company “of great magnitude,” the second-largest oil company in the world, and “Standard Oil Co.'s most dangerous opponent.” Meanwhile, intelligence that Standard Oil's tankers were regularly picking up cargoes of Spindletop oil from Port Arthur only increased Shell's anxiety to move swiftly. Samuel dispatched his brother-in-law to the New World—to New York, then to Pittsburgh, then to Beaumont—to seek a contract with the unknown Guffey. The negotiations were hastily pursued. Shell made no independent geological evaluation; it did not even bother to hire an American lawyer to review the eventual contract. At one point, the brother-in-law had to scurry around to buy a wall map of the world to explain to Guffey Shell's activities elsewhere in the world. After his tour and discussions with Guffey, the brother-in-law felt confident in reassuring Samuel, back in London, on a crucial point—

that “there is no likelihood of failure of supplies.” The only thing to worry about was overproduction.

By June of 1901, only half a year after the gusher had burst out at Spindletop, the two companies had completed their negotiations and signed a contract. For the next twenty years, they agreed, Shell would take at least half of Guffey’s production at a guaranteed twenty-five cents a barrel—a minimum of almost 15 million barrels. It could take more if it desired. To each side, this appeared to be the deal of the new century. Marcus Samuel ordered four new tankers to be built swiftly to implement what he regarded as another great coup—the new Texas trade.

Spindletop was to remake the oil industry, and with its huge volumes move the locus of American production away from Pennsylvania and Appalachia and toward the Southwest. Spindletop also helped open up one of the main markets of the twentieth century and the one Marcus Samuel was championing—fuel oil. This, however, was more by default rather than design; the Texas oil was of such poor quality that it could not be made into kerosene by existing processes. So it went, primarily, not for lighting, but for heat and power and locomotion. A host of industries in Texas converted almost immediately from coal to oil. The Santa Fe Railroad went from just one oil-fired locomotive in 1901 to 227 in 1905. Steamship companies, as well, rushed to switch from coal to oil. These conversions, the result of Spindletop, pointed to a major shift in industrial society.

Spindletop also became the training ground for the oil industry of the Southwest. Farm boys and city boys and ranch hands all learned the tricks of the trade there. A new language was even born on the hill, for it was at Spindletop that a “well borer” first became known as a “driller,” a skilled helper as a “roughneck,” and a semiskilled helper as a “roustabout.” A cash-short “shoe-stringer” would “poor boy” a well by splitting his interest with his crew, the landowner, his supply house, his boardinghouse owner, his favorite saloon keeper and, if need be, his most cherished madam, as well.

The boom at Spindletop, with all its madness and frenzy and honky-tonk, was to be repeated many times over in the Southwest in the course of the next few years, beginning with other salt domes along the Gulf Coast of Texas and Louisiana. But the Gulf Coast was about to meet its match in Oklahoma. A string of Oklahoma oil discoveries, beginning in 1901, culminated in the great Glenn Pool, near Tulsa, in 1905. More strikes followed in Louisiana. Meanwhile, North Texas ranchers who were trying to drill for water instead encountered oil, setting off another boom. Still, Oklahoma, not Texas, became the dominant producer in the area, with over half of the region’s total production in 1906; only in 1928 did Texas recapture the number-one rank, a position it would continue to hold in the United States until the present day.⁸

Gulf: Not Saying “By Your Leave”

James Guffey, the promoter who had backed Lucas, became a national symbol of instant wealth—on his way, it was said, to being another Rockefeller. That

was the appearance, at least. Guffey himself may have even believed it for a while. After all, he had made the largest oil deal in the world, to last twenty years, with Marcus Samuel of Shell. But, by the middle of 1902, within a year and a half of the Spindletop strike, Guffey and his company were in real trouble. The underground pressure gave out at Spindletop because of overproduction, and especially because of all those derricks on postage-stamp-sized plots, and production on the Big Hill plummeted. But the problems of Guffey Petroleum were also of its own making; James Guffey's skills were those of the promoter, not the manager. As a manager, he was about as poor as the quality of his oil.

This situation greatly distressed the Pittsburgh bankers who had put up the original capital to back Guffey and Captain Lucas—Andrew W. and Richard Mellon. Their father, Judge Thomas Mellon, had handed over the family bank to Andrew when he was only twenty-six; and he and his brother had built Mellon and Sons into one of the nation's great banks, central to America's nineteenth-century industrial development. The two brothers had a special feeling of affection and respect for John Galey, Guffey's partner. Galey's father and their own, Judge Mellon, had both come over as small boys from Ireland to the United States on the same boat. They knew John Galey was a great finder of oil, even if they worried about his financial carelessness. In 1900, Galey's partner, Guffey, had managed to convince the Mellons to put up the three hundred thousand dollars for the wildcat at Spindletop, plus several million dollars more to get Spindletop into production. Now, in 1902, only a few months later, with the pressure and flow having given out at Spindletop, the Mellons feared that Guffey would lose not only their money, but also that of the other investors they had brought in on the deal.

They thought they had a solution in the person of their nephew, William C. Mellon, only a decade or so younger than the two banker brothers. One could count on William. At age nineteen, he had heard about an oil strike in a town near Pittsburgh called Economy. The smell of oil, and the excitement of the business, captured him; and he threw himself into it. In the next few years he scrambled all over Appalachia, looking for oil and finding it. He once brought in a thousand-barrel-a-day well in a church graveyard. The church did handsomely out of it.

William knew he was caught up in a fever. "For a great many" of the oil men, he was to recall, "the oil business was more like an epic card game, in which the excitement was worth more than great stacks of chips. . . . None of us was disposed to stop, take his money out of the wells, and go home. Each well, whether successful or unsuccessful, provided the stimulus to drill another." But his uncle Andrew had instilled in him the lesson that such was not the way to run a serious business. Rather, the aim should be to integrate—to control every stage of operations. "The real way to make a business out of petroleum," said Andrew, was "to develop it from end to end; to get the raw material out of the ground, refine it, manufacture it, distribute it." Any other way, and one was at the mercy of Standard Oil.

William acted on his uncle's advice. Despite opposition from Standard Oil and the Pennsylvania Railroad, he built up an integrated oil company, which produced in western Pennsylvania, refined at both ends of the state, transported

by its own pipeline, and sold from Philadelphia to Europe. By 1893, the Mellons' company was shipping an estimated 10 percent of total United States exports, and it had a million barrels in storage. Then Standard Oil offered to buy the Mellons out. They were not sentimental; they built businesses and then sold them and went on to something else, and this was the time to cash out on their oil company. The Mellons made a considerable amount of money from the sale. William went into the streetcar business, thinking he was through with oil forever. Now seven years later, and only twenty-seven, William discovered that he was wrong. At the behest of his uncles, he went down to Spindletop to inspect the family's investment. He reported back that they would never get their money out so long as Guffey was in charge.

As they had seven years earlier, the Mellons offered the new enterprise to Standard Oil. But Standard said no because of the legal assaults that Texas kept launching against the company and, in particular, against John D. Rockefeller. "We're out," a Standard director explained. "After the way Mr. Rockefeller has been treated by the state of Texas, he'll never put another dime in Texas."

After that, said a disappointed William Mellon, there was only one solution to "just about as bad a situation as I had ever seen," and that was "good management, hard work, and crude oil." The first obstacle was James Guffey, whom William Mellon regarded as an incompetent blowhard. Mellon took over the management control of the intertwined Guffey Petroleum and Gulf Refining companies, both founded in 1901. Of course, Guffey was deeply resentful; after all, the press had pronounced him the greatest oil man in the United States. Sometimes William Mellon found that he had to be quite arbitrary and harsh with the greatest oil man in the United States.

"The main problem," Mellon said, "was to translate crude petroleum into money." Something had to be done about Guffey Petroleum's contract with Shell, which committed the American company to sell half of its production to Shell for twenty-five cents a barrel for the next twenty years. That contract had been drafted when production seemed unlimited, even unstoppable, when the company needed markets, and when oil was selling for ten or even three cents a barrel—a fine profit by any calculation. Though the contract was to run twenty years, the world had changed a great deal in less than two. In the latter part of 1902 and into 1903, as a result of the plunge in production at Spindletop, oil was selling for thirty-five cents or more a barrel. So, in order to meet the contract, Guffey Petroleum would have to buy oil from third parties and then sell it at a loss to Shell. Guffey may still have thought this was the deal of the century; Mellon certainly did not. He thought it was a rotten deal, and knew that he had to get out of it quickly.

But Marcus Samuel was counting heavily on the contract. Thus, the bad news from Texas—that Guffey's oil supplies had failed—was a great shock. Whatever the pain for Guffey, Shell had every reason to want to keep to the letter of the contract, or if not, to be generously compensated for its cancellation. Samuel ordered that the four new tankers that had been built to transport Texas oil be converted to carry Texas cattle to the East End of London, making the best out of a bad situation. But this was only meant to be a temporary expedient until the oil shipments could be resumed. He prepared to sue; but the outcome of a

court battle, an American legal expert warned him, was not at all certain, as the contract had been so poorly and incompetently drawn in the first place.

Andrew Mellon himself came to London to pursue the matter, and traveled down to Kent to talk with Samuel at his estate, the Mote. Mellon “greatly admired the Park,” Samuel wrote in his diary of August 18, 1903. The next day, Samuel added to his diary, “Went to London by the 9:27 train upon important business. . . . Had very busy day in negotiating with Mr. Mellon to try to avoid legal proceedings with Guffey Co. but did not succeed in reaching a *modus vivendi* and subsequently consulted solicitors.” Andrew Mellon was courteous, charming, mild in manner, but persistent and absolutely firm. By the beginning of September, the two sides did reach a *modus vivendi*, a new agreement. The deal of the century—so critical to Marcus Samuel’s vision—was replaced by a contract that guaranteed Shell practically nothing in the way of oil. Guffey Petroleum—and the Mellons—were completely off the hook.⁹

Meanwhile, William Mellon was pursuing a strategy that would be central to the oil industry for the entire twentieth century—to tie together all the disparate activities of the industry and build a coherent, integrated oil company. His strategy was intentionally different from that of Standard Oil. Mellon observed that Standard exerted its power and protected and enhanced its position because it was practically the sole buyer of crude oil and because of its control of transportation. “Standard made the price,” said Mellon, and practically every producer was dependent on the company. While producers could and did do well out of the arrangement, they nevertheless were “at the mercy of this company.” Mellon worried that, eventually, as more fields were discovered and developed in Texas, Standard would extend its pipeline system into the state, and the Mellons’ operation would inevitably become drawn into Standard’s production system. That was not what he was after; his ambitions were larger than merely to be an appendage of Standard. Echoing his uncle’s lesson, Mellon concluded “that the way to compete was to develop an integrated business which would first of all produce oil. Production, I saw, *had* to be the foundation of such a business. That was clearly the only way for a company which proposed to operate without saying ‘by your leave’ to anybody.” And the Mellons had no intention of saying “by your leave” to anyone, least of all to Standard Oil.

One of the biggest problems facing Mellon was the fact that the capacity of the company’s new refinery at Port Arthur was about equal to that of the production of the entire state of Texas. Moreover, it was dependent upon poor-quality oil that could give out at any time. But then, in 1905, with the discovery of the Glenn Pool in Oklahoma, better-quality oil was available. Here was the way out of the problem—oil of “marketable Pennsylvania quality in Texas quantities.” But the company would have to move fast. Standard Oil was busy extending its pipeline network from Independence, Kansas. “Unless we could hitch onto that Oklahoma field,” Mellon warned his uncles, their whole enterprise might fail. In order to speed the forced-pace construction of a 450-mile pipeline from Port Arthur to Tulsa, Mellon put four crews to work, one starting south from Tulsa; one starting north from Port Arthur; and two starting in the middle and working toward each end. It was a race against time—and against Standard Oil. By October of 1907, oil from Glenn Pool was flowing through the pipeline into the Port