World History of the Automobile
Other SAE books of interest:

The Birth of Chrysler Corporation and Its Engineering Legacy
by Carl Breer
(Order No. R-144)

The Automobile: A Century of Progress
(Order No. R-203)

Carriages Without Horses: J. Frank Duryea and the Birth of the American Automobile Industry
by Richard P. Scharchburg
(Order No. R-127)

For more information or to order this book, contact SAE at 400 Commonwealth Drive, Warrendale, PA 15096-0001; phone (724) 776-4970; fax (724) 776-0790; e-mail: publications@sae.org.
World History of the Automobile

Erik Eckermann

Translated by Peter L. Albrecht

Society of Automotive Engineers, Inc.
Warrendale, Pa.
Dedicated to my grandfather,

Willy Eckermann

to whom I owe so much.
Contents

Introduction ......................................................................................................................... ix

The Prehistory of the Automobile—From Ancient Times to 1884 ........................................... 1
   The Development of Animal-Drawn Transportation ......................................................... 1
   The Quest for a Prime Mover ......................................................................................... 10

The Pioneering Era and Coming of Age—1885 to 1918 ..................................................... 25
   The Four-Stroke Engine and Early Vehicles by Daimler, Maybach, and Benz .............. 25
   Further Developments at Daimler and Benz to the Turn of the Century .................... 32
   France as the Pacemaker of Motorization .................................................................. 36
   Europe and North America Embrace the Idea of the Automobile ............................. 40
   The Automobile Industry at the Turn of the Century, I ............................................. 48
   The Mercedes Era ..................................................................................................... 49
   The Great Awakening ................................................................................................. 52
   Commercial Vehicles and Buses to 1914 ..................................................................... 64
   The Role of Motorized Vehicles in World War I, 1914 to 1918 .................................... 72

The Automobile as an Industrial Product—1919 to 1945 .................................................. 79
   American Superiority ................................................................................................. 79
   The Situation in Germany, 1918 to 1932 .................................................................. 83
   Europe Between Imitation and Independence ............................................................. 87
   The Automobile Industry and Automotive Technology in the 1930s ....................... 101
   The Renaissance of German Automotive Technology .................................................. 110
   Commercial Vehicles and Buses, 1919 to 1939 ......................................................... 125
   The Diesel Engine Arrives on the Automotive Scene .................................................. 133
   Motorized Forces in World War II, 1939 to 1945 ....................................................... 142

The Mass-Produced Automobile—1946 to 1979 ................................................................ 153
   The Automobile Industry and Automotive Technology in the 1950s ....................... 153
   The German Auto Industry: Reconstruction and Consolidation ................................ 160
   The Beetle and Mini Establish New Directions ......................................................... 168
   Mass Motorization, and American Legislative and Oil Crises .................................... 176
   The Japanese Challenge .............................................................................................. 190
Introduction

Thousands of years separate the invention of the wheel and the first self-propelled vehicle. The intervening centuries witnessed wind-powered vehicles (Figure 1), wheeled sailing ships, and muscle-driven vehicles (Figure 2), in which human or animal power, hidden or in plain sight, served as motive power. However, these did not represent real progress, because neither wind nor muscle power was faster, more powerful, or blessed with greater endurance than the combination of horse and wagon. In other words, development of self-propelled road vehicles depended on finding a suitable power source.

Figure 1. Wind-powered vehicle, circa 1600. A sail car built by Simon Stevin, with rear-wheel steering. The helmsman used a tiller to swing the rear axle around a kingbolt.

The availability of this power source around 1885, in the form of a lightweight combustion engine, resulted in a paradigm shift 50 years after the railway had revolutionized transportation. Suddenly, it was possible to equip not only two-wheeled vehicles, coaches, and trucks, but also ships and boats, streetcars, airships, airplanes, fire engines, and many other devices with an engine that, thanks to liquid fuel carried on board, could operate anywhere. Motorized
road transport quickly overcame the decades-old advantage of the railroad, and set new standards for free-ranging surface transportation, time savings, and individual mobility. In the process, mass motorization has spawned problems of its own which threaten to grow to uncontrollable proportions: energy consumption, dwindling resources, environmental pollution, climate changes, and traffic accidents, to name just a few. The automobile must be regarded not only from technological or economic standpoints, but also from an ecological perspective.

Figure 2. Muscle-powered carriage, 1765. Four-wheeled muscle-powered vehicle, treadle operated with a ratchet-and-pawl mechanism on the left rear wheel.