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THE SECOND AGE OF RAIL

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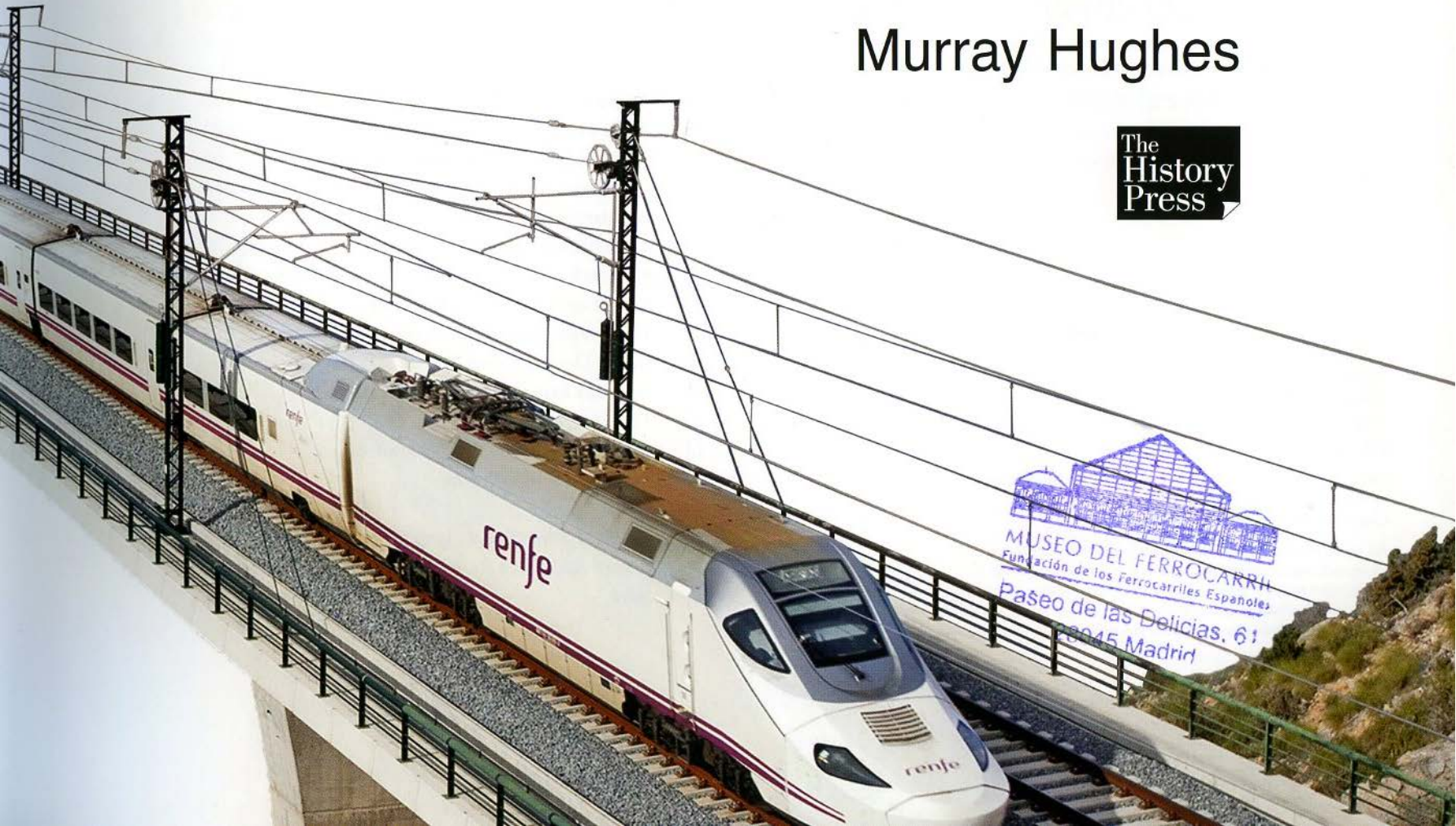


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A HISTORY OF HIGH-SPEED TRAINS

Murray Hughes

The
History
Press



This book is dedicated to

Richard Hope OBE

Editor of *Railway Gazette International* 1970–91

and to

Roger Zeender

Commercial Director for Swiss Federal Railways
in Lausanne when I worked there in 1971

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Foreword

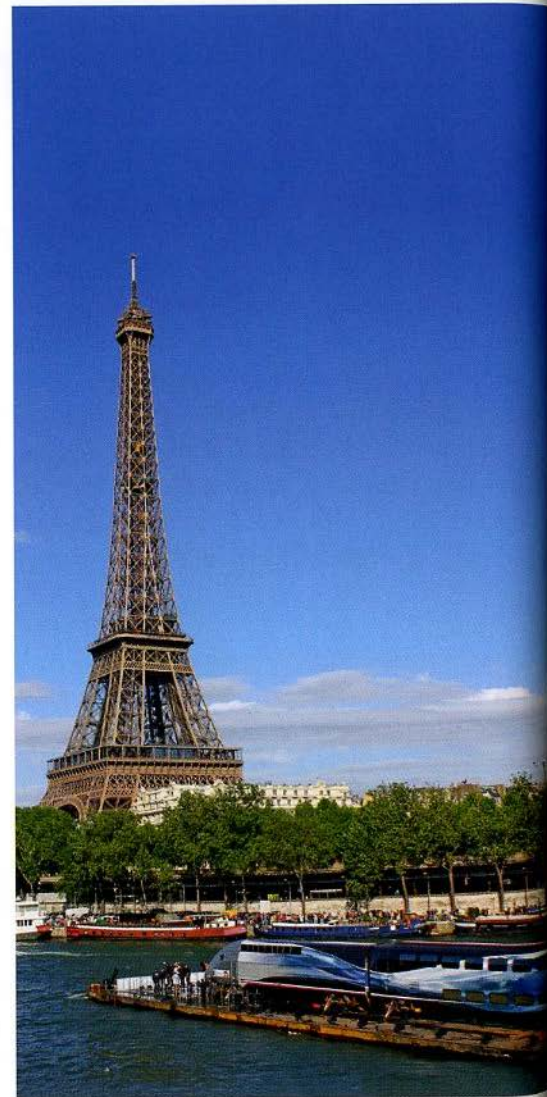
The fiftieth anniversary since the opening of the Tokaido Shinkansen allows us to reflect that it was a vitally important turning point in the fortunes of railways worldwide. The title chosen by Murray Hughes for this volume, *The Second Age of Rail*, is truly appropriate. In 1964 railways throughout the world were declining in the face of competition from rapidly expanding car ownership and, indeed, public transport generally was in decline. The boldness of the Japanese, only twenty years on from their defeat and destruction during the Second World War, in conceiving, constructing and operating the Shinkansen was remarkable and was a real renaissance of the railways.

The story is told in this volume of the spread of the high-speed rail idea from its birth in Japan to Western Europe, led by France and then later by Germany. In the last twenty years many other countries have joined the high-speed revolution, notably in the Far East where in the last several years the rise of dedicated high-speed lines in China has been absolutely astonishing. China now has a greater length of high-speed line than the rest of the world combined and will double the total in the next few years. The quality of the service offered on these trains is extremely high, as I have personally experienced on several journeys.

Currently the only high-speed maglev system in the world in commercial use is that connecting Shanghai Airport with the inner suburbs of the city. The story of the development of maglev is well recounted in this book. It is interesting to speculate, but at present unclear, on the reasoning behind the choice in China of conventional steel wheel on

steel rail for their extensive high-speed railways as opposed to expanding their embryo maglev system. One key feature is, and the story is well told in this book, that operational speeds on dedicated high-speed lines are now approaching the 300 to 350km/h range. Considerably higher speeds have been reached with prototype and experimental trains, including the superb French efforts which open this volume. However, the damage caused to both train and track by such extremely high-speed running precludes its exploitation in everyday commercial service. A reasonable and economic balance has to be struck between speed and increased maintenance costs caused by speed. If we speculate about the future, one might be tempted to say that something in the order of 350km/h will be an economic ceiling which the steel wheel on steel rail will find difficult to penetrate.

Furthermore, social conditions now are quite different from those which existed at the time of the Shinkansen's inauguration. As well as economic constraints, environmental issues now play a much more important role. These range from the local effects of noise and vibration to global effects caused by energy use and emissions. The electricity which is used to power high-speed trains is generated away from the point of consumption, but if the generation is from fossil fuel, the emissions continue to increase the carbon dioxide in our fragile atmosphere. The global imperatives to produce electricity from sustainable sources will play a significant role in issues of energy use for the railways in the future – and may indeed compromise the railway's present superiority, in terms of emissions, over the automobile.



Paris parade. After its spectacular exploits in April 2007, the V150 train set was displayed on a barge for a cruise along the River Seine. (Christophe Masse)

The question of where in the world new high-speed railways will next appear continues to fascinate. A project in the UK has considerable political support but has yet to be enthusiastically embraced by the wider public – the projected opening date is far into the future. Will the USA finally build a modern passenger railway before the oil runs out? To what extent will Middle Eastern countries use some of their oil revenues to build high-speed rail systems? Is Australia too large and its population too small to sustain a high-speed railway? Some answers may be found in the pages of this book.

A most remarkable achievement of the Shinkansen is its unblemished safety record with no fatalities due to train collisions or derailments during its fifty-year life. There have been three major accidents involving high-speed trains in other countries: those at Eschede in Germany, the collision at Wenzhou in China in July 2011, and two years later the derailment at Santiago de Compostela in Spain. It is worth noting that two of these accidents did not occur on dedicated high-speed track but on sections of conventional railway where the protection was more limited. In the case of Wenzhou, the collision happened

on a newly built line, but the issue was a software problem which was revealed by a lightning strike.

As we think about the future we might reflect that most professional railway engineers are convinced that the integration of track and train to form a complete system is a vital ingredient of train operation. In recent decades this simple principle has been eroded by efforts to improve the financial performance of railways led by economists and politicians: history has taught us that these groups of people are by no means immune from error.

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