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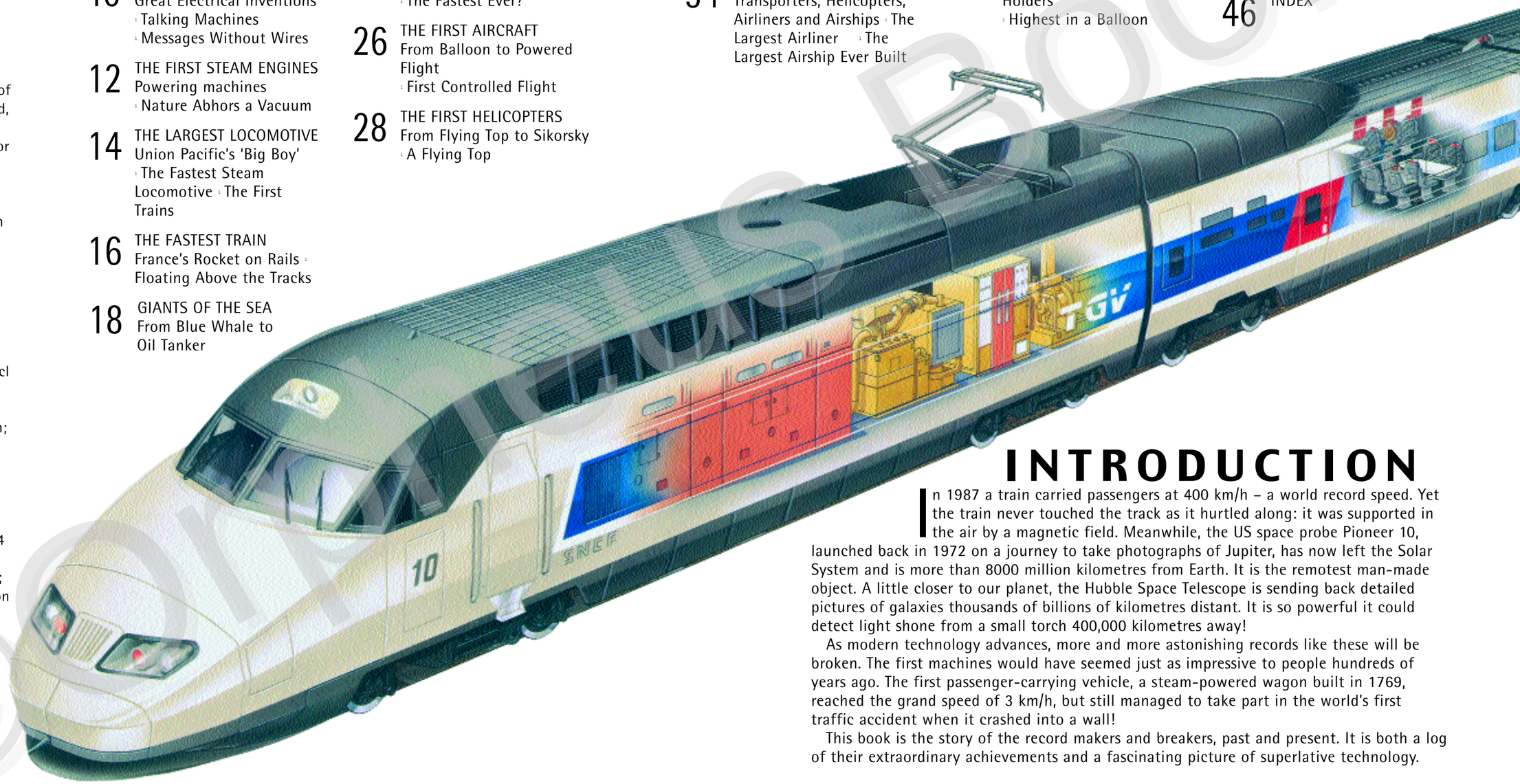

INTRODUCTION

In 1987 a train carried passengers at 400 km/h – a world record speed. Yet the train never touched the track as it hurtled along: it was supported in the air by a magnetic field. Meanwhile, the US space probe Pioneer 10, launched back in 1972 on a journey to take photographs of Jupiter, has now left the Solar System and is more than 8000 million kilometres from Earth. It is the remotest man-made object. A little closer to our planet, the Hubble Space Telescope is sending back detailed pictures of galaxies thousands of billions of kilometres distant. It is so powerful it could detect light shone from a small torch 400,000 kilometres away!

As modern technology advances, more and more astonishing records like these will be broken. The first machines would have seemed just as impressive to people hundreds of years ago. The first passenger-carrying vehicle, a steam-powered wagon built in 1769, reached the grand speed of 3 km/h, but still managed to take part in the world's first traffic accident when it crashed into a wall!

This book is the story of the record makers and breakers, past and present. It is both a log of their extraordinary achievements and a fascinating picture of superlative technology.

THE LARGEST LOCOMOTIVE

Union Pacific's 'Big Boy'

The largest, heaviest and most powerful railway locomotive that ever pulled a train was the 'Big Boy'. Between 1941 and 1945, 25 of these giants were built by the American Locomotive Company of Schenectady, New York for the Union Pacific Railroad. They were 40 metres long (about one-and-a-half times the length of a basketball court) and weighed more than 600 tonnes. Each locomotive was able to haul a load six times its own weight up a steep gradient in the mountains of the western United States.

Big Boys had two sets of eight driving wheels. The front set were specially designed to swivel to enable the giant locomotive to go around bends on the twisting mountain railway. No fireman could shovel coal fast enough to keep the furnace stoked up, so a mechanical stoker was used. This machine could deliver 22 tonnes of coal an hour to the firebox. The Big Boys used up a lot of water, too. At top speed they guzzled 50 tonnes of water an hour – about a saucepanful every second!

The illustrations are approximately to scale

The Big Boy locomotives hauled ore trains with more than 70 wagons between Wyoming and Utah, across the Wasatch Mountains.

THE FASTEST STEAM LOCOMOTIVE

A new world record speed for a steam locomotive was set on 3 July 1938. The *Mallard*, a new engine fitted with a streamlined casing, was chosen for the honour. Pulling a seven-coach train between Grantham and Peterborough, England, *Mallard* was timed at a speed of 201.16 km/h over a distance of about 400 m. It was damaged during the run, but was repaired and placed in the Railway Museum, York, England. Its record has stood to this day.

TREVITHICK'S LOCOMOTIVE

THE FIRST TRAINS

The first steam locomotive to run on rails was built by Cornish engineer Richard Trevithick. His four-wheel locomotive made a demonstration run on 22 February 1804, reaching 20 km/h when empty and 8 km/h (a brisk walking-pace) when loaded. Unfortunately, the weight of the train broke the rails! By 1812, stronger tracks had been built between Middleton Colliery and Leeds, England. They carried the first successful steam locomotives.

In 1829, while the new Liverpool and Manchester Railway was being built in northern England, a competition was held to find the best locomotive to run along it. The £500 prize was won easily by the Rocket, entered by George and Robert Stephenson. It reached the then breathtaking speed of 46.7 km/h, a world record. For the first time, people would be able to travel on land faster than by horse.

This illustration *(below)* shows the inside of a steam locomotive. Water is heated by the fire tubes in the boiler. The steam is forced into a cylinder where it pushes a piston linked to the driving wheels. When the piston reaches the end of the cylinder, steam is let into the other side, pushing the piston back again.