

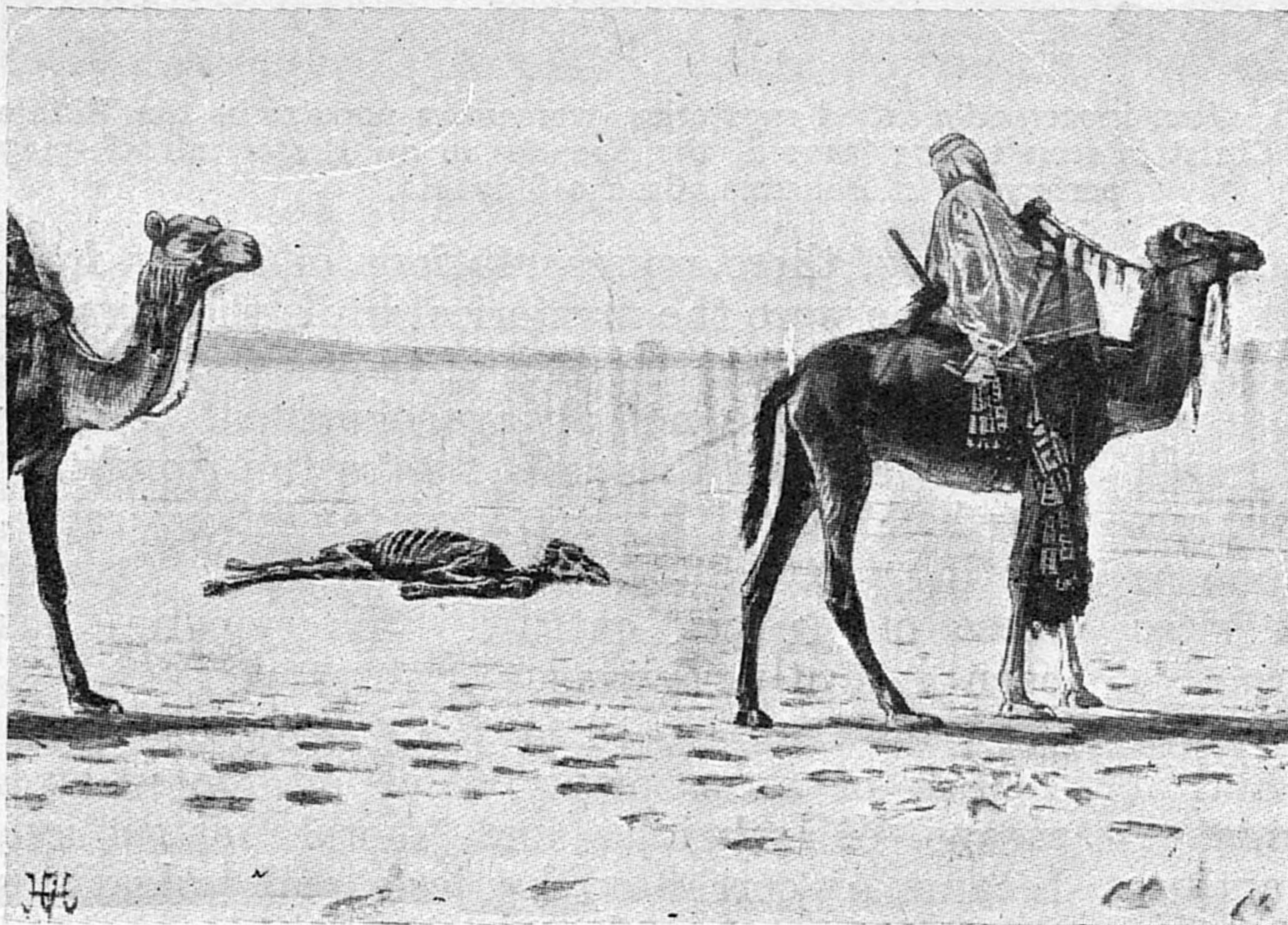
To understand the cause of a mirage it must be remembered that we see an object by rays of light reflected from it to our eyes, and in the straight line in which the rays enter the eye. Ordinarily these rays come to the eye in straight lines from the object and we see only objects above our horizon.

Now in the case of a desert mirage the rays of light passing upward from an object below the horizon are reflected back from a layer of denser air above the hot light air next the sand. This higher layer of dense air acts as a mirror and, being above the object it reflects, this object appears above the horizon and in the sight range of the traveller, when in reality the place seen in the reflection is miles away and out of sight. But this is not all, for the air layers vary in density and sometimes reflect a double image, one upside down.

Mirage on the Ocean

In the ocean mirage a vessel below the horizon is plainly reflected in the upper air. A most remarkable ocean mirage was seen in 1854 on the Baltic, when the English fleet of 19 vessels 30 miles away was distinctly seen floating in the air. The case of the ocean mirage, which occurs in the cold northern waters, is just the opposite

AN ILLUSION OF THE DESERT



These desert travellers, before they had arrived at this spot, saw in the distance what they believed to be water. They later realized, however, that they had been deceived by a mirage.

of the desert mirage, for the cool dense air is close to the water and the reflection is caused by a warmer layer of air above it.

Still another form of mirage is known as "looming." In this the objects are seen magnified and sometimes, when the sun is just in the right position and the sea and the air help, are set against a background of coloured mists. This form of mirage is common in the Straits of Messina. People of Reggio, looking toward Sicily, may see castles, trees, and men suspended

above the sea. This vision is a reflection of the city of Messina, though for long years it was thought to be a city of fairy castles and so was given the name "Fata Morgana," by which it is still known, from the powerful fairy Morgan la Fay.

MIRRORS. In prehistoric times the only mirrors were pools or lakes. Later highly-polished metal mirrors were made, such as the bronze mirrors of the Egyptians, Greeks, and Romans, and the mirrors of the modern Japanese. Similar to these were the unbreakable "trench mirrors" used in the World War. Not until the 13th century were mirrors of glass with backs of lead or tin manufactured.

Mercury Process of the Venetians

In the 17th century the Venetians made a vast improvement by mixing mercury with the tin for the reflecting surface. Although the mercury fumes killed many workmen, and weeks were required to complete a mirror, the method was in common use until about 1855, when the modern process of backing mirrors with nitrate of silver was patented. The mercury process is still occasionally used for cheaper mirrors.

To-day a mirror of any size can be made in about an hour. For the best mirrors, plate glass about a quarter of an inch thick is used. This is cut to the proper size with a diamond-pointed instrument. Then it is bevelled with sand and water in a "roughing mill," polished on emery wheels, and smoothed with the sandstone and buffers of thick felt covered with rouge.

Next, in the silvering department, it is cleansed and placed on heated and blanketed tables. A diluted compound of nitrate of silver, ammonia, and tartaric acid is poured over it, the heat from the table helping the silver to adhere to the glass. The silver back is dried, and then varnished or painted. Silvered mirrors reflect 20 to 25 per cent. more of light than those backed with mercury.

Distorting Mirrors

In the ordinary flat-surface mirror, your image appears erect, and as far behind the mirror as you are in front of it. But for scientific and other purposes curved mirrors are often made—convex, concave, etc. Curved mirrors reflect distorted images, and so are often seen in amusement halls. When you look into a concave cylindrical mirror you see yourself as very tall and lean, while a convex mirror makes you look shorter and fatter than any little brownie.

The mirror-making industry is of great importance in England and on the Continent.