Lights, camera, direction!

IDEA № 9

THE LENS

The lens was the unassertive inventor of photography. Even though the camera obscura housed many of the earliest photographic experiments, it was just a light-tight box. But the lens – already the subject of centuries of scientific refinement – was far more advanced than the other humble parts that came together to create photography.

The camera's lens concentrates and conducts light rays to the film plane or digital sensor inside the camera. A lens may be a single piece of glass or, nowadays, plastic. Often lenses consist of several layers, called elements, which are sandwiched together to achieve maximum effect. Before cameras and other photographic materials were manufactured in standardized sizes, lenses were carefully adapted to an individual camera's dimensions, especially the size of the area where the light-sensitive material was placed. Fortunately for the fledgling medium, the craft and science of lens making was advanced and complex when photographers came to require lenses that would direct the light onto the prepared sensitive surface with as few distortions as possible.

The role played by Charles Louis Chevalier in the creation of photography is not as well known as that of the French inventors of the medium. Yet Chevalier, a Paris optical specialist, brought together Joseph Nicéphore Niépce and L.J.M. Daguerre, whose collaboration resulted in the daguerreotype. Chevalier did not contribute technically, except by providing fine lenses. He was the go-between who introduced Niépce and Daguerre, whose social and physical distance would have kept them from otherwise meeting. W.H.F. Talbot, photography's British inventor, also relied on the availability of fine lenses for his experiments.
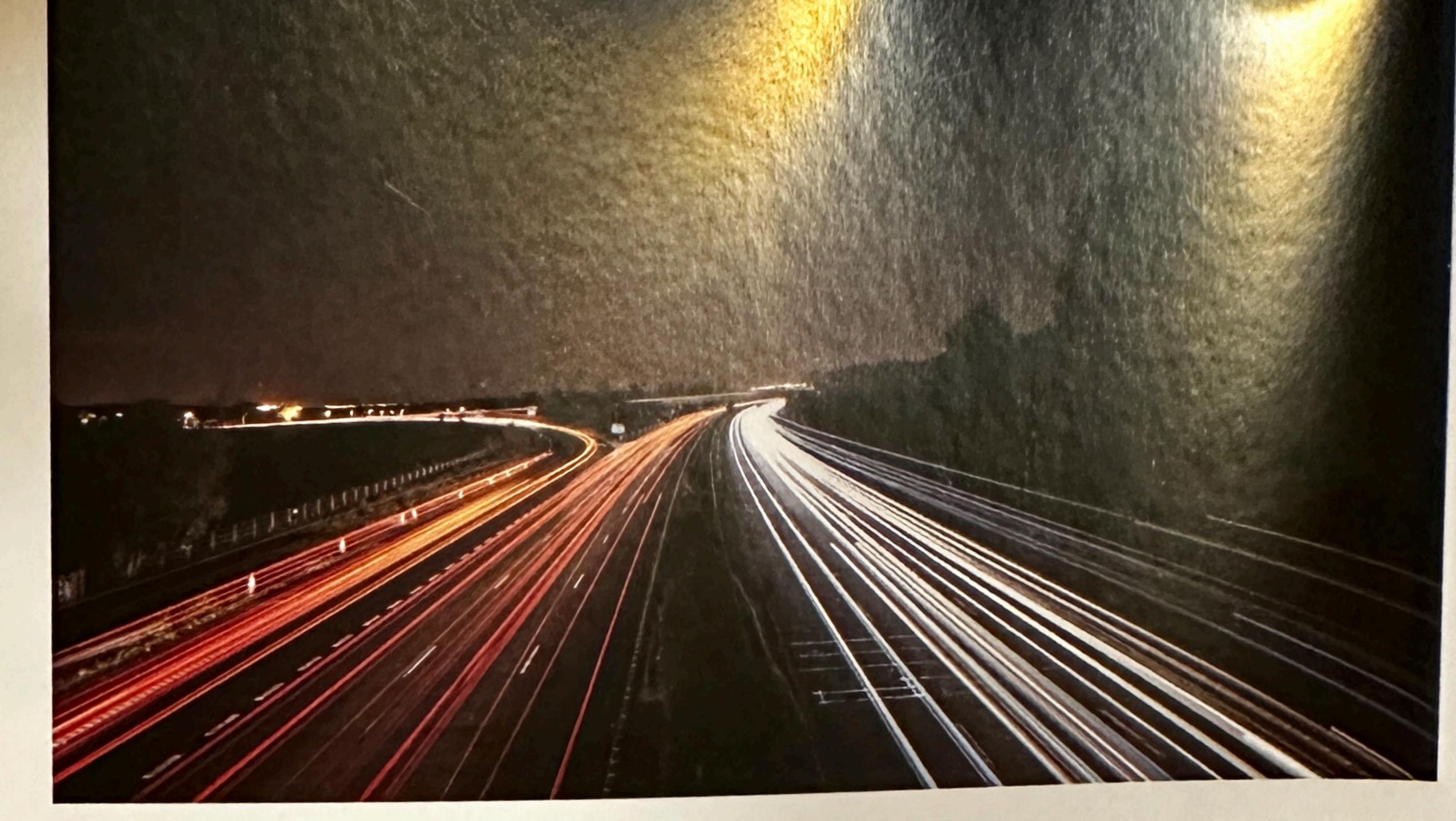
As photography improved, special lenses were developed for particular situations. As its name suggests, a portrait lens was adapted to take pictures of people. In early photography, when sitters moved or closed their eyes repeatedly, the resulting images would be blurred. Portrait lenses were faster – that is, they let light travel through them more quickly – which shortened exposure times and helped to create an unblurred image. Since portrait work was the bread and butter of early photographers, the portrait lens was instrumental in building the photography business. Wide-angle lenses allowed the photographer to render a broad span of imagery, while macro lenses enabled scientists and amateurs to make close-up studies.

Although opticians who create camera lenses may also work with microscopes, telescopes and other viewing devices, the camera lens is distinctive. A good microscope, for instance, allows the viewer to see and steadily study the image. But a good camera lens goes further. It is designed to deliver light rays to the whole light-sensitive surface so that the chemistry of the film changes, or the tiny photosites of the digital camera respond properly, so as to render the image. ■

Specially designed weights or impromtu inventions were attached to the shutter to create timed lens exposures.

Open wide!

IDEA № 10

THE SHUTTER

A camera shutter controls the amount of light that passes through the lens and onto the light-sensitive material where the image is initiated. The ability to predict exposure time – the period during which the shutter is open – not only gave the photographer greater control of the medium, it also encouraged experimentation with shutter-borne effects.

In the first few years of photography, exposures were often minutes long, and light entering the camera was controlled by taking off the lens cap, waiting for a few minutes, then replacing the cap. Occasionally, a black cloth was also used to cover the **lens** between exposures. Simple flap shutters were operated by hand or by an ingenious pneumatic pressure bulb. Most early shutters were situated outside of the camera body, in front of the lens.

As film became more sensitive and lenses improved, shutters became finely engineered devices that were integrated inside the lens or elsewhere in the camera. The increased use and sophistication of shutters helped to produce a visual effect that has become a worldwide symbol of speed, especially in automobile racing and other fast-paced sports (see **Sporting Scenes**). Using a slow shutter speed while panning – that is, moving the camera in the direction of the action – causes the background to blur while the subject remains clear. Thus the blur-streaked background became a visual metaphor for speed. Extended exposures captured light events that take place in darkness, the fullness of which the human eye cannot register. Ambient-light nighttime street photography owes much to shutter control, as do images of firework displays, lightning storms and images of the penumbra of street lights in fog. Night-time exposures of automobile traffic yield another familiar image: long trailing streaks of white headlights and red taillights. That image, which has come to symbolize not only heavy traffic, but also the isolation of people in their automobiles, was born in still photography and persists there as well as in cinema, **television**, and **video**.

Ironically, when photographic plates began to be manufactured with greater ease and were more reliable, the photographer's work became more complex. Calculating exposure time required charts, mathematics and light meters. Since these functions were not integrated into cameras until the late 1930s, amateur camera fans tended to avoid intricate shutter work. The public demand for simple, automatic cameras increased as complicated professional tools, such as sophisticated shutters, proliferated and grew in cost (see **The People's Art**). Today, the public's demand for easy-to-use cameras is evident in the automatic and simple manual settings that allow the user to select a degree of complexity for picture making. Visual effects, like panning, can be created in the camera, or after exposure with photo-editing programs. ■

'Shutters became finely engineered devices ... inside the lens or elsewhere in the camera.'