

A Swimming Machine

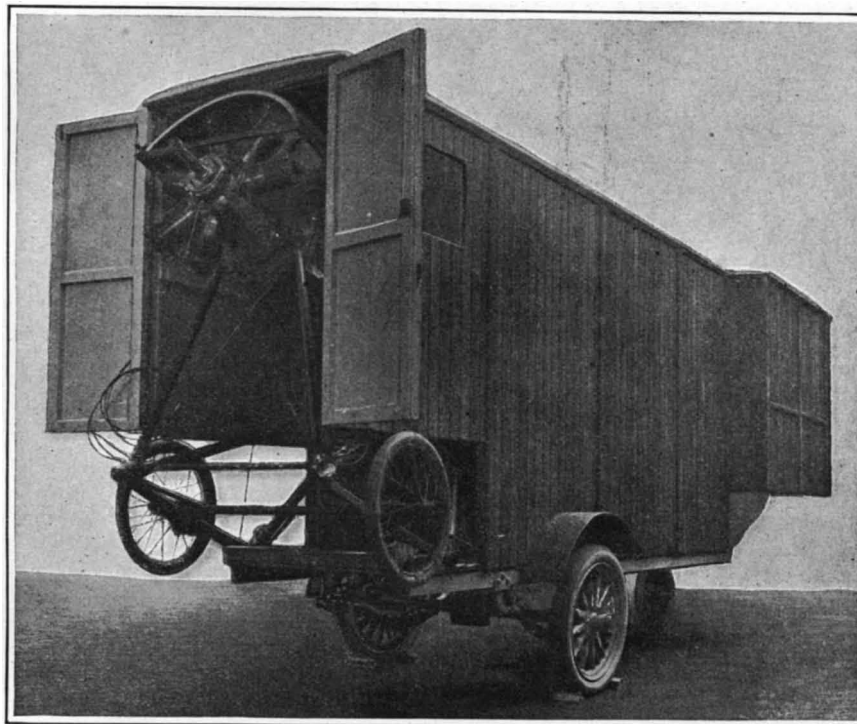
AN inventor living near Paris has constructed an apparatus which for lack of a better name we may call a swimming machine. It consists of a light beam six feet long provided with a float at each end. The swimmer supports himself on this device with his feet on pedals under the rear float. By giving the pedals a reciprocating motion, he operates a propeller that drives the machine through the water. The steering is done by the hands and arms. With a device of this sort the swimmer can make a high speed through the water, because his energies are used to best advantage. The apparatus may readily be folded up and transported. The small insert shows the apparatus in use. The harness on the swimmer's back is connected by a wire to the supports of the rear float and enables the operator to gain a better purchase on the pedals.



Propeller driven swimming machine.

Truck for Aeroplanes.

DURING the recent war maneuvers the aeroplanes of the aviation squad were transported to the aviation station by a motor truck of standard make. The work of this motor truck was very satisfactory, considering the fact that it had to travel over bad roads and very rough ground. The aeroplanes, however, had to be completely dismantled in order to stow them on the motor truck. In European countries trucks of special design have been built for the purpose so that the aeroplanes do not have to be dismantled completely, and hence can be assembled more quickly. The accompanying photograph shows a truck of this type exhibited at the Belgian automobile exposition last winter. This truck is a trailer, not being provided with a driving mechanism, but being adapted to be hauled behind a motor truck or an automobile. The truck is designed to take a monoplane from which the planes have been removed, the latter being packed alongside the body of the aeroplane.



Truck for transporting aeroplanes.

The de Lesseps "Wind Wagon."

By T. M. R. von Keler.

WHILE the idea of driving motor cars by means of an "aeroplane" propeller is not exactly new, the invention of Count de Lesseps, shown in the accompanying photograph, presents several exceedingly novel features. It is by all odds the most elaborate attempt on the part of a motor car designer to utilize the pushing power of a large two-bladed propeller. The machine is not an ordinary automobile chassis in which the differential and transmission have been temporarily "disconnected," so to say, but it is a car designed especially for this sort of propulsion.

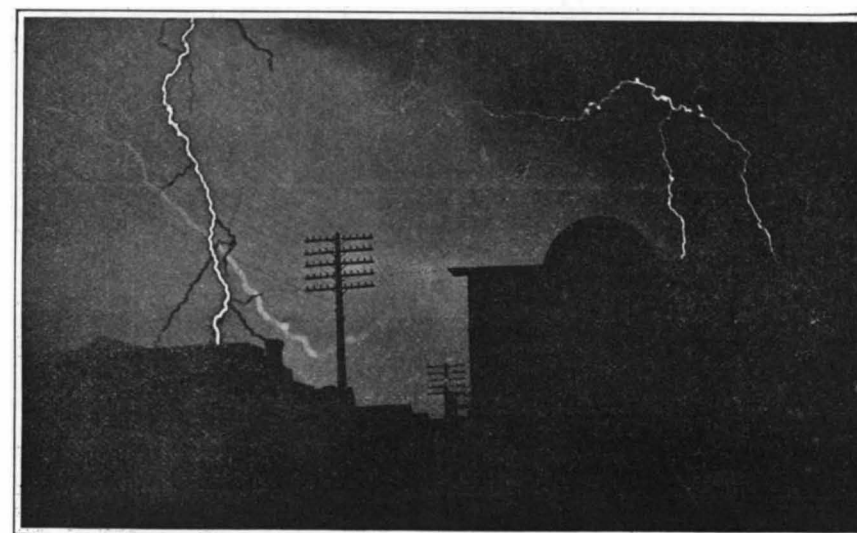
The de Lesseps car has no "live axle," and all its four wheels are "free turning." The propeller is driven by a single chain leading from the main shaft to a short jack shaft to which the blades are fastened. Strong guards made of steel tubing and wire netting form a partial protection for persons approaching the whirling propeller blades. These guards are also expected to catch the broken pieces of the propeller blades in case of an accident. The motor is of 40 horse-power. In its long trial run of over 300 miles the car attained a speed of about 62 miles per hour over fairly good roads—a noticeable feature of the trial being that practically no dust was raised by its passage.

This latter very desirable attribute of such a car is easily explained by the absence of the slanting "dust pan," which hangs below the chassis of the ordinary motor car, and which deflects a strong air current directly upon the road surface. Furthermore, there is the free turning of the rear wheels, which in the de Lesseps car perform only a simple rolling motion, while in the axle-driven automobile the rear wheels exert a strong push or "flip" upon the road surface, causing it to disintegrate.

Difficulties which would tend to over-



The de Lesseps car starting a trip from Paris to Lyons.



An example of "black lightning."

balance these advantages and to retard a general adoption of propeller drive are not missing. Starting the car in a strong headwind would be almost impossible, the forward pull and speed being largely dependent upon the movement of the surrounding atmosphere; in heavy sand or sticky mud it would also be difficult to obtain sufficient tractive power to overcome suction of the mud at the moment of starting. Once the car has been set in motion it is kept going at a small expense of power.

Then there is the great danger of steering troubles, induced by the constantly changing speed of the car under changing wind conditions, and by the gyroscopic action of the large propeller, which submits the mechanism to enormous torsional stresses. Tests made on the ice here in America with a similar "wind wagon" have shown it to be incapable of taking sharp turns at even moderate speed.

While the de Lesseps car may be interesting from an engineering point of view, there appears little danger of its general introduction—at least in its present form.

Black Lightning Flashes

THE accompanying photograph of lightning, showing both bright and black flashes, was taken at Lake Benton, Minnesota, on the night of May 2d, 1912, at midnight. The shutter was open one minute, during which time probably several successive flashes occurred.

Black flashes are frequently seen in lightning photographs, and the conditions under which they occur are now well understood. White flashes with black borders, as shown in the present case, are a characteristic feature of the phenomenon. The black flash does not occur in nature, but is a trick of the photographic plate, and different kinds of plates are sensitive in very different degrees to the process involved. The present picture was probably taken on a film, and shows the phenomenon in a marked degree.

As long ago as 1889 Mr. A. W. Clayden, the well-known English photographer, showed how to reproduce this phenomenon in the laboratory (*Philosophical Magazine*, 5th series, vol. 28, p. 92-94), whence it has since been known as the "Clayden effect." If an electric spark of moderate intensity is photographed, and the plate is subsequently exposed to a very feeble general illumination (e. g., with gas-light), the plate, after development, will print an ordinary white flash; if the after-illumination is a little brighter, the spark will not appear on the print at all; and, finally, if the after-illumination is still brighter, the spark will print black. In order to get black flashes, therefore, the plate must have been exposed at least twice to the light.

Suppose, now, that a lightning flash has registered its impression on the plate, and before the shutter is closed a second flash occurs in the same field. If the latter is bright enough, the clouds will be lighted up and the light reflected from them will produce the diffuse illumination of the field necessary to produce "reversal" of the original image. That often only the border of a bright flash is reversed is explained by the fact that this is less bright than the "core" of the discharge and is more easily affected by the subsequent illumination of the field.

An attempt to explain the chemistry of this process (somewhat too technical to be given here) will be found in the *Verhandlungen der deutschen Physikalischen Gesellschaft*, September 15th, 1911, p. 676.

In photographing lightning for scientific purposes it is desirable to select plates that are as little as possible susceptible to the Clayden effect; for, as stated above, this effect may entirely obliterate certain flashes. Tests of a large number of plates from well-known makers were made a few years ago by Dr. B. Walter, of Hamburg, to determine which are most satisfactory in this respect. (See *Annalen der Physik*, 4te Folge, Band 27, p. 92.)