

### TRANSPORT BY ROCKET.

Years must elapse before the rocket principle of propulsion, which enabled FRITZ VON OPEL to attain a speed of over two miles a minute, has been so far developed that it can compete with pistons driven by expanding steam or explosive gas. Yet who can suppress admiration at the imagination, technical ability and physical daring the Germans have displayed? Out of MAX VALIER'S dream of rocketing from star to star comes this entirely new automobile and the promise of experimental railway cars and planes capable of making speeds well over 400 miles an hour. Practical business man that he is, VON OPEL keeps his feet on his native earth and lets others romance about interstellar voyages. He sees a definite commercial future in the rocket principle. New York to Berlin between breakfast and luncheon at a speed of 1,000 miles an hour—such is the possibility that fascinates him.

The experiments made some ten years ago by Professor R. H. GODDARD at Clark University with rockets intended to hit the moon showed that nozzle velocities of 8,000 feet a second are readily attained with available combustibles, such as smokeless powder, and this with remarkably high efficiencies. On paper, then, VALIER and VON OPEL can make out a good engineering case for a 1,000-mile-an-hour express which is to streak across the Atlantic at a height of fifty miles where air resistance is almost negligible and where only a rocket can be propelled.

The systematic research methods of VON OPEL, the automobile manufacturer; SANDERS, the rocket-maker, and VALIER, the "astronaut," all seeming like veri-

table incarnations of JULES VERNE'S heroes, carry conviction. What technical difficulties, what human perils must be faced fifty miles above the earth? Unmanned sounding balloons are unable to ascend more than twenty miles. Hence a manned rocket-plane, hermetically sealed and manufacturing a terrestrial climate within the cabin, must be constructed to make the necessary preliminary explorations. What a tale the Columbus of the upper atmosphere will have to tell if he returns alive—a tale of stars and sun blazing in an inky sky, of auroras, waving like diaphanous, shimmering curtains, of strange electrical manifestations, of a cold that approaches absolute zero!

A speed of over seven miles a second, enough to burn up meteors by mere friction with the atmosphere, must be acquired to escape the earth's gravitational clutch. To be jerked from rest at that rate means that rocketeers would be crushed against the cabin wall. What of the vertigo produced by falling toward the moon with a velocity faster than that of a rifle bullet when even a falling elevator causes physical distress? Can the human organism withstand it? Baffling, too, is the question of energy. Present combustibles are not concentrated enough. It would take hundreds of pounds of powder to send a single pound to Mars. Probably we must wait for the chemist to discover how the atom can be disintegrated, how hydrogen can be transmuted into helium and the excess mass radiated as energy in accordance with Einsteinian principles. A long, long wait that will be.