WHO'S FOR THE MOON?

By R. Esnault Pelterie

As soon as the human mind opened to the understanding of things, it wondered why human beings could not fly and travel about in space as freely as winged creatures are able to do. Man's newly born understanding saw no difference in altitude between the hovering clouds and the twinkling stars, so that the imitation of birds appeared to him as the ultimate achievement, opening the way not only to terrestrial travels but to penetration into space, thus marking the final victory of man over Nature.

Nowadays, the development of our knowledge has changed these notions, at least for those who think, but it is astounding to see, as Camille Flammarion often pointed out, how little the public in general realizes the disproportion between the highest altitudes reached by man and the enormous distances between us and other worlds.

A few birds can fly some miles above the earth's surface, and those that man has built up out of metal and canvas have beaten them by climbing to a height of seven or eight miles; this is a good deal over the region of the highest clouds, the icy altostratus floating about five miles high. A few registering balloons have reached eighteen miles, and this at present appears to be the limit attainable by human endeavours.

We know from the laws of gases and gravity that the atmosphere extends a long way beyond that limit, while gradually decreasing in density. We know by observation that the density at a height of sixty or seventy miles is still sufficient to produce white heat in the meteoric stones that reach us from space at a speed of between ten and thirty, and sometimes fifty, kilometres a second. We also know that beyond this distance atmosphere still exists, though it is so tenuous that nothing reveals it except certain kinds of aurora borealis. Here begin the endless and empty fields of interplanetary space in which even the feeble and fugitive support of air will be denied to the wings of man.

The distance which must be travelled through the atmosphere is nothing when compared with the journey through space; 380,000 kilometres to the moon, 42,000,000 kilometres to Venus, 78,000,000 kilometres to Mars, reckoning the second and third of these distances at the period of the nearest approach of these planets to the earth. We need not even mention the distances to the stars, which are as great in comparison with those I have just quoted, as the latter are in comparison with the depth of our atmosphere.

A great many people still believe that science gives no means of access to these regions, and no means of moving about in them, and that man is for ever chained to his little globe by the laws of gravity.

Such a conception is entirely wrong. The laws of mechanics show beyond any doubt that it is quite possible to conceive a vehicle that can be mobile and dirigible without having any medium of material support. As a matter of fact, the principle of such a vehicle has been already known for centuries. It is the rocket!

We are accustomed to be told that the propulsive force of a rocket comes from the resistance offered by the air to the gases expelled by it. This is another mistake: the operation of a rocket is just the same as that of a rifle or machine-gun discharged in a state of free suspension—hanging, let us say, from two wires. Whenever a bullet is fired in one direction, the weapon is violently repelled in the other. A very simple law known as the "law of momentum" provides that the respective speeds acquired by the two movable bodies are in an inverse ratio to those of their masses. There is no exception to this law. Whether the force be applied resiliently or with friction, the principle applies in exactly the same way, so that there can be no possible doubt as to the working of such an apparatus as described.

It makes no difference if the projectile is of a gaseous nature. The mathematical law remains unaltered. It is, therefore, certain that a rocket expelling a continuous jet of gas is subject to a propulsive force in empty space, just as much as—if not better than—in air.

As to the steering of such an apparatus, it could be realized just as well as in the case of an aeroplane, though by entirely different means.

I need hardly say that we are still a very long way from organizing interplanetary journeys, but during the last few years a good deal of practical as well as theoretical progress has been made. The principal experiment of the former kind was made by a German, Max Valier, who, following the example of Fritz von Opel, tried to produce a car propelled by rockets. This experiment was even more interesting than those of Von Opel, inasmuch as Valier used liquid reactives (liquid oxygen and petrol). His apparatus unfortunately exploded during the trial and killed him.

Professor Darwin O'Lyon, another American, who works at Vienna (Austria), also contrived a rocket, which was to have been sent up from the top of an Alpine peak. This rocket also exploded prematurely, injuring two or three people.

I am inclined to think that these inventors are going rather too fast, and that we should apply ourselves to regulating combustion until we obtain, by laboratory experiment, what we may call a "reaction motor," working as regularly as our present engines for motoring and flying. To act otherwise would simply be to put the cart before the horse, and this, I regret to say, is what seems to have been done up to the present, probably with the object of obtaining more or less interesting results likely to procure funds for the continuance of these costly experiments. When capitalists realize that the problem can only be solved by strictly scientific and progressive methods, and not by the sensationalism which led to such unnecessary sacrifice of lives in the early days of flying, the final progress will be much more rapid, and in four or five years we may have a meteorological rocket rising sixty miles from the earth and bringing back samples of the outer atmosphere, perhaps composed of hydrogen, as to the nature of which it is so much to the interest of science to obtain precise information.

When once this result is attained, it will very soon be utilized in the form of postal rockets, which will bring Paris within five minutes of London, Algiers within less than an hour of Paris, New York within half an hour of Chicago, and so on. The Atlantic itself will be crossed in a couple of hours, and, eventually, in half an hour when the apparatus is perfected.