

# SCIENCE IN REVIEW

## Astronaut's Dream: A 5,000-Mile High Mirror That Would Make the Oceans Boil

By WALDEMAR KAEMPFERT

A strange tale was cabled from Germany last week—a tale of a station or island which the Germans had planned to create 5,000 miles away from the earth and on which there was to be a sodium mirror to reflect solar heat to the earth and thus generate power. Physicists raised a skeptical eyebrow as they read of gravitation nullified on the island and of oceans that would boil under the reflected rays. Naturally, they pointed out that gravitation is never nullified, though it can be greatly reduced as distance from the earth increases. Probably they had their doubts, which we share, about the possibility of concentrating enough solar heat on the earth from a distance of 5,000 miles to do much engineering good. Light and heat follow the well-known inverse square law, which means that radiant energy is rapidly dissipated as the distance from the earth increases. Still the feat is theoretically possible, provided the mirror is big enough. An area of 1.86 square miles seems too small.

Sodium happens to be a very bright metal which would make a good mirror. On the earth sodium has to be kept in kerosene or some other liquid that contains no oxygen. As soon as sodium combines with oxygen it is reduced to caustic soda—good for cleaning but not for mirrors. Out in space this difficulty disappears. There is no air, hence no oxygen, so that a sodium mirror ought to be good forever.

### Neither New Nor Startling

The plain truth is that students of rocket-ship literature found nothing that was new or startling in the tale that correspondents cabled to this country. Since the middle of the last century rockets have fascinated Russians, Frenchmen, Germans and Austrians, and it was from the earlier ones that Jules Verne derived his inspiration for a "Trip to the Moon."

The ablest of the latter-day rocketeers are Herman Oberth (top man to our mind), Robert Esnault-Pelterie, Walter Hohmann, Count Potocnic and Count Guido von Pirquet. Anybody who takes the trouble to pore over their ponderous mathematical works will find in them all that our Army officers and correspondents revealed and a good deal more.

The island in space has been considered by all recent rocketeers. In 1928 the late Count Potocnic wrote a whole book about it under the pen name Hermann Noordung. Count Guido von Pirquet, a practicing engineer, went into the subject elaborately, only to reach the conclusion that if men are ever to voyage from the earth to the moon or Mars they would have to content themselves as a beginning with the creation of an island in space, fairly near to the earth, and to use it as an experiment station before embarking on larger efforts.

### Variations on a Thesis

It looks to us as if the German plans which have been dug up are nothing but von Pirquet's, with some improvements. Thus von Pirquet recommended not one but three stations at distances from the earth ranging up to 3,105 miles. These would revolve around the earth respectively in 100, 150 and 200 minutes like little moons. Von Pirquet found that if a rocket-ship had an exhaust velocity of 4,000 meters a second it would be theoretically necessary to consume about seventy tons of fuel for every ton of useful load. Hence he wanted three stations. One would hardly have been enough to store all the liquefied gases needed by rocket-ships that had to refuel on their way to a planet.

The sodium mirror of the cabled accounts puzzles this reviewer. If the island on which the mirror is mounted revolves around the earth in a matter of a few hours it could hardly concentrate enough solar heat on one terrestrial spot to do any good, even if somebody were on hand to direct the beam. It is conceivable that an automatic mechanism would turn the sun's rays on one spot for hours at a time, but that means more complications, more periodic inspections, more repairs.

Count Potocnic tried to get over this difficulty by placing the artificial island in an orbit 22,300 miles distant. Such an island would circle the earth once in twenty-four hours, so that concentration on one spot would be possible. He even went to the trouble of designing the island and its apparatus. We suspect that his designs have been found and that they have been the inspiration of the newspaper dispatches that have given the German General Staff far more credit for imagination than it deserves. Von Pirquet had designs for an island, too, and these may have fallen into the hands of our innocent Army officers.

### Ship Was Nucleus

It was not the intention of Potocnic, von Pirquet and Oberth to do much ferrying between the first bit of island planted in space and the earth. The ship itself was to be the nucleus. Other ships were to add more and more material, until finally the island would be complete. Not many trips would be necessary. Nor would the island have to be large. A mirror alone would float in space, and it could be carried by a ship complete, faced in the proper direction and left to itself. Like the moon it would always turn the same face to the earth.

Von Pirquet is no dreamer (for all we know he may still be alive and one of Germany's rocket experts). As a consulting engineer he saw nothing absurd in the idea of building an island or platform at any convenient distance from the earth. His calculations convinced him that rocket-ships simply cannot carry enough fuel to reach even the moon, which is 236,000 miles away, and he wanted refueling stations.

If this reviewer reads von Pirquet correctly there would be no thought of stationing scientists or engineers on the island in space. They would not only be lonelier than lighthouse keepers but unnecessary. The German rocketeer merely wanted to mount a huge mirror (1.86 square miles in area) on their island—von Pirquet's island we insist again—and let it catch the sun's rays to drive power plants on the earth. That can be done in theory without human aid, though somebody might have to visit the island now and then to make repairs and to give the equipment the once-over. There was no thought of war in all this, though the work done probably had its bearing on the designing of the V-1 and V-2 rockets.