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ROCKET FLIGHT TO THE MOON--FROM IDEA
TO REALITY: A MEMOIR⁺

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There is no stronger force in nature than an idea whose time has come. About the turn of the century, it was the idea of flying. Thus, the "journey to the Moon" had already begun in 1908 when I bought for 25 Pfennig in Nürnberg, Jules Verne's book The Journey to the Moon that described how three men were to be shot to the Moon in a giant projectile from a cannon near Cape Kennedy. However, I soon figured out that this was impossible, since all three would have been killed immediately when the projectile was fired. I took Verne's book to my physics professor, Dr. Hess, at the high school in Nürnberg, and asked him how and whether a person could actually fly to the Moon. After reading this book, he said that he did not know either. But Verne gave a figure of 11.181 km/sec as the velocity that a body must have in order to leave the gravitational attraction of the Earth, and that pointed to rockets! But what was known at that time about Rockets?

We knew that the Chinese had invented rockets in 800 AD as incendiary arrows, and that German rocket corps had played a role in the War of Liberation (1813-1815). When rifled guns came on the scene, military rockets disappeared, in general consigned to fire-works and signal applications. Professor Hess advised me to get involved with flying so that I could get an idea for myself of how and whether we could actually get to the Moon. But what did we know about flying at that time? I found out that Otto Lilienthal had already made more than 2500 flights in the years 1890-1896 in a glider he had put together himself, thus laying the foundations for present-day powerless and powered flight. Thus, at the start of the century, powered flight began in Berlin-Johannisthal (Figure 1).

I wanted to see this powered flying for myself, close up. Now I did not just go out and buy myself a train ticket, although a fourth-class ticket from Nürnberg to Berlin and back would have only cost 5 Marks. Instead I built myself a bicycle for

⁺Presented at the Fourth History Symposium of the International Academy of Astronautics, Constance, German Federal Republic, October 1970.

⁺⁺An early experimenter with solid-and liquid-propellant rockets in the 1920s and 1930s.

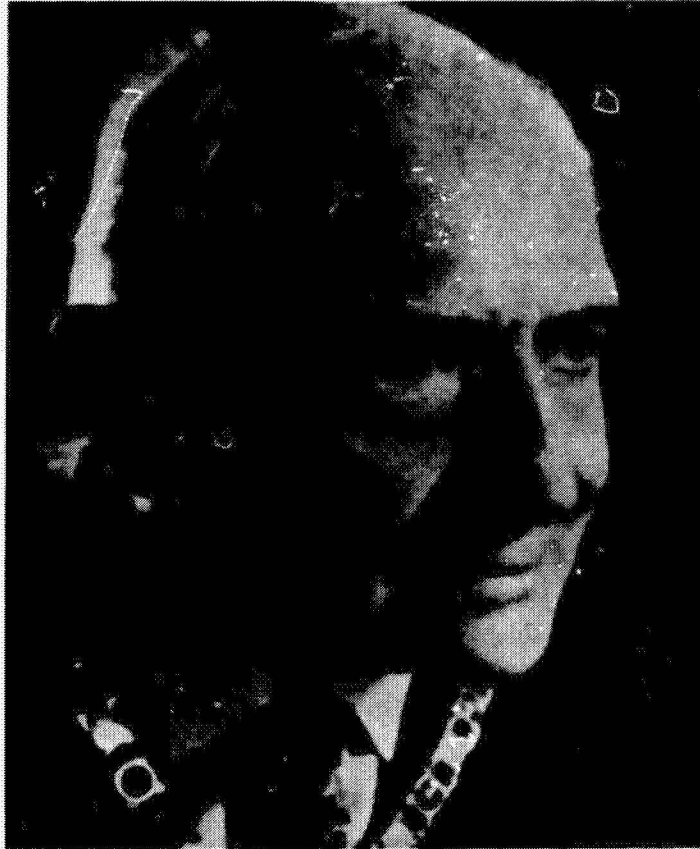


Fig. 1
Rudolf Nebe.

5 Marks (Figure 2). In order to use it, I had to pass a bicycle test in front of the 16 Aldermen of Nürnberg, whereupon my bicycle acquired the number 18351; now I could ride it to Berlin. Five hundred kilometers going, five hundred kilometers back on dusty streets, full of horseshoenails, and plagued by dogs which chased after me--what an adventure!

In Johannisthal I then saw the first airplane, which flew around at housetop height when there was no wind at all. This made me so enthusiastic that I immediately resolved to take part in flying. Naturally, I needed something which would require only a minimum of expense, and so I decided to build a large kite which would carry me aloft and then glide back to the ground. However, once I had built the kite, I was forced to admit that it was not at all capable of lifting me off the ground. Instead, I learned that I would have needed eight such kites. However I did not have the money. But I got the money in an original manner. I built myself a card-board camera, installed it in this kite, tripped the shutter with a string--an elastic cord--1000 m above Nürnberg, and

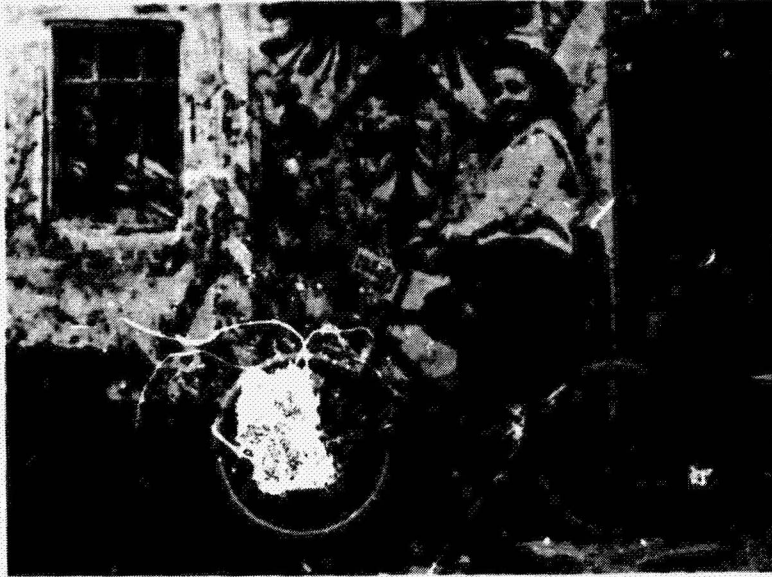


Fig. 2
Home-Made Bicycle No. 18351

obtained the first aerial photographs of the town from the kite. At that time, I took more than 200 such aerial photographs. They sold like hotcakes, so I no longer had to consider large kites, but instead had the money to build a genuine monoplane (Figure 3), such as I had seen in Johannisthal.

When it was finished, I rolled around the training ground in Nurnberg in 1911. Now, procuring money with photographs was naturally very arduous, so I wrote to the War Ministry, stating that it would someday be possible to utilize such aircraft for military objectives, and requested financial assistance in my work. The reply was a disappointment. They responded that aircraft could never have military significance, because piloting an airplane required acrobatic agility.

On August 15, 1912, I won my Bavarian pilot's license No. 178 with a flight from Nurnberg to Frankfurt and back. Within 2 years, moreover, the War Ministry had to admit that war could not be conducted at all without aircraft. But because of this short-sightedness, Germany arrived at the front with 750 old Taubes, while the French already had 3000 new airplanes, securing air superiority for the enemy from the outset (Figure 4). However, the War Ministry soon received even more dramatic proof of the necessity of airplanes. At the beginning of September 1914 our flyers returned with the information that the French were retreating in flight toward Paris, but they were ridiculed because the cavalry had reported the French advancing in full strength toward the Marne.

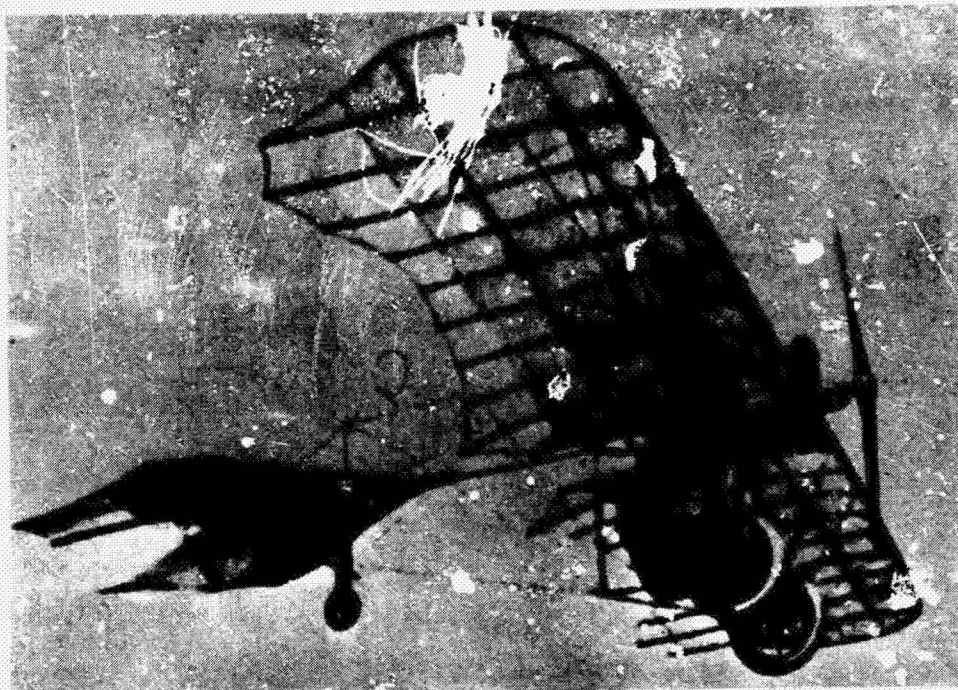


Fig. 3
Home-Made Airplane

A General Staff Officer was summoned from the Central Headquarters in Spa to make a decision. He decided for the report of the cavalry and used his authority to order a retreat to the Marne. But what would have happened if we had conquered Paris at the beginning of September in 1914? In hindsight, we can only say that the entire First World War would have gone differently. Now the War Ministry recognized that airplanes had to be built in great haste and that we had to fly them!

In 1916, I sat in the cockpit of a Fokker monoplane (Figure 5) with two machine guns that fired through the propeller and were supposed to shoot down enemy airplanes. I soon found out that things were not this simple. With these primitive machines, one had to fly within 20 m of an enemy aircraft in order to hit it at all. However, the air superiority of the enemy was about 10:1. Before I could get within the 20 m, my own craft had been hit. Shards flew, the machine went out of control and into a steep dive. When I woke up, I was in a field hospital covered with bandages. I now had time to consider whether it would not be better to shoot down enemy airplanes with rockets from a distance of 200 m, instead of with machine guns from a distance of 20 m.

When I was released from the hospital, I went to the nearest engineering-supply depot, drew out the largest signal rockets, and attached warheads to them. Everyone was tensely waiting to see what would happen when, 4000 meters up, we encountered an enemy

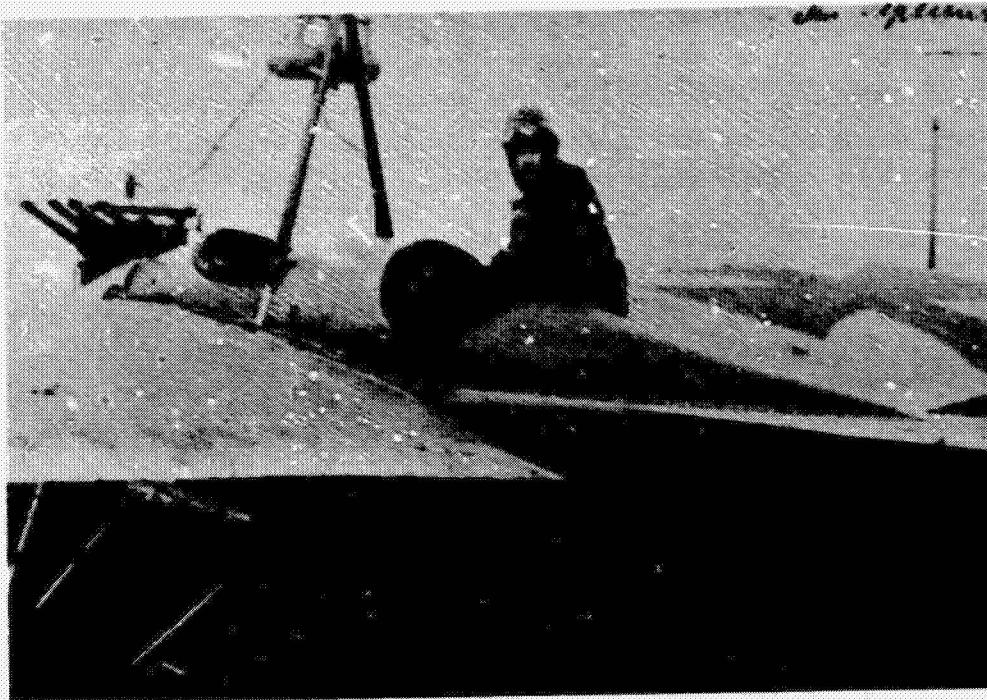


Fig. 4
Rudolf Nebel in a Taube, 1914

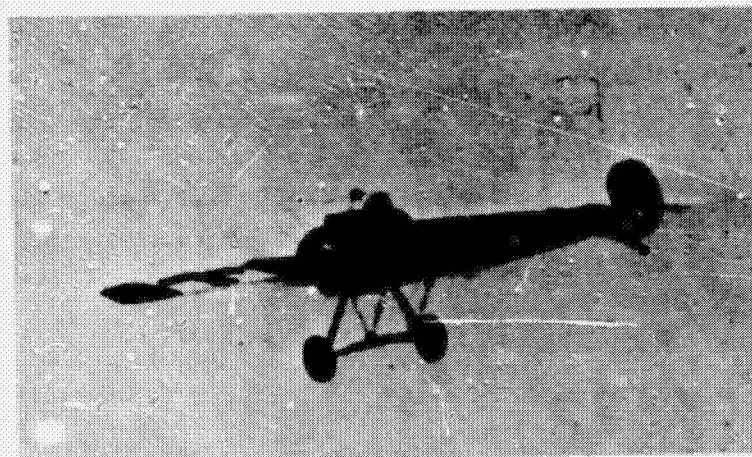


Fig. 5
As Fighter in Focke Monoplane

squadron of 25 planes. I pressed the button; an immense trail of powder smoke passed through the center of the enemy squadron. One plane immediately dropped its nose and went into a dive, landing on the nearest meadow. With the second hit, I succeeded in shooting away an enemy propeller. Only with the third shot did I get into trouble: I shot myself down. When I pressed on the button, the primitive hand-made rockets exploded before they had left my airplane. The aircraft caught fire—and there weren't any parachutes at that time.

I plummeted toward the earth in my burning machine. But then I had an improbable stroke of luck. Right next to where the burning aircraft struck the ground, two privates were working on line construction and they got me out of the burning aircraft in time. I certainly would not have escaped by myself. They delivered me, somewhat burned, to the hospital. I was immediately commanded to cease using these new weapons. However, we had to have a new name for this weapon. We baptized them "Nebelwerfer" (Editor's note: this pun on the author's name means literally "smoke thrower"), and still tried unsuccessfully to get the Nebelwerfer used in the First World War. We had to continue fighting with machine guns. In 1918 I acquired the best fighter plane of the First World War, a Pfalz D 8 (Figure 6) with a 300-hp rotary engine with which I could climb to 8000 meters in 30 minutes. The air battles at elevations of 8000 meters taught me that I could take these aircraft up only as far as there was still air. If one wished to fly higher into



Fig. 6
As Fighter in Pfalz D 8 with 300-hp Rotary Engine

airless space, one required an entirely different type of drive, namely jet or rocket drive which I later patented as the liquid-propellant jet engine under the number DRP 633,667.

After the War, I initially had other worries. I received my engineering degree at the University of Munich in 1919. In order to finance further rocket research, I founded a fireworks factory at Pulsnitz in Saxony. I sold fireworks to rifle clubs and continued my research on rockets. With some comrades who had survived World War I, I believed that we had to do something to prevent a second World War. One contribution could be a rocket which would fly at least 1000 km. We chose the slogan "no more war," and founded an International Research Society that later received the name "PANIERRA." Our objective was to stimulate the interest of the peoples of the Earth in the major problems of science and technology, and divert unnecessary funds for armaments to peaceful and productive work. We organized this world peace program of PANIERRA as follows:

1. Rocket flights for the purpose of space travel.
2. Atomic energy for peaceful purposes.
3. Robots to relieve mankind of manual labor.
4. Geothermal power plants for exploiting the heat of the Earth.
5. World power plant Gibraltar—lowering the Mediterranean Sea.
6. Making fertile the Sahara Desert.
7. Large-scale wind power plants.
8. Tidal power plants.
9. Solar mirrors to influence weather.

In 1927 the Society for Space Flight was founded, and in 1928 the first rocket cars were driven on the Avus test road. In 1929 UFA filmed a movie "Woman on the Moon" that employed Hermann Oberth as scientific advisor. He had already published the book Rockets to the Planets in 1923. I met Hermann Oberth on the UFA lot, and this meeting turned rocket flight into reality. UFA provided 35,000 Marks for the first liquid-propellant rockets built at IG Farben in Bitterfeld, brought about the first combustion tests with liquid oxygen and gasoline, and resulted in a meeting (Figure 7) on July 23, 1930, with personnel at the Reich Chemical-Engineering Laboratory in Berlin.

Thus, on September 27, 1930, I established the first launch site in the world in Berlin-Reinichendorf. Starting with minimum rockets with one liter of liquid propellants, abbreviated MIRAK 1, and through four liter, 50 liter, and 500 liter rockets, the theoretical foundations of the V-2 rocket were worked out. This work resulted in the patent DRP 633,667, a jet engine for liquid propellants, and the DRP liquid propellant rocket as a secret patent with the number N 32827 I 46g. The first liquid-propellant rockets driven with liquid oxygen and gasoline were launched from an island in the Tegeler Sea. A manned rocket, the "Magdeburg piloted rocket," was also built, financed by the Mayor of Berlin, Professor Reuther. It did not get beyond a test launch in

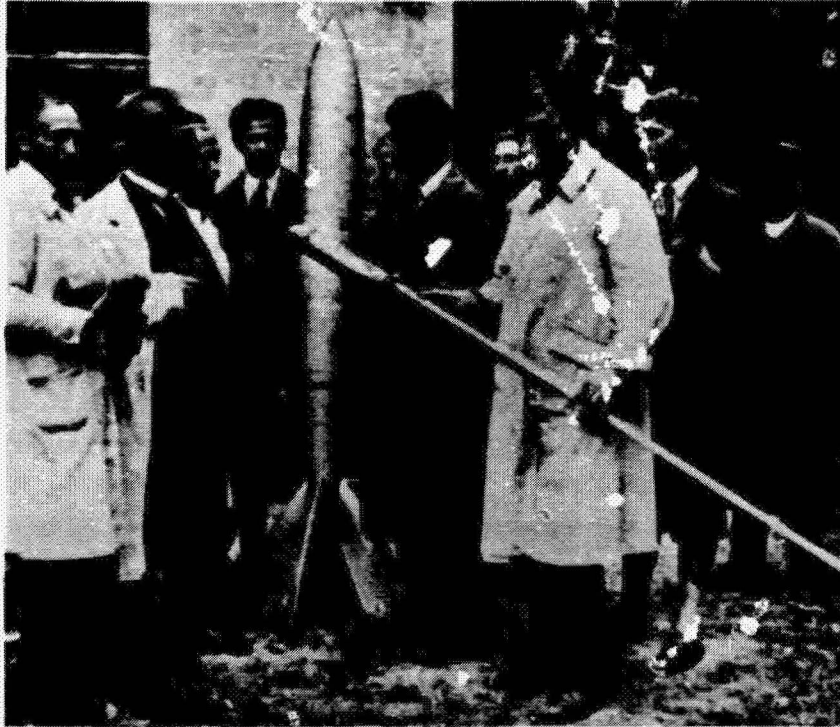


Fig. 7
Experts from Chemisch-Technische Reichsanstalt
[Reich Chemical Engineering Laboratory]
with Nebel, Oberth, von Braun, and Dr. Ritter

Magedeburg, because on January 30, 1933, Adolph Hitler came to power; the rocket became a "secret command matter," and the tests were transferred to the authority of the Army Weapons Office.

The Reich Central Security Office (RSHA) in Berlin took over supervision of the rocket launch site in Berlin. I succeeded in convincing them that it was important to put together a documentary film to record the experiments for posterity. This was possible because the Siemens Company had brought out the first 16mm film device in 1930, and I got the idea of filming the experiments from the beginning. The documentary film "Rocket Flight 1944" was produced, but confiscated by the English on May 2, 1945. Through my personal visits to London, I eventually succeeded in obtaining the release of this documentary film and had it deposited in the Federal Film Archives in Koblenz.

On May 2, 1945, the Americans arrived at the V-weapon plant at Norder-Sachsenwerk in Harz, took possession of the last 18 V-2s and V-1s, and all the German patents. Some 200 rocket researchers led by von Braun were also taken to the USA, where they later developed other liquid-propellant rockets including 15 Saturn V rockets. A spacecraft launched on the seventh Saturn V landed a man on the Moon on July 20, 1969.

But despite all the outstanding outerspace achievements made possible through the principle of rocket propulsion, I already foresaw in 1932 great difficulties in placing a large manned spacestation in orbit by rocket propulsion alone. Therefore I welcomed a study made by Mr. W. H. Kurpanek about a method to place a space vehicle into orbit by electromagnetically accelerating it in a evacuated 10-mile-long tube (Figure 8). We submitted the study in 1969 to NASA. At the Marshall Space Flight Center in Huntsville, Alabama we received a research grant of \$280,000 to build a electromagnetic accelerator tube for simulated meteor impact studies. The Metro Physics Company in Santa Barbara, California, was chosen to build the accelerator tube but the company failed to reach a business arrangement with NASA, so we postponed this project.

The mounting difficulties with the Space Shuttle Project, the launching of a large spacestation and most of all the accumulation of radioactive waste material prompts us to show the most economical way to solve those problems. A electromagnetic accelerator is the most economical and clean way to launch things into orbit, for only the payload in a hull without any instruments or motors on board is brought into orbit. The needed energy is produced on the ground with a MHG-Generator.

A half century ago I initiated with others the first generation of space flight; man has reached the moon, now I would like to initiate together with Mr. W. H. Kurpanek the second generation of space flight and let man reach the planets.

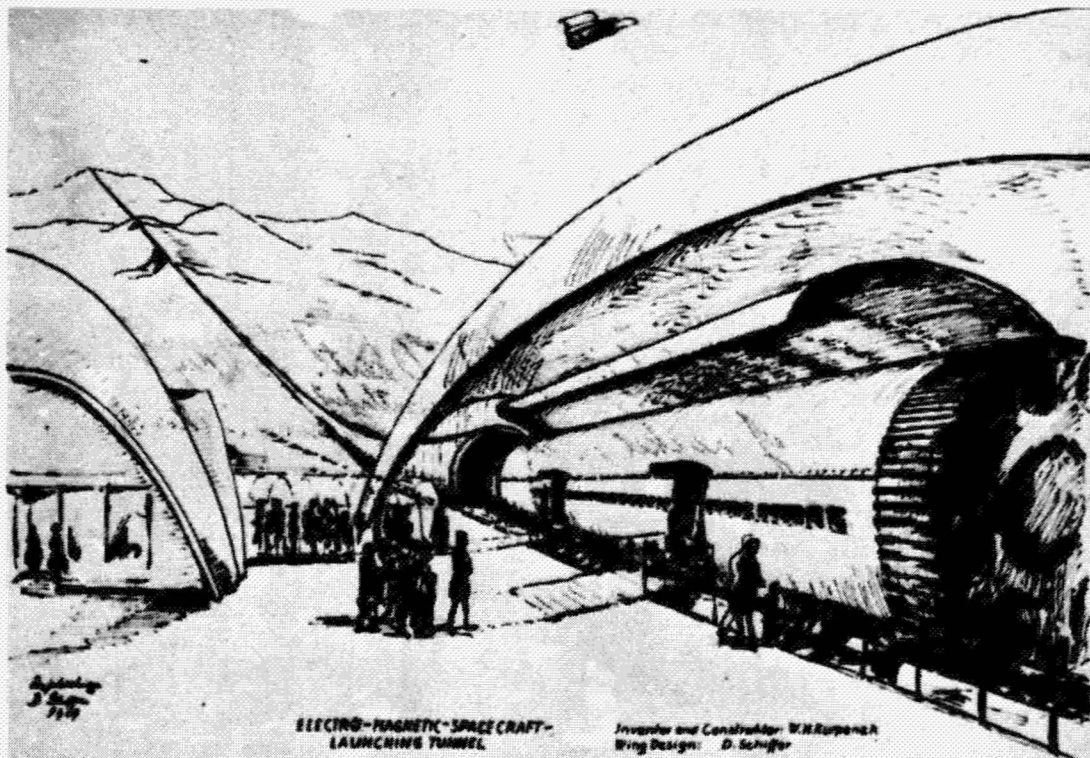


Fig. 8