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Chapter 14

When the Studies of German Astronautics Pioneers Were Encouraged by their French Counterparts (1927–Mid 1930s)*

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Abstract

After World War I, Germany was subject to significant constraints related to the "diktat of Versailles," which limited research in many areas, with some exceptions such as rockets. Thus, in the 1920s, a lot of gear trials were performed. At the same time, in France, studies on rockets were organized under the guidance of Robert Esnault-Pelterie. At the end of 1927, Robert Esnault-Pelterie contributed to the creation, within the French Astronomical Society (SAF), of the "Astronautics Committee," an organization in charge, firstly of rocket's research all over in the world, and secondly of the attribution of an International Astronautics Prize (also called "REP-Hirsch" in honor of its President Esnault-Pelterie and his patron-secretary Louis-Hirsch). The Astronautics Committee then followed with great interest the research carried out in Germany, which had become popular and were revealed by the media. Not surprisingly, the first International Astronautics Prize was awarded in 1929 to Hermann Oberth for his book *Wege zur Raumschiffarht*. The author will write a little later with astonishment: "I hon-

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estly did not believe that in France, one would grant this price to a German." It was indeed daring eleven years after the 1914–1918 war. Thus, links and friendships were built between German and French pioneers. On several occasions, the Astronautics Committee sent one of its members to Germany to observe the German studies, especially those concerning the dynamic Verein für Raumschiffahrt (VfR). Subjugated by the German astronautic advances, the SAF was the spokesperson of the VfR in France, contributing to the Franco-German rapprochement. Unfortunately, Hitler's rise to power in 1933 quickly put an end to scientific exchanges. Rocket studies became confidential, and the Astronautics Committee did not survive the events of World War II.

Until the eve of World War I, studies on "interplanetary navigation" or "intersidereal navigation" (as it was said at the time), and the means to achieve them, including the rocket, were mainly theoretical [1]. They still were in the aftermath of World War I. Thus, in 1919, the American Robert H. Goddard published *A Method of Reaching Extreme Altitudes*, a communication in which he exposed his reflection on rocket theory and his first experiments regarding the topic. Europeans were not left out: studies were taking place in several countries, such as Germany, Austria, Italy, Russia, and so forth.

I. The Question of "Interplanetary Travel" in Germany and France after World War I

Four years after the publication of Goddard, the German-Romanian Hermann Oberth [2] wrote *Die rakete zu den Planetenräumen*, the first ever doctoral dissertation on space navigation. In the following years, the document had an important impact in Germany, but also in bordering countries including France.

Other important publications followed in Germany, such as Walter Hohmann's [3] *Die Erreichbarkeit der Himmelskörper* (1925) [4]; *Die Möglichkeit der Weltraumfahrt: Allgemeinverständliche Beiträge zum Raumschiffahrtsproblem* (1928) [5] under the direction of Willy Ley [6]; *Mit Raketenkraft in Weltenall—Vom Feuerwagen zum Raumschiff* (1928), by Otto W. Gail [7]; and more. This proficiency did not fail to challenge French observers, such as essayist and scientific popularizer Jules Sageret: "From 1923 to 1929, we can point out three or four good German books on the application of rockets to the exploration of the close or distant space," he wondered. He added bitterly [8], "In the meanwhile, there are some in France. [But] We are not very advanced." However, Sageret also pointed out that Robert Esnault-Pelterie [9] who made some interventions and, in 1930, published *L'Astronautique*, a work described as the "true breviary" of astronautical science.

Figure 14–1: *Die Rakete zu den Planetenräumen*, Hermann Oberth, 1923, completed and reissued in 1929 under the title *Wege zur Raumschiffahrt*. © DR.

In this late 1920s and early 1930s, the French press was particularly attentive to what is happening in Germany. It could only note a national backwardness compared to the Germans with "the regret that *L'Astronautique* is not as well-known and studied in France as in Germany, where one can find an increasing number of books on this captivating problem," as observed by the newspaper *Le Journal* [10]. In French newspapers and weeklies, there was indeed relatively little concern about rockets [11] but a rather a keen interest in German research [12].

It should be recalled that German rocket studies took off shortly after World War I, not least because of the fact that the Treaty of Versailles, which restricted Germany in the acquisition of heavy weapons, did not impose any restrictions regarding rockets. That area did not even have a name—the word "astronautics" would not appear until the end of 1927. However, the Treaty of Versailles did not explain everything. It should be noted that before 1914 the Germans had won numerous Nobel Prizes—five in chemistry, five in physics, and four in medicine, which testified to a vitality of research and a pronounced taste for science. Finally, we should not forget the existence of an important industrial fabric favorable to science and technology. As a result, the writings of Hermann Oberth and Walter Hohmann were echoed, triggering a craze for rockets, where Germany was witnessing initiatives to set rocket engines on almost everything: cars, trains, canoes, and more. For example, the engineer and industrialist Fritz von Opel tested a rocket-propelled car in 1928 to the delight of the public and foreign observers—including the French—intrigued by these experiments [13].

Two main groups in Germany were then engaged in the development of liquid-propelled rockets: the Winkler Group [14] and the Nebel Group [15]. The

first, after learning about Oberth's work, aimed to build a rocket capable of reaching altitudes of around 30,000 meters. Never had interstellar navigation seemed so feasible. On 5 June 1927, Johannes Winkler, together with Max Valier [16] and Willy Ley, contributed to the founding of Verein für Raumschiffahrt (VfR) in Breslau, where many enthusiasts and specialists came together to attend the event. This astronautical company was rapidly gaining success, as testified later by Willy Ley himself: "At the end of its first year, the company had nearly five hundred members, including all those who, in Germany and neighboring countries, had written some work on rockets. Oberth and Hohmann, Drs von Hoefft and Guido von Pirquet of Vienna, Professors Rynine and Robert Esnault-Pelterie were among them" [17]. The VfR was also equipped with a quality magazine embellished with rich illustrations: *Die Rakete*. Among the articles signed in this review were contributions of Hermann Oberth and Willy Ley... As for Rudolph Nebel—who also joined the VfR—he ran the *Raketenflugplatz*, a site of nearly 4 km² bought from the German army in September 1930, located in the northern suburbs of Berlin, to serve as a firing range for the first VfR rockets (Mirak and Repulsor). Nebel was convinced that rockets could also serve in the future as a rocket-post to connect the major European capitals. This type of project did not leave indifferent the German press, but also the French one: "Dr. Nebel directs the "*Raketenflugplatz*." The tests, *Le Figaro* explained, "are extremely curious. Dr. Nebel believes that for the moment, it is only necessary to try miniature rockets that can slide inside a vertical pylon... . Dr. Nebel would like to use this means of transport for the mailing of mail from Berlin to Moscow in eleven minutes, to London in six minutes, and to Vienna in four and a half minutes" [18].

All these projects and all these first experiments helped make "young people, dream of cosmic cruises," remembered Alexandre Ananoff, a young French enthusiast engaged in the popularization of astronautical research at the end of the 1920s [19]. Like many other young people, he was able to see many sketches or drawings of rocket and space vehicle projects in magazines (see Figure 14-2).

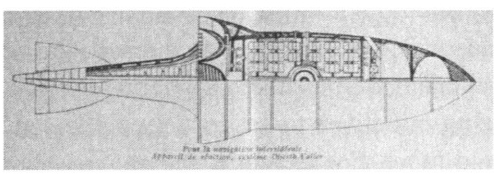


Figure 14–2: "For interstellar navigation: reaction apparatus, Oberth-Valier system," *L'Air,* 1 March 1928, p. 23. © BnF.

Now, in several European countries, including the Soviet Union, engineers and physicists were taking up the challenge of building rockets to get as high as possible into the atmosphere. However, the first successful launch of a liquid-propelled rocket did not take place in Europe, but in the United States on 16 March 1926. It was a very modest test by Robert Goddard that was not immediately known in Europe, as Willy Ley pointed out:

> "So while we were discussing the merits of the Mirak, Goddard was working in Fort Devens (Massachusetts) on liquid rockets. Even if we had been kept informed—that is, if our efforts to correspond with Goddard had not been sharply repelled by him—we could hardly have followed a line different from the one we followed" [20].

On the French side, we find the same feeling. For example, the astronomer Louis Montangerand noted, in 1928, that in the "recent years, we sometimes read in newspapers, information of this kind: the American professor Goddard proposes to launch soon in the Moon, a projectile that he invented" [21]. But Montangerand never mentioned the 1926 essay. Similarly, in May 1928, De Varigny (Doctor of Science) dealt in detail with the question of interplanetary travel; Goddard's works were discussed several times, but he never mentioned a shot made by Goddard [22].

Anyway, interplanetary navigation no longer seemed impossible, it appealed to both the public and the scientific community. It looked fascinating [23] or amusing [24]. However, it was not unanimous: there were criticisms both in Germany [25] and in France, where one could read in the newspaper *France Soir*:

> "I went to the observatory to ask for the opinion of the great specialist of the Moon ... Mr. Le Morvan ... : 'There are many lunatic people currently on our Earth!' he screamed ... . I do not believe much in astronautics, if not perhaps in a considerable number of centuries.' At least, do we [at *France Soir*] hope to use the rocket for scientific observations. ... This hope, I'm afraid, will be disappointed too. Consider the physical conditions that the recording devices placed in this rocket will have to undergo..." [26].

II. How to Catch Up with French Astronautical Research?

Passionate about astronautics, the banker André Louis-Hirsch [27] considered that only the "great scientist" Robert Esnault-Pelterie could contribute to change the situation, especially since he already approached the question before 1914 [28]. Because of his banking activities and his knowledge of the German language, Louis-Hirsch had contacts abroad and could access German works. He

quickly became aware of German astronautical studies. In his case, it is probable that he knew the writings of Hermann Oberth [29].

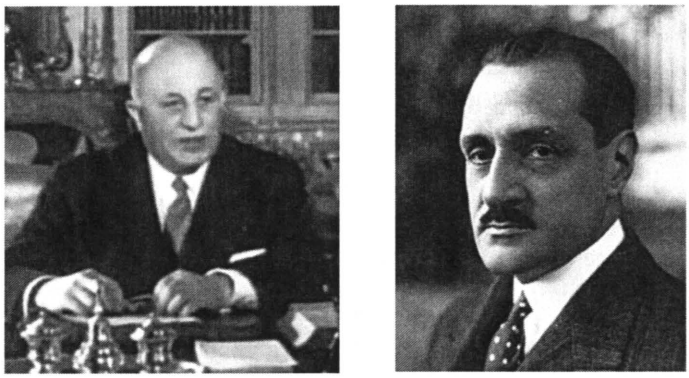
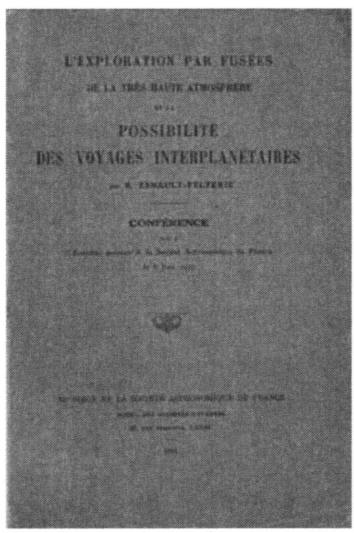


Figure 14–3: A. Louis-Hirsch and R. Esnault-Pelterie. © INA and DR.

In 1925, Louis-Hirsch contacted Esnault-Pelterie and encouraged him to resume his studies and lectures on rockets and propulsion that he had abandoned a few years earlier. Thus, on 8 June 1927, at the Astronomical Society of France (SAF), Esnault-Pelterie gave a remarkable lecture on "Exploration by rockets of the very high atmosphere and the possibility of interplanetary travel," three days after the creation of the VfR in Germany.


L'EXPLORATION PAR FUSÉES

POSSIBILITÉ

DES VOYAGES INTERPLANÉTAIRES

CONFÉRENCE

Figure 14–4: Conference by Robert Esnault-Pelterie, 8 June 1927. © SAF.

A coincidence? This is quite unlikely because, after this conference, Esnault-Pelterie and his friend Louis-Hirsch took the initiative to create a

"Groupement Scientifique" (Scientific Group)—to promote the development of interplanetary travel—accompanied by a prize to encourage and reward research in that field.

However, there was a risk the group would not be taken seriously. To avoid this, it was housed within the SAF, of which Esnault-Pelterie and Louis-Hirsch were also members. But the name "Groupement Scientifique" [30] was still not accurate enough for the group. On 26 December 1927, during a meeting in the family home of Louis-Hirsch, seven personalities [31] gathered around André Louis-Hirsch and Robert Esnault-Pelterie. They made the decision to call it "astronautics" rocket studies and interplanetary navigation [32] and, therefore, to name the "Groupement Scientifique" the "Astronautics Committee." The initiative was significantly echoed in the national press [33]. Henceforth, the question of space travel was no longer a fanciful idea, as *La Croix* points out:

> "The idea of interplanetary travel would have seemed extravagant some fifty years ago; but since, the progress of science has brought within our reach more and more powerful means of action, to the point that the possibility of leaving the terrestrial domain is seriously examined by the most qualified scientists ... [such as] M. Robert Esnault-Pelterie..." [34].

As for the Astronautics Committee, it was definitively constituted during the first two months of the year 1928, gathering about twenty personalities with very diverse expertise fields [35]—to which was added an international prize of astronautics called "Prix REP-Hirsch." The latter was officially created according to a strict legal framework [36]. It should be noted that the prize had an annual reward of 5,000 francs. Why such an approach?

First, it had to convince the French scientific community of the seriousness of astronautics, which was at the confluence of many scientific and technical fields [37]. Secondly, the awarding of a prize had to encourage French and foreign researchers to embark on astronautical studies, testifying on the part of the founders of the Committee that astronautical science had frontiers and that it had to be in the service of humanity. Finally, as it was necessary to submit to the Committee a work in progress to obtain the prize, it allowed the French to know more about the studies carried out abroad...

Naturally, the Astronautics Committee did not limit itself to waiting to receive the work of researchers. It was also aware of what was being published mainly in Germany, Austria, the United States, Italy, the United Kingdom, Switzerland, and, to a lesser extent, Soviet Russia. For this, André Louis-Hirsch created a library specialized in astronautics and, moreover, he held a press review where he regularly presented to the members of the Astronautics Committee and the SAF. For example, in November 1928, in a major stocktaking report [38], he detailed the activities of several countries, emphasizing the importance of Ger-

man and Austrian works. For the former, he remarked on the results of Hermann Oberth and Walter Hohmann, and for the latter, he emphasized the quality of the studies of Franz von Hoefft [39], who published *Die Eroberung des Weltalls in Flugzeug und Yacht* in 1926.

III. By Rewarding the German-Speaking Oberth, the Astronautics Committee Encouraged German Astronautical Research

At the beginning of June 1929, the Astronautics Committee awarded the first Prix REP-Hirsch "to the German Hermann Oberth, who presented to the Astronautics Committee a remarkable work on the "*Possibility of interplanetary voyages by means of rockets*" [40]. On numerous occasions, Esnault-Pelterie explained to the media: "We owe Oberth to have demonstrated, for the first time, the possibility of making rockets expelling their gas at a speed greater than 4000 meters per second, using an oxygen-hydrogen mixture. This discovery earned him the *Prix REP-Hirsch* ..." [41].

Figure 14–5: The experiments of Professor Oberth "Here is Greisfswald, near the Baltic and the lighthouse from which the rocket will be sent," *Le Populaire*, 3 December 1929. © BnF.

Oberth's choice seemed logical, given the importance of his work and his influence, but it might have been surprising in France, considering that a decade earlier French and Germans were coming out of a devastating and traumatic war; rewarding a German could have appeared as a provocation, an anxiety for the future. For example, Alphonse Berget wrote a few months later: "Dr. Oberth deals with rockets, but with the ferocity of the inhabitants of the central empires,

he considers them as long-range bombs, carrying deadly gas tanks that could exterminate whole populations!" [42]... So, Hermann Oberth's reaction was not surprising: "I honestly did not believe that in France, they would award this prize to a German...". Honored, he added, "It is comforting to see that Science and Progress are strong enough to overcome national prejudices. I do not think I can better thank the Astronomical Society of France (SAF) than by swearing here to work on my side for Science and Progress" [43]. As for the VfR, the distinction offered to Oberth was felt as an honor, and it was immediately announced in the magazine *Die Rakete* [44].

The SAF and the Astronautics Committee thus deployed a real sense of open-mindedness detached from the passionate relations between France and Germany, eleven years only after the Great War. However, one should not forget that Franco-German relations improved significantly in the 1920s, especially under the actions of French Aristide Briand and German Gustav Stresemann, both promoting a Franco-German rapprochement.

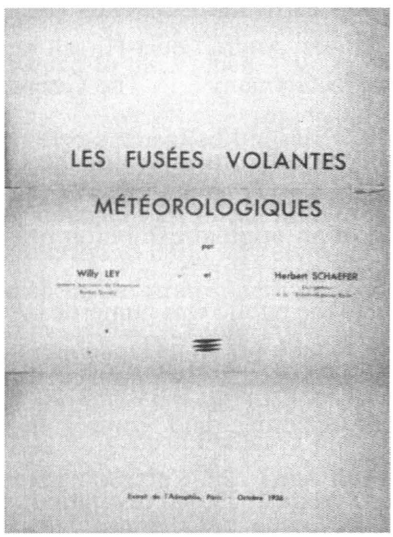

LES FUSÉES VOLANTES
MÉTÉOROLOGIQUES
par
Willy LEY
et
Herbert SCHAEFER

Figure 14–6: "Flying Weather Rockets," W. Ley and H. Schaefer, *L'Aérophile,* October 1936. © BnF.

The action of the Astronautics Committee indisputably led to a dynamic, sparking "in the technical and scientific journals, a host of articles of all kinds" as emphasized by *Le Populaire* on 15 June 1928 [45]. *Le Matin* recognized the "merit" of the German scientist Oberth without, however, dwelling on the man, as if there was some embarrassment in congratulating a "German" [46]. Similarly, without complimenting the man, *Le Populaire* of 3 December 1929 reported

with some details the studies of Hermann Oberth who "prepares a rocket ... It will rise to 50 km of altitude. We know that the professor is trying to project rockets thousands of kilometers away ... . He hopes to send, to America, a rocket containing thirty kilos of correspondence" [47].

German authors even published in French magazines, like Willy Ley in *Nature* [48] or in *L'Aérophile*. In the latter, in October 1936, Willy Ley wrote an article with Herbert Schaefer on "Flying weather rockets," in which the authors showed how rockets could be useful in bringing scientific devices to high altitudes.

IV. The Astronautics Committee Listened to the VfR and German Astronautical Events

In addition to its interest in foreign publications, the Astronautics Committee was also conducting real investigations into what astronautic societies in general were doing. The VfR was particularly watched because of its advance in astronautical studies. In his reports, André Louis-Hirsch repeatedly noticed "... the effort currently being made in Germany ... . The German Astronautical Society ... has more than 700 members" [49].

Louis-Hirsch regularly updated members of the Committee on the evolution of studies and the various events taking place in Germany. For example, he gave a detailed description of an original exhibition organized on 26 May 1930 by the VfR in Berlin's biggest store [50]:

"... in the basement ... where the public was numerous. Indeed, we admired:

1. Oberth's rocket ready to take-off, in its launching pylon.
2. The rocket and its open parachute.
3. Nozzle measurement diagrams and control instruments to study the performance of rockets.
4. A rocket wheel able to rotate at 39,000 revolutions per minute.
5. Armatures, nozzles and photographs regarding practical work in Astronautics.
6. The latest diagrams on combustions, explosives, speed of evacuation of ejected gases and all the other works necessary for the study of this problem.
7. The constants of the nozzles.
8. The musical T.S.F. transmitter allowing at any time to detect the position of the rocket.
9. All the works published on Astronautics."

Reading this description, one might be surprised by the highly technical side of an exhibition made in 1930 for the general public, as well as the admiration of Louis-Hirsch, who kept on referring to German studies during the meetings of the Committee and in the newsletters (entitled *L'Astronomie*) of the SAF. It was very likely that this kind of event motivated Alexandre Ananoff, then a member of the SAF, to organize in the summer of 1937—at the request of the director of the future Palais de la Découverte André Léveillé—the first French "Astronautic Exhibition," at the Paris Universal Exhibition "Arts and techniques of modern life." In the room, there were photographic enlargements of Oberth's spacecraft, the cosmic trajectories of Hohmann, and a number of German experiments [51].

To know more and to make himself aware of the progress of the Germans, Louis-Hirsch traveled to Germany in 1931. He went directly to meet the experimental engineers: "Mr. André Hirsch, co-founder of the *Prix REP-Hirsch*, went to Berlin expressly to have an interview with Dr. Nebel who runs the *Raketenflugplatz* ... . Mr. André Hirsch attended the experiments at the top of a fort with Dr. Nebel" [52]. However, Nebel was only testing engines or firing "miniature rockets" because, he conceded to the French, "the moment has not yet come to launch a rocket in space."

André Louis-Hirsch also acquainted himself with the work done by engineer Winkler (but without meeting him) that he reported to the Astronautics Committee. This engineer devoted part of his time to astronautical studies with, said Louis-Hirsch, "the intention to build rockets with liquid propellant and oxidizer, for scientific research in the stratosphere up to an altitude of 30,000 meters" [53]. During his trip in Germany, Louis-Hirsch did not hesitate to cover his activities [54]. He went to Tempelhof, where he observed rocket launching pylons. He also talked with various German specialists: "I spoke with the team, many of whom were willing to work in France. I brought their diagrams back to Paris and I even bought them a nozzle" [55]. Thus, thanks to Louis-Hirsch's trip, it looks like German material eventually arrived in France...

Louis-Hirsch was literally seduced by the idea of developing postal rockets, as Nebel then advocated in Germany: "... Dr. Nebel would also like to use this means of transport for the transport of mail. If the necessary financial means were available to build a reaction-powered aircraft weighing 5 tons, the transport of the letters, he said, would cost only 5 pfennigs per gram." These letters could be sent from Berlin to Moscow in eleven minutes, to London in six minutes, and to Vienna in four and a half minutes," reported Louis-Hirsch with a certain astonishment [56].

V. The End of Contacts with Germany

From February 1933, with the arrival of Hitler, the political context was gradually becoming tense. In Germany, the topic of rockets became a very serious subject. It was placed under the authority of the military, and the research became classified. As of 30 September 1933, the Raketenflugplatz was closed and, in January 1934, the VfR was dissolved by the Nazi government. Some pioneers agreed to continue their work for the new power (von Braun, Oberth, etc.), others refused and went into exile (Hohmann, Ley, etc.). For the Astronautics Committee, it became difficult to maintain contacts with German specialists...

From 1938, Europe inexorably slipped into war. Germany threatened its neighbors, crises followed one another. Concern was rising in France. Esnault-Pelterie and Louis-Hirsch then tried to warn of the potential danger posed by German military research in the field of "rockets of war" that they thought France should also develop. In vain. The journalist Pierre de Latil later recalled this singular approach that did not mean that the two men were in favor of the war:

> "Just before the war, the two friends ... tried to alert public opinion the future of the new artillery which was being prepared in Germany: they handed over their file to the Ministry of War; they held a press conference. But they preached in the desert" [57].

In such a context, it was to be expected that criticism sometimes arose against the SAF, which had awarded, a few years earlier, a prestigious prize to a German. However, he was a great scientist who, in 1929, did not put his knowledge at the service of the war, as Alexandre Ananoff would explain it in 1945, being then one of the main popularizers of astronautics:

> "... if, today, there are people criticizing the Astronomical Society of France (SAF) for having awarded the Prix REP-Hirsch to a German, this respectable society should comfort itself, because we know that in 1929, it is not the work on the war flares that it crowned, but those relating to the pure Astronautics to which, whatever one may say, Hermann Oberth [...] gave solid bases" [58].

It is true that in 1945, the recent devastations of the terrible V-2 missiles raised legitimate grievances...

Anyway, in the aftermath of World War II, Alexander Ananoff would continue to pay homage to the pioneers of astronautics of the 1920s and 1930s, including the Germans Oberth and Hohmann [59].

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[1] Among the pioneering astronautical theorists was the Russian mathematician Constantin Tsiolkovsky (1857–1935) and the American engineer and physicist Robert Goddard (1882–1945). They did not want space travel to be made with liquid propulsion stage rockets. Details provided and results of rocket experiments but with solid propulsion.

[2] Oberth, Hermann (1894–1989), born in Austria-Hungary of German culture, specialized around 1918 in the studies of mathematics, physics and chemistry, allowing him to study rockets and to publish major papers. In 1929, he served as scientific advisor to Fritz Lang for the film A Woman in the Moon. On the eve of the Second World War, he worked in Peenemünde alongside von Braun, the father of the V2.

[3] Walter Hohmann (1880–1945), German engineer and architect, started thinking of space travel issues in 1916; in particular, he investigated the issues of landing on other planets and atmospheric re-entry.

[4] The work is so technically advanced for its time that later it will be consulted by NASA when designing the first missions of interplanetary probes.

[5] Several authors are involved in this work: Hermann Oberth, Franz von Hoefft, Walter Hohmann, Karl Debus, Guido von Pirquet, W. Sander.

[6] Ley, Willy (1906–1969), German science journalist, who became American. After studying astronomy and physics, he learned about Oberth's work and helped make astronautics popular in Germany and then in the United States from 1935.

[7] Gail W. Otto (1896–1956), studied electronics and physics and then became a science journalist. Alongside the pioneers of astronautics, including Oberth, he became passionate about this new science.

[8] Sageret Jules, "*Will we be soon on the moon?*," In *Cahiers de Radio-Paris*, No. 7, July 15, 1932, p. 693.

[9] Esnault-Pelterie Robert (1881–1957), French engineer and inventor in the field of aeronautics. Pioneer as well in the theory of spaceflight, he wrote in 1930 the first related scientific book in French *L'Astronautique.*

[10] Anonymous, "*The journey from Earth to the Moon is only a question of ... millions,*" in *Le Journal,* September 24, 1930.

[11] Distrustful publications on science and rockets exist, such as the work of Victor Meric, *War Returns Fresh and Gaseous* (Ed Sirius, Paris, 1932): "Attila today is the scientist (...) "he writes (p. 23). He also emphasizes that rockets will play a negative role: "... gases, death birds, bombs, rockets, and all the chemical ingredients we are supposed to fill them with, we will have to look at ways of curbing 'to avoid their maleficence' (p. 110).

[12] Anonymous, "*Shall we go from earth to the moon one day? Scholars seek to solve the problem,*" in *Le Matin,* June 6, 1929, p. 1; J.V., "*The trip to the moon, in ten years*?," in *L'Intransigeant,* May 1, 1930, p. 7; Bourdet Maurice, "*What will one day be the interplanetary rockets useful for,*" in *Le Petit Parisien,* June 11, 1931, p. 2.

[13] Many French media reports the experiments of rocket-cars: *L'Aérophile* June 1, 1928, *Le Populaire* June 15, 1928 (p. 4), *Le Génie Civil* October 6, 1928 (p. 323), etc.

[14] Winkler Johannes (1897–1947), a technician trained as a driver, worked with the aviation firm Junkers in Dessau. From 1931, he built and experimented the first German rockets.

[15] Nebel Rudolf (1894–1978), after studying engineering, becomes passionate about astronautics, joins Oberth and helps to organize the VfR.

[16] Valier Max (1895–1930), Austrian pioneer of rocket studies. In 1923, after reading Oberth's book, he wrote a popular book *Der Vorstoß in den Weltenraum* (1924). In 1928–29, he worked with von Opel on projects of cars or planes equipped with rocket engines. Valier killed himself during a test.

[17] Ley Willy, *Towards the Conquest of the Worlds*, Amiot-Dumont, Paris, 1955, p. 95.

[18] F.R., "*Astronautics—Interplanetary Circulation,*" in *Le Figaro*, June 11, 1931, p. 4.

[19] Ananoff Alexander, *L'Astronautique*, Arthème Fayard, Paris, p. 234. See also Mouriaux Pierre-François and Varnoteaux Philippe, "*Alexandre Ananoff (1910–1992): 30 years to promote astronautics before Sputnik,*" in 63rd IAC, Naples, October 2012.

[20] Ley Willy, *Towards the Conquest of the Worlds*, op. cit., p. 109.

[21] Montangerand M.L., "*What can be said now about Astronautics or interplanetary navigation,*" in *Mémoires de l'Académie des Sciences, inscirptions et belles lettres de Toulouse*, volume VI, p. 250.

[22] De Varigny Henry, "*The Esnault-Pelterie Astronautical Prize for interplanetary travel,*" in *Je Sais Tout*, popular science magazine, May 1928, pp. 120–122. The magazine publishes page 121 the drawing of the "first self-projectile made by the American scientist" but without further comments.

[23] Between 1928 and 1930, publications proliferated in France in *l'Aérophile, L'Air, Je Sais Tout, Pèlerin, La Revue scientifique*, etc.

[24] In "*Let's Go to the Moon!,*" from the May 1928 issue of *Femmes Seules*, Irène Cosma writes: "The inventors have not given up all hope of organizing these little trips [to the Moon] and to win, according to the recommendations of the English novelist [Wells], the action of gravity... . We already know that in three hours twenty-seven minutes, with a speed of 222,000 kilometers, we can go to the moon, have lunch there and come back to Paris in the evening. Lunch, is that sure?"

[25] In *Towards the Conquest of the Worlds* (Amiot-Dumont, Paris, 1955), Willy Ley evokes for example the criticisms made about Oberth's publication of 1923: "it was the specialists who seemed to sulk the work of Oberth" (p. 87).

[26] Archanboult R., "*A Congress of Astronomers will meet tomorrow in Budapest.*" Subtitle: "*It is unlikely that it is interested in traveling in the moon,*" in *Paris Soir*, August 8, 1930, p. 1 and 2.

[27] See Philippe Varnoteaux, "*André Louis-Hirsch (1899–1962)—A Sponsor for Early Astronautics in France,*" IAC Bremen, 2018.

[28] On November 15, 1912, Robert Esnault-Pelterie presented a paper to the French Society of Physics (SFP) entitled "Consideration on the results of an indefinite engine reduction."

[29] Had he really read them? The current state of our research does not allow us to be totally affirmative on this subject.

[30] Words used by André Louis-Hirsch during his speech at the inaugural meeting of the 1st International Congress of Astronautics, Paris, 1950. Logie P., "*Interplanetary Journeys. Will we go to the Moon one day?*" *La Croix*, July 18, 1928.

[31] Henri Chrétien (optics engineer and professor at the *Collège de France*), Ernest Esclangon (mathematician and astronomer director of the Observatory of Strasbourg and later the Observatory of Paris), Charles Fabry (physicist and member of the Academy of Sciences), General Gustave Ferrié (Polytechnicien, engineer in the transmissions, member of the Academy of Sciences, president of the SAF in 1926–27), Jean-Baptiste Perrin (physicist and chemist, Nobel prize of physics in 1926), Emile Fichot (Polytechnicien, hydrographer, member of the Academy of Sciences, president of the SAF from 1927 to 1929) and elder Rosny (writer, president of the Goncourt Academy from 1926).

[32] Proposed by the writer Rosny Sr., the invention of the word "Astronautics" is officially published in the newsletter *L'Astronomie*, February 1928.

[33] Anonymous, "*Intersideral Navigation or Astronautics,*" in *L'Air*, March 1, 1928, p. 23; De Varigny Henry, "*The Esnault-Pelterie Astronautical Award for Interplanetary Journeys,*" in *Je Sais Tout*, No. 269, May 1928, pp. 120–122; Anonymous, "*Will the rocket be the propulsion system of the future?,*" In *Le Populaire*, June 15, 1928, p. 4; etc.

[34] Logie P., "*Interplanetary Journeys. Will we go to the Moon one day?*" *La Croix*, July 18, 1928.

[35] Astronomers (Jules Baillaud, Henri Deslandres, Ernest Esclangon, Armand Lambert), Polytechniciens (Emile Belot, Eugène Fichot, Ferrié General (Chairman of the Committee), Rodolphe Soreau), physicists and/or chemists (Charles Fabry, Charles Maurain, Jean Perrin, Georges Urbain), engineers (Joseph Bethenod, Prosper Charbonnier, Henri Chrétien), an industrialist (Léon Gaumont), a writer (Rosny elder), two pioneers of astronautics (André Bing, Robert Esnault-Pelterie (President Honorary Committee), and a banker (André Louis-Hirsch, Secretary-Treasurer of the Committee).

[36] "*International Astronautics Prize,*" in *L'Astronomie* vol. 42, March 1928, Archives of the Astronomical Society of France; see also Varnoteaux Philippe, "*André Louis-Hirsch (1899–1962)—A Sponsor for Early Astronautics in France,*" IAC Bremen, 2018.

[37] Regarding this topic, *L'Air* No. 200 of March 1, 1928, page 23, is explicit: "MM. Robert Esnault-Pelterie and André Hirsch have just created ... an annual prize of 5,000 francs to reward, each year, in June, the best technical work likely to make an important contribution to the development of Astronautics. The field of studies proposed is vast and involves almost all branches of science: Physics ..., Chemistry ..., Mechanics ..., Metallurgy ..., Physiology...".

[38] Louis-Hirsch André, "*Main Works on Astronautics*," in the newsletter *L'Astronomie*, November 1928.

[39] Von Hoefft Franz Oskar Leo (1882–1954), Austrian chemist and pioneer of astronautical science, founded in 1926 with Guido von Pirquet the first European astronautical society: the *Wissenschaftliche Gesellschaft für Hohen-Forschung* ("Scientific Society for High Altitude Research"). In 1928, he imagined a rocket launched from a stratospheric balloon, but also powerful machines capable of carrying passengers around the world, to the Moon and other planets. In 1930, his company was dissolved and, in 1938, his country was annexed by Nazi Germany.

[40] Newsletter *L'Astronomie*, September 1931, p. 312.

[41] J.V., "*The trip to the moon in ten years?*," In *L'Intransigeant*, May 1, 1930, p. 7.

[42] Berget Alphonse, "*The problem of Astronautics*," in *Ric et Rac*, June 27, 1931, p. 2.

[43] Post-scriptum written in the book *Wege zur Raumschiffahrt* of Oberth (Munich, Oldenburg), reported by André Louis-HIRSCH in "Astronautical Research Abroad," Newsletter *L'Astronomie*, September 1930, p. 322.

[44] "*Der REP-Hirsch-Preis Professor Hermann Oberth zuerkannt*," in *Die Rakete*, vol. 3, June 15, 1929, p. 75.

[45] Anonymous, "*Will the rocket be the propulsion system of the future?*," In *Le Populaire*, p. 4.

[46] Anonymous, "*Will we ever go from earth to moon*," in *Le Matin*, June 6, 1929, p. 1.

[47] Anonymous, "*The Experiments of Professor Oberth*," in *Le Populaire*, December 3, 1929, p. 1.

[48] Nature No. 3043, February 15, 1939.

[49] Louis-Hirsch André, "Astronautical Research Abroad," Newsletter *L'Astronomie*, September 1930, p. 324.

[50] The name of the store is not mentioned.

[51] Mouriaux Pierre-François and Varnoteaux Philippe, *Alexandre Ananoff, the unknown astronaut*, Ed2A, 2013, pp. 44–45.

[52] Louis-Hirsch André, "*Recent Progress in Astronautics*," in *L'Astronomie*, October 1931, p. 353.

[53] Same, p. 352.

[54] "Mr. André Hirsch had the opportunity to visit in Reinickendorf, near Berlin, an airfield for rockets or Raketenflugplatz, where Dr. Nebel conducts interesting experiments ..." etc. ..., in *Le Petit Paris*, June 11, 1931, p. 2.

[55] Louis-Hirsch André, "*How will astronautics evolve*," in *L'Astronef* no. 1, October 1950, p. 22.

[56] Louis-Hirsch André, "*Recent Progress in Astronautics*," in *L'Astronomie*, October 1931, p. 353.

[57] De Latil Pierre, "*With amazement, Esnault-Pelterie, pioneer of astronautics*," *Le Figaro*, November 1957, p. 6. The intervention of Esnault-Pelterie and Louis-Hirsch has obviously called certain journalists like Guilhermy: "*the rockets of war formidable machine of bombing*," in *Le Figaro*, May 10, 1938, p. 6.

[58] Ananoff Alexander, "*The German Professor Oberth*," in *Les Ailes*, February 17, 1945, p. 5.

[59] Ananoff Alexandre, "*Advocacy for Astronautics*," in *L'Aérophile*, September 1945, p. 17.