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Chapter 6

The Two Coissac Novels: *L'Envol* and *Sur La Lune*[*]

Jacques Villain[†]

Abstract

Victor Coissac was one of the visionary Frenchmen of the conquest of space at the beginning of the 20th century. In 1916, he wrote and published *La Conquête de l'Espace*[‡] and, in 1925, an augmented version of it. All the ideas he promoted in these books were retained in his two novels: *L'Envol* and *Sur la Lune*, respectively published in April 1934 and February 1935. In fact, it seems these novels were written by Charles Rouch, Coissac's friend, and corrected by Coissac himself. These two novels were published under the pseudonyms Illidé and Lesly. Only a few copies of each novel were sold. It's the reason why they are not well known. Another space novel was announced by the authors in February 1935. The title was *Le Village Spatial,* but it is not sure it was ever written.

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[*] Presented at the Thirty-Sixth History Symposium of the International Academy of Astronautics, 10–19 October 2002, Houston, Texas, U.S.A.

[†] SNECMA, Paris, France.

[‡] This book is actually two different books bound in a single volume under the title *L'évolution des mondes suivi de la Conquête de l'Espace*, as noted in the bibliography. *Conquête* comprised the latter portion of the book.

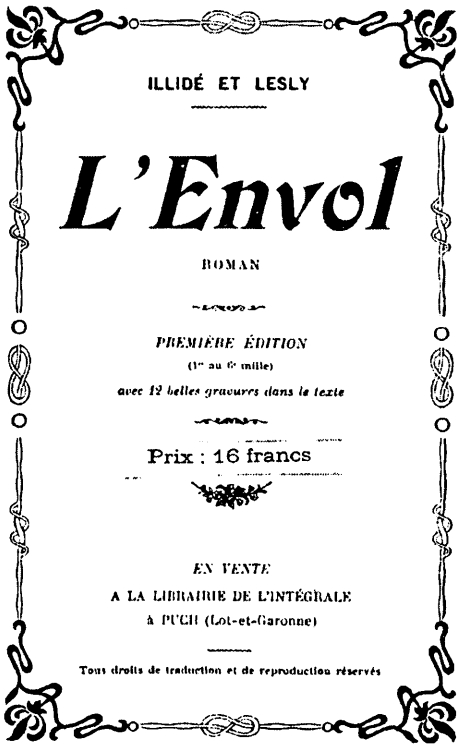

Figure 1: Cover of the novel *L'Envol* (Take Off) published in 1934. Reserved copyright. Jacques Villain collection.

L'Envol

Six friends living in the city of Montpellier in the south of France, after reading of Coissac's book, *La Conquête de l'Espace*, imagine going to the Moon. They first meet Coissac, who indicates that is possible. These friends are:

- Frédéric Beller, also called Fred, 29, aviator and chemical engineer
- Aorica Mouresco called also Mourette, 25, young Romanian student
- Plumon, 30, law student
- Lieutenant Sarret
- Riplon, 32, retired
- Charamel, philosophy teacher.

Back in Montpellier, they create *Le Club de l'Envol*. A few days later, there are more than 150 members. The decision is made to ask for money from several nations, but only the Soviet Union answers positively by sending a well-known scientist (Is it a reference to Coissac, and did Coissac know Tsiolkovski?) and $100,000. Later, the U.S. Congress gives $200,000; the French government,

2 million francs; and the British, £20,000. It is decided to build a huge rocket, a launch base at the top of the Pichincha volcano in Peru. Many persons are engaged: 7 carpenters, 30 powder men, 15 blacksmiths, 6 mechanics, 30 masons, 30 laborers, 10 miners, 8 electricians, 2 printers, 5 writers, 1 glazier, 6 drivers, 1 tailor, 1 shoemaker, 1 baker, 1 butcher, 6 engineers, 2 astronomers, 2 doctors and 4 teachers.

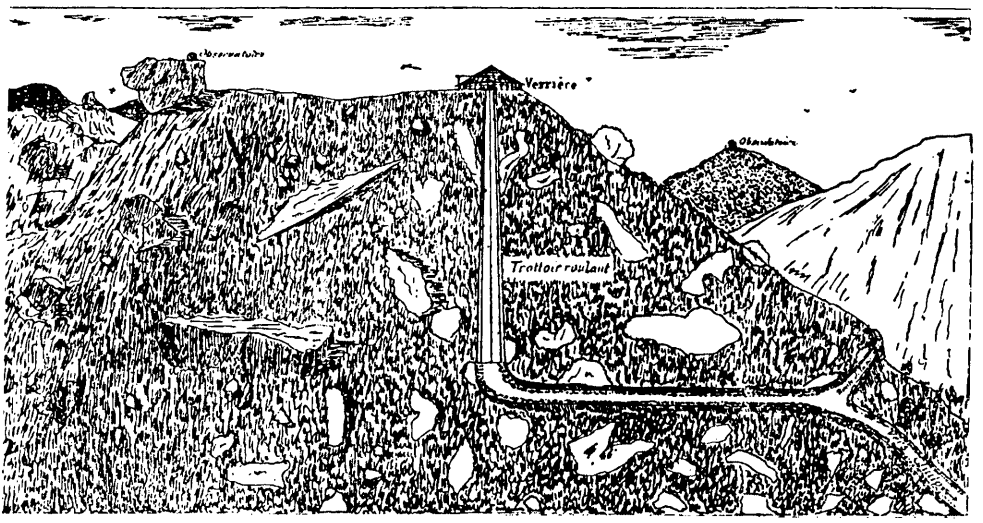

Fig. 6. — Le Pichincha, la verrière, les deux observatoires, la route et le trottoir roulant.

Figure 2: The volcano Pichincha in Peru. The Moon launcher is in a silo at the top of the volcano under a glass roof. Reserved copyright. Jacques Villain collection.

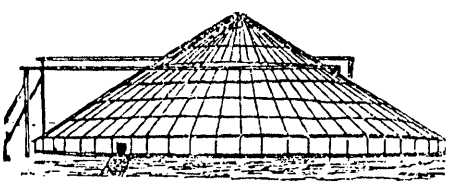

Fig. 3. — La verrière.

Figures 3/4: The glass roof. Right, as seen from above. Reserved copyright. Jacques Villain collection.

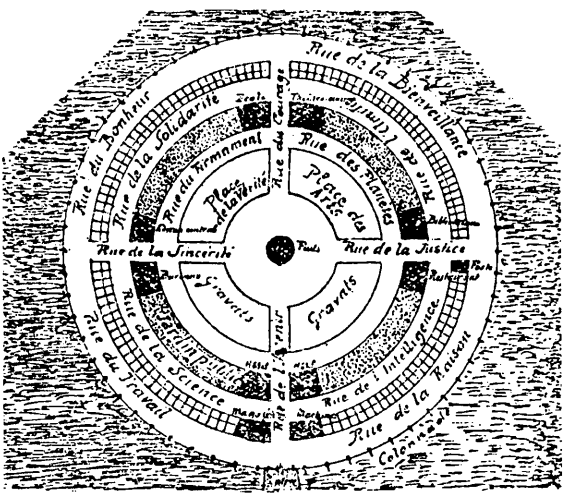

Fig. 4. — La Verrière (plan).

Characteristics of the Rocket

- Length: 25 m
- Shape: square base pyramid: 9 m x 9 m
- Propellant: powder
- Powder weight: 4,472 tons for a combustion pressure of 1 kgf/cm^2 or 3,300 tons for 2 kgf/cm^2
- Powder arrangement: several thousand 5 kg cartridges distributed in several layers
- Structure: iron frame covered by iron riveted sheets (0.5 mm thickness)
- Thermal protection between powder and structure: cardboard
- Roll, yaw, and pitch control: small rockets situated on the four faces of the rocket

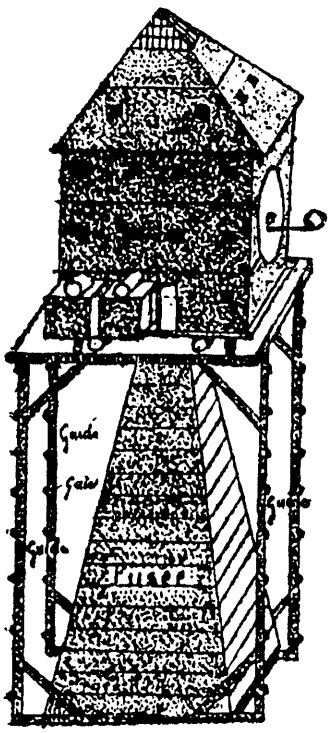

Fig. 12. — La fusée et le pavillon volant, supposés montés hors du puits).

Figure 5: The top of the rocket surmounted by the spacecraft *Pavillon Volant* equipped with two small lunar modules on the side. Reserved copyright.
Jacques Villain collection.

Characteristics of the Spacecraft Called *Le Wagon* or *Pavillon Volant*

Le Wagon is installed at the top of the rocket. The shape is that of the hut of bathers on the beaches, that is to say a cubic form with a pyramidal shape roof.

- sizes: 8m x 8 m x 7 m (height).
- 3 floors
  —1st floor: common room with a garden
  —2nd floor: dining room, cellar, and pharmacy
  —3rd floor: four bedrooms, oxygen, hydrogen, and water tanks.
- Above there is a granary that includes the astronomer's bedroom, another bedroom, a room for the oxydric gas motor and another for the 55 batteries, giving a 110 or 220 V electric voltage.
- Above that floor, there is access by a ladder to the astronomic observatory. The pyramid at the top of the roof is made of glass.
- Communications between the spacecraft and Earth: only in Morse code by using electric lights installed on the external structure.
- 25 tons of powder cartridges are also onboard. They are used for trajectory corrections. The cartridges are put in holes made in the four faces of the spacecraft.
- The thermal isolation of the spacecraft is provided by panels made with wood, cardboard, and air sandwiches.
- Heating is done by an oxydric gas stove, which also produces steam water by condensation. (It is a primary version of the fuel cell used later in the Gemini and Apollo programs).
- Each bedroom contains:
  —a bed with inflatable mattress
  —a shelf
  —a wash basin
  —a folding chair
  —a stool
  —a coat rack
  —and, at the ceiling, an electric light.
- On one of the external faces of the spacecraft, there are also two lunar modules named *les wagonnets.* The weight of each is one ton. The separation with the main spacecraft occurs at the altitude of 100 km above the Moon, and they reach the Moon at a speed of 568 m/s but with dampers the speed is reduced to one or two m/s.

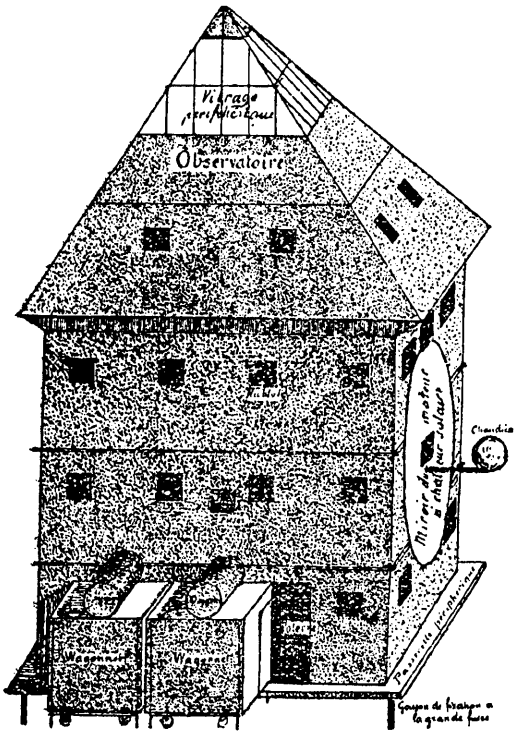

Fig. 8. Le chalet volant (perspective géométrique).

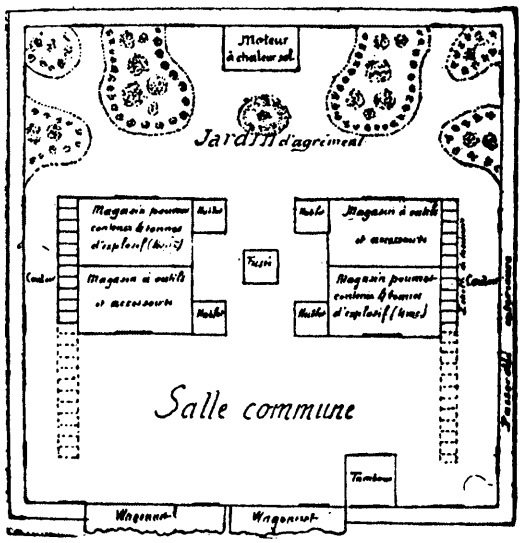

Fig. 9. — Plan du pavillon volant (1er étage).

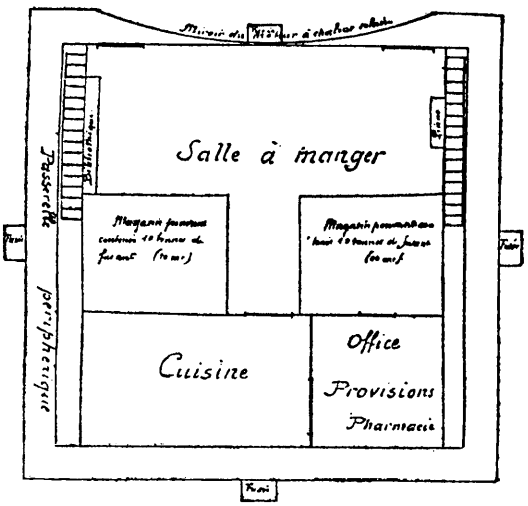

Fig. 10. — Plan du pavillon volant (2e étage).

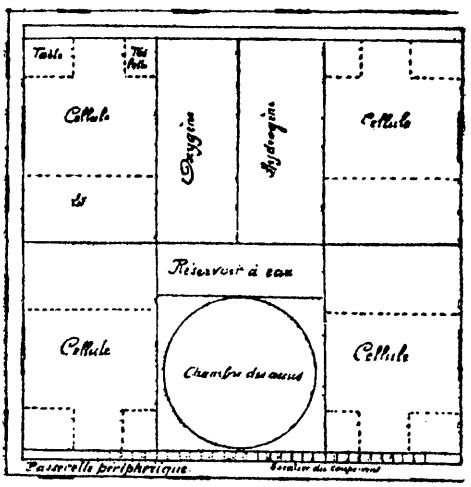

Fig. 11. — Plan du pavillon volant (3e étage).

Figure 6: The spacecraft with its three floors: on the first floor are the common room and the garden; on the second floor the kitchen and dining room; on the third floor the bedrooms, water, hydrogen and oxygen tanks. Reserved copyright. Jacques Villain collection.

The Launch Base

It is built at the top of the Pichincha volcano in Peru. This site was chosen because it is close to the equator, close to a great city (Quito), and because the top of the volcano is made of a large esplanade on which the launch pad and an aerodrome can be built. The planes can bring VIPs and hardware. The launch pad consists of a silo containing the rocket (this concept will be adopted 25 years later for the ballistic missiles) and a large glass roof. The silo has a 15 m diameter and a 50 m depth. The objective of the conical glass roof is to protect the silo and the rocket from rain and extreme temperatures. Inside, there are also lodgings for the workers. Its diameter is 110 m and the lodgings are separated by streets, whose names come from Coissac's philosophy of life: joint responsibility, justice, sincerity, reason, labor, and intelligence. On the surrounding mountains, two observatories are built. They will be used as meteorological and astronomical stations. The construction of the glass roof is the responsibility of a U.S. company, Investment Industry Co. An access way to the launch pad is also built and, for the last hundred meters, the way is replaced by a sidewalk. A powder plant is also built near the launch pad for economical reasons. (It will be also the case in Kourou 60 years later for Ariane 5).

Tests before the First Launch

Before sending men to the Moon, it is necessary to test the launch vehicle. The main problem is to determine the quantity of powder to put in the rocket to reach the desired speed. A rocket with a 600-kg spacecraft is designed. The trajectory can be observed easily because the rocket is equipped with electric lights, which can provide light for 180 hours. With such a device, Coissac considers it will be possible to see the rocket in the vicinity of the Moon with a telescope.* A first rocket is launched but the speed is too high. A second one is not fast enough, and the third is good. Two others, identical to the third, confirm the configuration. Lunar travel is judged possible. Construction of the rocket takes 26 days.

* This presages a suggestion by Robert Goddard in his seminal monograph, "A Method of Reaching Extreme Altitudes" (Smithsonian Institution, 1919) in which he speculates on launching to the Moon a rocket contain a small quantity of flash powder that would ignite when the rocket impacted the surface of the Moon. The explosion would be visible from a terrestrial telescope of sufficient power, confirming that the rocket had reached an "extreme altitude."

The Launch

It occurs on 18 November at 7:00 a.m. Eight hundred people are moved from the glass roof to one of the two observatories. A siren is activated. The glass roof is opened by rotation. Take off!

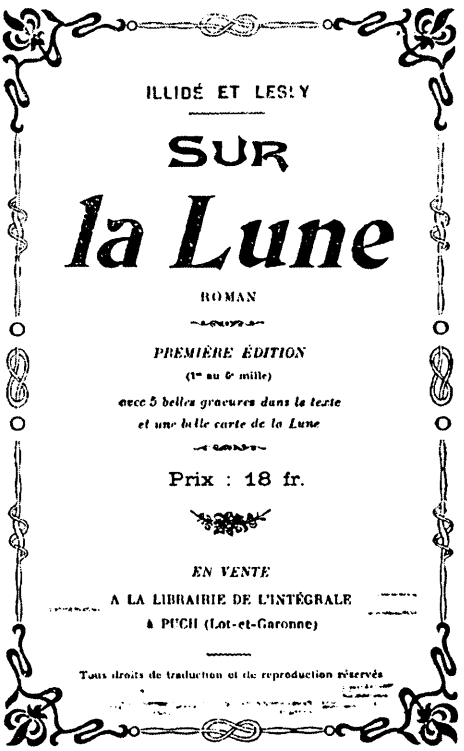

Figure 7: Cover of the novel *Sur la Lune* (On the Moon) published in 1935. Reserved copyright. Jacques Villain collection.

Sur La Lune

This novel is the continuation of *L'Envol* and relates the journey of the five travelers to the Moon. Inside the rocket, they are placed in the wagon in rectangular boxes like coffins. They have the shape of the human body and are able to reduce considerably the effects of acceleration, which can reach 4.5 g. Some minutes after take off, they leave their boxes and float in the wagon on account of the absence of gravity. The separation of the wagon from the rocket is done by a large screw. A solid-propellant cartridge then provides a propulsion pulse to the wagon to avoid a collision with the rocket. When the distance between the two

vehicles is acceptable, another pulse is given from the opposite side. The wagon recovers its initial trajectory, that of the rocket, but at enough distance from it.

Sometimes, the American astronomer controls the wagon speed by measuring the apparent diameter of Earth. At the first control point, he calculates it is necessary to reduce the speed of 144 m/s. Two hundred and sixty-six powder cartridges, weighing 5 kg each, are ignited. This operation is repeated four times.

The travelers drink and eat at a table with chairs, like on Earth. For entertainment, there is a piano. They observe that objects stay floating in the cabin, and liquids have a tendency to take the shape of a sphere.

During the Earth-Moon phase, they test a *wagonnet* (lunar module). It is separated from the wagon by igniting a cartridge. During that test, one of the travelers equipped with a space suit is in distress in space. Happily, another traveler catches him with a cord.

The Descent to Lunar Surface

Sarret and Fred take their places inside a *wagonnet* and in their respective boxes. It takes five minutes to descend from an altitude of 100 km to the surface of the Moon. They bring guns for their safety. Coissac always thought the main danger on the heavenly bodies could come from ferocious animals! On the lunar surface, they open the door of the *wagonnet* and leave with their space suits and bicycles. The temperature is –13°C in the shade. The atmospheric pressure is 27 mm of mercury. To communicate with the wagon, which is in lunar orbit, they display on the ground a message with letters that are read by the wagon:

Descent without accident
All is going well

They then go for a tour of a volcano. On their bicycles they are connected by a telephonic cable. They reach the speed of 80 km/h! They descend into the crater with a cord and take a sample of lunar air in a glass demijohn. After a tour of several hours, they return to the *wagonnet*. It is a narrow escape since they have no more air. They send another message:

Coming back. Adventures. Going to sleep
New exploration tomorrow

The second day, they find onyx and penetrate an abyss. There is air, so they remove their suits. At the end of the day, they leave the Moon with the *wagonnet* and reach the wagon in three minutes! (In fact, the reader can observe that the trajectory imagined by Coissac is a direct flight from Earth to the Moon and a rendezvous between the main spacecraft and the lunar module in lunar or-

bit at about 100 km altitude. This last phase of the trajectory is similar to the Apollo one promoted by John Houbolt. The difference is Coissac obtained it by intuition and Houbolt by calculation).

A new exploration with two *wagonnets* is then organized. They find another abyss containing pure oxygen. At the bottom, there is a meadow with a luxuriance of vegetation. Strange animals are present: birds with only one leg, one eye, and big chenille* (Coissac read H. G. Wells and cited Wells in his foreword). There is also water and ice. They visit the Langrenus Crater, the Sea of Crises, and the Sea of Fecundity.

At last they explore the hidden face. They meet cats, birds (but with more legs than those living on Earth), and a rooster without feathers. These animals live in full happiness, and they have no fear. The travelers discover a glass mountain, and they meet adorable quadrupeds with human heads living like termites underground, but also in peace and love. They live together several days, then cross an ocean with their bicycles transformed in pedalos. At the end of their trip on the Moon, they have traveled 2,100 km with their bicycles.

It is now time to finish the first trip of men to the Moon. A message is sent to the astronomer Sawaroff in his observatory at the top of the Pichincha volcano: We come back. The information is known worldwide. There is delirium.

Back to Earth

To leave lunar orbit, they ignite several cartridges at the rear of the wagon. The speed is increased from 1,602 m/s to 2,259 m/s. Four days later, the wagon is 6,000 km from Earth. Its speed is reduced from 7,860 m/s to 5,603 m/s. It needs to burn eight tons of powder, that is to say 1,600 5-kg cartridges. But the impulse is too high, and the orbit becomes elliptical instead of circular. A correction is provided by the solar motor. The stay in Earth orbit is eight days. During reentry, the speed of the spacecraft is reduced by aerobraking, but it arrives inside a typhoon, and no information comes from it. The whole world thinks the travelers died, and there is dismay. The Soviet boat *Comrad Tolstoï* discovers the spacecraft floating in the Pacific Ocean. They are alive! It is taken in tow to the equatorial harbor of Esmeralda. There a triumph awaits them.

* caterpillars.

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