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Fernand Baldet (1885 – 1964)

A freedom-loving astronomer

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Why become an astronomer? There are certainly as many answers to this question as there are astronomers in the world. But the answer given by Fernand Baldet, in the description of his life, deserves to be read and considered.

Fernand Baldet's family was from Millau where his grandparents were shoemakers. After the Franco-Prussian war and defeat of 1870, the Germans introduced to France machines to make shoes and the traditional *savoir-faire* became useless and was lost. With no way to earn a living, the Baldet grandparents asked a notary for advice. He pushed them to sell their land, their shop and all their goods and to settle in Paris where, he said, the houses were made of gold. Never having travelled and knowing nothing about what happened elsewhere, the grandparents sold everything and arrived at the Gare de Lyon, where they realized that they had been tricked and that it was very difficult to find work in the capital.

They settled in the Gobelins neighbourhood. Fernand's parents lived on rue Pascal, near Saint Médard Church where he was baptized. His father was hired at a tannery, where the work was very hard because the tannery workers spent their time in water up to their waists. The grandfather became a labourer, also a difficult job and with no compensation in case of unemployment. In 1892, Fernand's younger brother died at the age of 5 of croup, caused by diphtheria, and he became an only child.

He passed his elementary school certificate at the age of 12, then spent one more year at school. At 13, he became a jeweller's apprentice. Very good at drawing, he created models for artistic gold jewellery. Life for the Baldet family was very difficult at this time. He remembered a very harsh winter when he would go to the Halles (a large wholesale market) with his father at four a.m. to pick up the tops of vegetables so that they could eat. At the age of 15 or 16, Baldet attended drawing classes for his work. He studied nudes and went to the Jardin des Plantes to draw the big cats at the zoo. He thus acquired great precision in his drawings.

The birth of a passion (1900 – 1911)

With his curiosity and his sense of observation, Baldet was thirsty for knowledge and spent a lot of time looking at the books for sale along the quais of the Seine. One day in 1900, he found a book by Camille Flammarion about astronomy, in particular about amateur astronomy. He was filled with enthusiasm and it was the starting point of a passion which never died. He used to go to the rue Serpente, to the headquarters of the Société Astronomique de France, and met its most regular members: Camille Flammarion, its founder; Ferdinand Quéniisset, his assistant astronomer; Emile Touchet, an employee of the Crédit Lyonnais; Gaëtan Blum; Albert Senouque, who was to participate in Charcot's expedition to the Antarctic in 1908-09; Henri Chrétien, who became a professor at the Ecole Supérieure d'Optique; Pierre Fournier, schoolteacher. The young amateur astronomers formed a very tight-knit group, that of "astrognomes" or "gnomes", supervised by Flammarion. Fernand Baldet also met two older astronomers, the wealthy Greek Eugene Antoniadi, and Count Aymar de la Baume Pluvinel.

He was also inspired to continue his education and registered at the free evening classes at Arts et Métiers in physics and mathematics which he attended regularly, even while spending many nights at Juvisy Observatory with Ferdinand Quéniisset, all the while continuing his apprenticeship in jewellery. He even obtained the prize of "Best Worker in France" in jewellery at the age of 20, which meant that he did not have to do his military service.

Count de la Baume noticed Baldet and found that his exceptional intellectual gifts and his passion for astronomy deserved to be encouraged. The count was a wealthy independent astronomer with his own well-equipped laboratory in Paris, rue Laugier. Towards 1904, he offered to take Baldet on as a laboratory assistant along with Senouque, who had already been working for him since at least 1901. So at the age of

20, Fernand Baldet left jewellery, to the great displeasure of his parents who thought it was foolish to leave a promising profession to dream about the moon. Count de la Baume was mainly interested in photography, the sun and comets. With Albert Senouque, Baldet was responsible for preparing missions to observe eclipses. He took part in several expeditions: Alcala de Chisvert in Spain to observe the solar eclipse of 1905 and Medea, Algeria in 1911 to observe with the zenith telescope. For young Baldet, who had never left Paris, these adventures were exciting, but also filled with pitfalls and difficulties that we have a hard time imagining today.

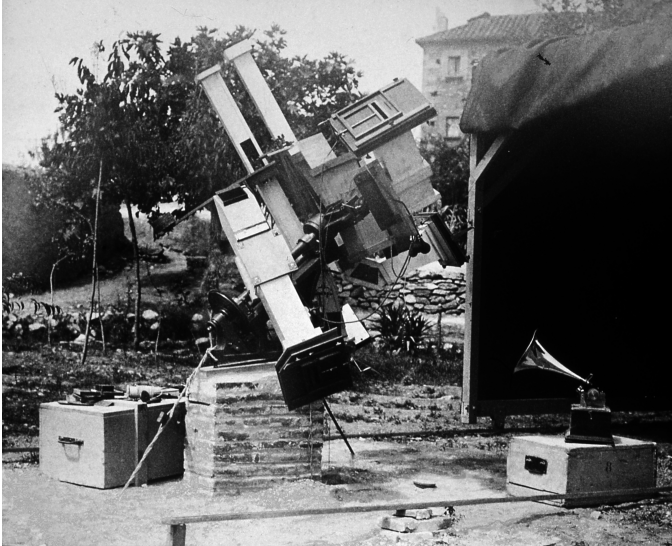


Figure 2: The instruments to observe the eclipse of 1905 and the phonograph to be used as a talking clock



Figure 1: Fernand Baldet at the 50cm telescope of Pic du Midi Observatory

During this time, Fernand Baldet continued his studies, which were entirely paid for by Count de la Baume. When he failed his baccalaureat the first time because of his marks in history, the count sent him to a prep school to study for the September session. His baccalaureat was followed by a *licence* (undergraduate degree) in physics and chemistry.

In 1908 the appearance of the Morehouse comet, which he observed in Juvisy with Count de la Baume and Ferdinand Quéniisset, inspired Baldet to become interested in astrophysics. These were just the beginnings of this science, but he well understood how promising it was and he came back to it as soon as he could and stayed there.

Count de la Baume was a friend of Benjamin Baillaud's, who invited him to use the new 50 cm telescope that he had installed at the summit of the Pic du Midi. Baldet spent September and October of 1909 and 1910 at the observatory there, where he observed Mars in 1909 and Saturn the following year.

In 1911, Fernand Baldet married Marguerite Chrétien, Henri Chrétien's youngest sister. Hoping to spare his household all the hardships he himself had suffered, he looked for a stable position and asked to be hired in "official" astronomy. He was not afraid of being fired by Count de la Baume but did not want to find himself out of work if the count died prematurely. Since he was well known by astronomers such as Benjamin Baillaud, the director of Paris Observatory, he was offered a position as assistant astronomer at Algiers Observatory in Bouzareah. The day after their marriage, in July 1911, he and his wife left for Algeria.

Algeria (1911 – 1922)

At the time, Algiers Observatory was run by François Gonnessiat, who was very demanding with his staff. Baldet worked at the meridian telescope, where he made a catalogue of fundamental stars. The problem with Algeria was that there were, on an average, 25 fine nights per month, and Baldet often had to start working again at 8 a.m. after having observed with the meridional telescope a good part of the night. The very frequent nocturnal observations were tiring, and the repetitive movement during these observations caused him ptosis of the stomach. For several years his wife worked as a calculator at the observatory, but after the

birth of their daughter, Jeanne, in 1916, she preferred to stay at home. Another calculator, Julie Malbos, hired in November 1912, became a family friend.

In those days, daily life in Algeria was difficult for those coming from metropolitan France. The food, the heat, the scirocco, the lack of water, as well as restrictions and the impossibility of returning to France because of the war were all factors.

Fernand Baldet and his family were housed in one of the observatory's buildings. It was located at an altitude of 350 metres, near the village of Bouzareah, 11 kilometres from Algiers, in an area planted with aloes and barbary figs. The observatory's park was magnificent, with pines and cyclamen, and a splendid view over the bay of Algiers, but the astronomers and their families were quite isolated. The director's wife and three young daughters had no leisure activities other than watching the employees' comings and goings.

There were few shops in Bouzareah. The Arab butcher's merchandise was not always tender. "It's because the cow ran a long way before it was caught!", he explained. Water was brought in barrels every day from a spring three kilometres away, which sometimes dried up in summer. At one point, water was rationed to five litres of water per day, per family. With any water remaining after household use, Fernand watered his tiny garden. At night, they could hear the sound of jackals howling. An old stagecoach pulled by horses connected the village with Algiers. Coming back from the city, passengers often had to get off and push the stagecoach since the road was so steep. And if anyone chose to walk, there was a single eucalyptus tree to make shade along the road.

In 1913, Baldet, an only child, brought his parents to Algeria where they settled in Bab-el-Oued, at 1 rue de Nancy. His father was worn out by hard work and Fernand found him an office job at the meteorological service of the University of Algiers, where he would remain until 1925-26.

Despite his exemption from military service, Baldet was conscripted at the beginning of World War 1 and sent to a barracks in Constantine. The captain noticed him and appointed him secretary and nurse. He tended the soldiers suffering from typhus after the defeat in Serbia. After several months and many administrative requests, arguing that he was needed for the time service, Baldet returned to the observatory.

1916 was marked with the welcome birth of his daughter, Jeanne. Since Bouzareah was too isolated, she was born at his parents' house in Bab-el-Oued. Back in Bouzareah, his wife took the baby for long baby carriage rides as soon as Fernand came home, so that he could rest after working all night.

In 1918, Marguerite and Jeanne both caught Spanish flu during the epidemic and were cared for in Bab-el-Oued. When Baldet returned to Bouzareah, where he became ill, he was tended by Julie Malbos because doctors didn't want to approach patients for fear of becoming ill themselves.

At the end of 1918, the armistice was celebrated by artillery salvos from the warships in the bay of Algiers. But only Fernand and his daughter were able to admire the spectacle because Marguerite was ill again, this time with jaundice. The Baldet family's health was visibly affected during their stay in Algeria.



Figure 3: Fernand Baldet and Julie Malbos at the meridian circle at Bouzaréah

The family spent several months in France in 1920 and Fernand took advantage of it to make contacts and try to return permanently and finally work in astrophysics. Henri Deslandres, in charge of inspecting French observatories, came to Algiers in 1921, and Baldet was able to mention his desire to work in astrophysics. Deslandres promised him a job and an apartment at Meudon Observatory where he was the director.

Meudon (1922 – 1939)

Fernand Baldet was hired at Meudon Observatory and returned definitively to Paris in 1922. But when he asked for the promised apartment, Deslandres answered, "But, my dear man, it was to please you that I said that!" When Baldet insisted, he agreed to give him a room on the second floor of the Chateau Neuf. The building had been covered in oil and burned during the Commune, and part of the third floor had been razed to make a terrace. The second floor was in fact the former living room of the brother of King Louis XIV, and the rooms were very big, with high ceilings and windows nearly from floor to ceiling.

No electricity, nor running water. The place was impossible to heat in winter and the heater, intended to also heat the large dome on the terrace, used astronomical amounts of coal. They therefore had to heat with a small iron stove and cook in a corner on an oil stove. The gardener used to bring a cistern of more-or-less drinkable water with his donkey and it had to be filtered once again before being used. Baldet asked the director to install a lightbulb on the second floor. Henri Deslandres, who was not practical at all, told him to use a mirror to reflect sunlight!

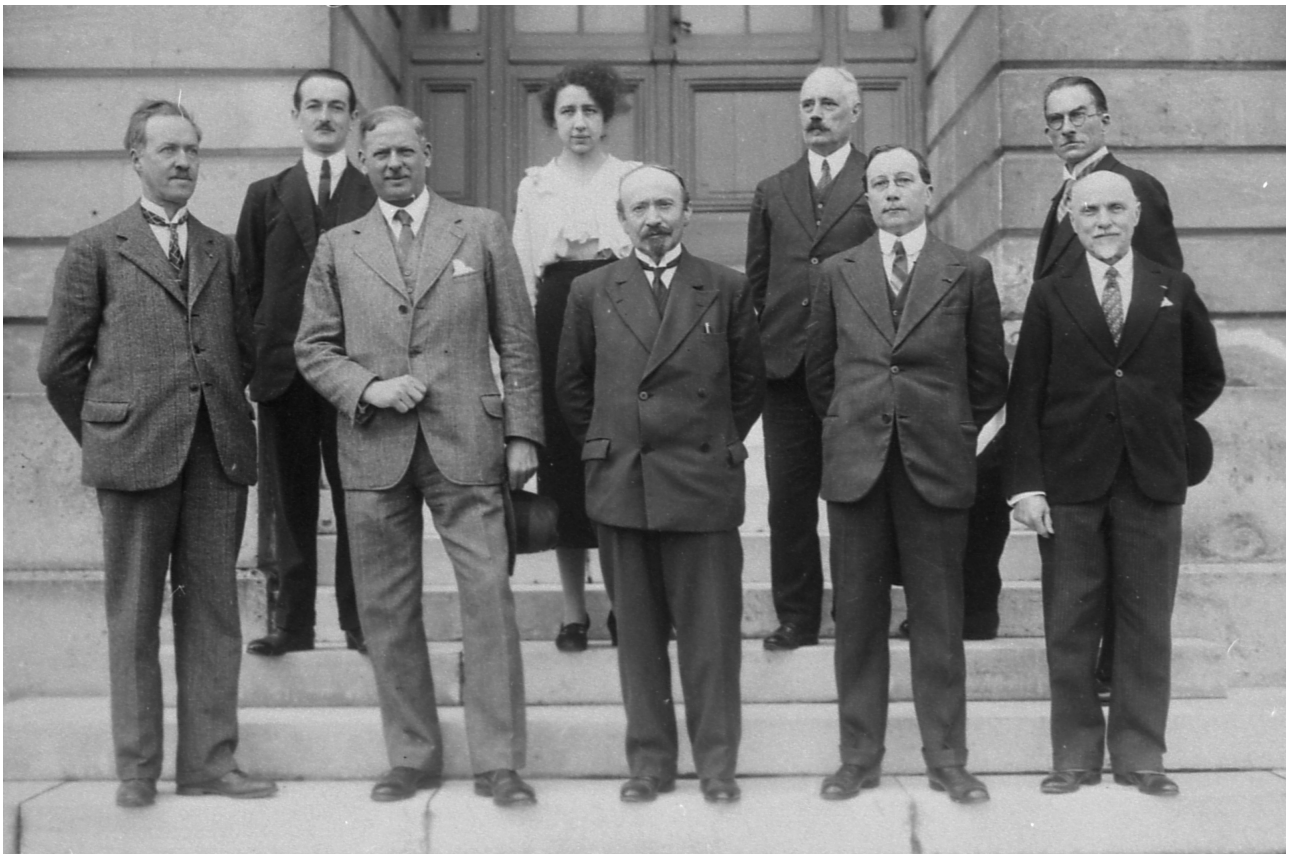


Figure 4: July 9, 1931 in front of Meudon Observatory. From left to right, first row : Fernand Baldet, a foreign astronomer, Ernest Esclançon (director of Observatoire de Paris-Meudon), Lucien d'Azambuja, A. Roger (secretarial staff). Second row : Henri Grenat, Marguerite Roumens, Charles Lamiable (secretary-librarian), Vital Burson

In 1922, the staff at Meudon Observatory was very limited. Baldet's colleagues were Lucien d'Azambuja, a specialist on the sun; Vital Burson, in poor health after being gassed during the war, who worked with Deslandres on the chromosphere of stars; Henri Grenat who wrote several theses that he never defended. Later arrived Marguerite Roumens, Bernard Lyot, Henri Camichel, Charles Bertaud, Roger Servajean, Alexandre Dauvillier.

There were few visitors, although some were memorable. Josef Mohr, a Czech astronomer who stayed at Meudon Observatory in 1923 and 1924, caused hilarity when he introduced himself: "Je suis Mohr" (which could mean "I am dead"). Another Czech, Edvard Beneš, a politician and future president of the Czechoslovak republic, made such an amusing impression with his worldly manners that he was nicknamed "the waffle iron". A Russian grandduchess, invited to observe a beautiful star through the great telescope after it was carefully set, pushed the eyepiece back completely, thus obtaining an image completely out of focus, exclaimed, "Oh, that's wonderful, I can even see the flames!".

Fernand Baldet was able to devote himself completely to astrophysics, and particularly to the physics of comet tails. He set up ingenious experiments in the laboratory to reproduce the observed spectra. By bombarding carbon oxide in a low atmosphere with electrons from an incandescent tungsten cathode, he managed to reproduce the carbon bands observed in comet tails and even discovered a new one, called "the Baldet-Johnson group". In 1926, he defended a doctoral thesis entitled "Research on the constitution of comets and carbon spectra", for which he received the jury's congratulations.

Over the course of the years, he continually developed his experimental devices, proving his talent as an engineer as much as an astrophysicist, and his 125,000 voltage generator made a great impression. Baldet was one of the rare French astrophysicists of his time, a pioneer. His competence in the field of comets was recognized internationally, and he was to be president of the comet commission of the International Astronomical Union from 1935 to 1948.

At the same time, he explored the resources of photographic plates and films, methods to sensitise, development, and became so competent that he was president of the French Photographic Society from 1946 to 1949. At the mention of the name Baldet, a maritime expert interested in the treatment of Leica films, could still, sixty years later, hear him talk enthusiastically about his Leica developers with ortho- and paraphenylenediamene.

For Baldet, astronomy was also knowledge and passion that had to be shared. He participated in the activities of the French Astronomical Society, whose secretary he was starting in 1925, then president from 1939 to 1946. He gave lectures in astronomy at the Sorbonne for young women with a baccalaureat, from 1928 to 1936. He briefly took care of the astronomy section of the Palais de la Découverte. Wishing to provide astronomy with an image of quality, he reread before their publication the popular science books of the writer Pierre Rousseau, and often complained about journalists' fantastical interpretations of astronomical news. He also encouraged vocations in youth and helped his young colleagues. Charles Bertaud was one who benefited from his advice in preparing his thesis.

Baldet used his great competence in photography in the field of arts, working on enlargements of landscapes and portraits. He tried to go beyond these techniques by doing watercolours and oil paintings. In other words, he was a humanist.

A Science of Peace

It is probable that the cordial atmosphere among the small group of colleagues in Meudon allowed Baldet to continue his philosophical quest. Since his youth, he had asked himself questions, ceaselessly looking for answers which other people were rarely able to provide.

For him, astronomy was much more than a kind of scientific technique. It was above all marvelling about the creation of the universe and essentially a science of peace. The contemplation of celestial beauty could inspire only serenity, admiration and enthusiasm. Louis Leprince-Ringuet, whom he had met shortly before the war and who confided that his research on atomic fission could lead to catastrophe if it was continued industrially, caused Baldet much worry.

This was why the declaration of war in 1939, which occurred while he was on holiday at the Bassin d'Arcachon, caused Baldet great distress, going as it did against his own path to knowledge. He was sent to Bordeaux Observatory, where he had to make meridian observations for the time service, but he remained there only a short time. He was so depressed that he had to see a famous Parisian doctor who had moved to

Séviqnacq-Meyracq, near Pau, the home of Baldet's old friend Emile Touchet. He stayed there until September 1940. Baldet was so disoriented by the war's brutal events that he could no longer work. He even considered retirement (he was 54). The war was his obsessive fear.

Back in Meudon (1940 – 1956)

Back in Meudon in autumn 1940, Baldet returned to work. Meudon and Saint Cloud were in a strategic military position, and Meudon Observatory was particularly suited as an observation post over Paris and to house troops. In fact, Henri Camichel was housed there as a soldier in September 1939 along with his sonar tracking service. But Karl Kiepenheuer, a Wehrmacht officer and astronomer in civilian life, managed to prevent the observatory from being occupied by the German army. He considered that science was above nations and their conflicts, which probably reconciled Fernand Baldet somewhat with the world. Kiepenheuer also knew that troops would damage anywhere they were billeted. Besides, he was fundamentally anti-Hitler, like his father.

To prevent the requisitioning of the observatory, Karl Kiepenheuer suggested that Lucien d'Azambuja map the sunspots every day and communicate these maps to the Luftwaffe. Because of their harmful effect on radio wave transmission, sunspots were of prime importance for the military, but d'Azambuja was careful to always delay sending his maps by 48 hours, so that they were never of any use. At the end of the war, Kiepenheuer managed to prevent French soldiers from occupying Munich Observatory.

Kiepenheuer's ruse could not work indefinitely and German troops eventually occupied part of the Observatory. Eugène Charreton, Meudon Observatory's new secretary was a difficult man who came into conflict with several astronomers, while his predecessor, Charles Lamiable, had been charming. Bernard Lyot, who often lost his pencils, annoyed him. The difficult atmosphere of this period, the fact that the secretary was not frankly hostile to the Germans, caused Baldet, known for his pacificism and fearing for his life, to leave his apartment in Meudon in 1943 to go and live in Paris, rue Claude Bernard, while keeping his observatory apartment.

In 1947, he managed to have a newly-hired technician, Gisèle de Obaldia, assigned to him. She assisted him efficiently for 18 years, because Fernand Baldet didn't stop working. He continued to be interested in comets, but also studied meteorites. He also pursued his philosophical considerations, he followed the development of aeronautics, which began to resemble an ideological competition, worrying him greatly. He feared that it would be used in a new war.

At the age of 79, as he was preparing his participation in a colloquium in Liège on meteorites, Fernand Baldet suffered a stroke and died a few months later.

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