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Margalida Comas Camps (1892–1972), a woman for all seasons

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In Spain, women did not have the right to enter research institutes and universities until 1910. At best, they could attend a Teacher Training College (*Escuela Normal*, in Spain), a kind of junior college devoted to train high school graduates to be teachers. However, it was unimaginable a woman could become, for example, a physician, a lawyer or a scientist. It would still be more than twenty years before women's suffrage arrived. With the Second Republic, in 1934, Spain was one of the last European countries to adopt it. However, very soon a bloody and cruel Civil War (in 1936–1939) would truncate projects and dreams of a whole generation of young Spanish people.

In this scenario, Margalida Comas Camps (Fig. 1) went on to become the first Spanish woman to be awarded a research-based doctorate in the natural sciences [17]. It was not without obstacles and impediments, which made it more like a steeplechase than a scientific career.

Margalida Comas was born in 1892 in Alaior, a small village on the island of Minorca, in the Balearic Islands. She was extremely influenced by her father Gabriel Comas (1864–1942), a liberal vocational teacher and educator who started a free night school for adults and who transmitted to his children that education was the key to achieving the development of society [18]. In time, she became "the most important Spanish female scientist of the first third of the twentieth century, and one of the most important educators of the first half of the twentieth century" [14]. Indeed, her mother Rita Camps, also contributed to Margalida's vocation. But let us start from the beginning.

Powerfully drawn to science, Comas obtained excellent grades in high school and she won the High School Special Award of the Science Section with a project entitled "Flowers and insects: reciprocal adaptations to cooperate in pollination". In September 1911, once she finished high school, she asked for permission to take the exam of the subjects she needed to complete and obtain the degree of elementary, middle and high school teacher. She asked to take the exams directly because doing so she would skip going to the Teacher Training College, as it was customary at that time. So, at the end of 1911 (she was only 19) Comas became a teacher, with excellent grades.

Keywords: Margalida Comas (1892–1972) · natural sciences · Second Spanish Republic · women in science

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Fig. 1. Margalida Comas in Alcaufar (Minorca), in the 1920s.

As it can be found in the detailed biography edited by María Ángeles Delgado and published in 2009 by the Government of the Balearic Islands [14], Comas cultivated her pedagogical facet and scientific experimentation in parallel in order to offer to future teachers an appropriate scientific and academic training. She also wanted teachers to have an interest in modern scientific methods. Throughout her life, Comas never distinguished science pedagogy from scientific knowledge. To her, the ideal of scientific training consisted of "placing students in the same position as the researcher, not because they should discover by themselves what had taken centuries to be discovered, but because they should look through researchers' eyes and handle their scientific instruments in order to acquire the qualities of observation and reasoning typical of scientists and to apply them to other aspects of their life" [3].

She was convinced that science education could not be separated from usual scientific practice. She argued that the main objective of science education ("to train students in the observation, reasoning, inventiveness and ingenuity, and to prepare them to train their students this way" [15]) could not just be learned in books but also in the lab. This is why, once she became a tenured teacher of physics, chemistry and natural history at the Teacher Training College in Santander (Cantabria, Spain), she continued her scientific formal education.

In 1918 Comas began her studies at the Faculty of Sciences of the University of Barcelona as an unofficial student. Her great interest in research then led her to continue her studies in laboratories in Paris and London, while she was also working as a teacher at the Bedford College for women, at King's College, and at Sir John Cass Institute.

In 1921, when she returned to Spain, she completed her degree and wrote her first scientific work, entitled "Sobre la estructura microscópica del corazón de los cefalópodos" ("On the microscopic structure of the cephalopods' heart"), that was published in the 24th *Newsletter* of the Royal Spanish Society of Natural History [4].

Some years later, she took the exams for her doctoral courses and started her doctoral thesis at the Sorbonne in Paris. In 1926, she started working in the *Laboratoire d'evolution de êtres organisés*, under the direction of Prof. Caullery. There she studied the extremely topical (at that point) concept of biological inheritance. Specifically, she studied the relationship between sex and temperature in the frog *Rana temporaria*. She also worked on the study of chromosomes in the mosquito *Chironomus*, getting to design an innovative way to get generations of *Chironomus* in captivity, which would mark her scientific career. During the period she spent in Paris, Comas published five notes on her research in scientific journals in French. First, "Sur le mode de penetration de *Paramermis contorta* dans la larve de *Chironomus thummi* Kieff" [5] and "Sur l'origine des pigments des larves de *Chironomus*" [6], which were published in the *Comptes Rendus de la Société de Biologie*. Those pigments are haemoglobine, because the larvae of *Chironomus* need to catch the low concentrations of oxygen present in the anoxic mud where they live. She also published "Notes biologiques sur *Chironomus thummi* Kieff" [7] and "Sur les métamorphoses de *Prodiamesa Notata* Meigen (Chironomidae)" [8] in the *Bulletin de la Société Zoologique de France*. Finally, her article "Sur l'intersexualité chez *Paramermis contorta* V. Linzt" was published in the *Bulletin biologique de la France et de la Belgique* [9].

Despite her fruitful research, she wanted to return once again to the Teacher Training College in Tarragona. However, Prof. Caullery offered her the possibility to go back to Paris during the academic year 1927-1928 to go into depth with her research. During that period she focused on the study of chromosomes of *Paramermis contorta*, the origin of the intersexuality of such species and the inheritance of the lack of pigment in certain *Chironomus*. She made the most of that stay writing her doctoral thesis, entitled "Contribución al conocimiento de la biología de *Chironomus* y de su parásito *Paramermis contorta*" ("Contribution to the understanding

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CONTRIBUCIÓN AL CONOCIMIENTO DE LA BIOLOGÍA DE *CHIRONOMUS* Y DE SU PARÁSITO *PARAMERMIS CONTORTA*.

por

MARGARITA COMAS

(Lámm. VI-XI.)

Introducción.

Si hubiera que caracterizar de algún modo nuestra época por lo que a los estudios biológicos se refiere, la distinguiríamos de la anterior por la preponderancia de la experimentación. A los trabajos puramente descriptivos de últimos del siglo pasado han sucedido los experimentales del actual, y la pregunta «¿Cómo es tal ser?» ha sido reemplazada frecuentemente por la de «¿Por qué es así?». Mecanismo de la herencia, localizaciones germinales, injertos, origen de los caracteres sexuales secundarios, función y procedencia de los pigmentos, etc., etc.; he ahí unos cuantos de los problemas cuya solución está buscándose actualmente en multitud de laboratorios europeos y americanos.

Pero para experimentar sobre un animal es generalmente premisa indispensable que éste pueda vivir en condiciones aproximadamente normales bajo los ojos del investigador, y, por lo tanto, suele ser labor previa de muchas investigaciones el «élevage» del ser objeto de estudio. Así se explica que habiéndome propuesto, de acuerdo con el Director del laboratorio, resolver una serie de cuestiones, a mi parecer interesantes (y que serán en su mayor parte objeto de trabajos posteriores), acerca de la ovogénesis y espermatogénesis de *Chironomus*, de los efectos de la destrucción de las células polares en sus embriones (cosa

Memorias de la Real Sociedad Española de Historia Natural, tomo XIII, 1928. 14

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Fig. 2. First page of Margalida Comas' doctoral thesis.

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Fig. 3. Margalida Comas and 14-months-old Miquel Sintes Comas (one of her nephews) in Barcelona in 1933.

of *Chironomus thummi* biology and of its parasite *Paramermis contorta*") (Fig. 2). Her thesis defense, in January 1928 at the Central University of Madrid, obtained an excellent grade. For this reason, the work was published in the *Memorias de la Real Sociedad Española de Historia Natural* [10]. And this is how Comas became the first Spanish woman to be awarded a research-based doctorate in the natural sciences.

Scientists are said to always remain scientists. And Comas continued to be a very productive researcher after her doctoral studies, publishing several papers every year. For example, she published, along with her thesis supervisor Prof. Caullery, "Le determinisme du sexe chez un nematode parasite des larves de Chironomes" [2]. She also published "Sobre la influencia de la tiroidina en el desarrollo de *Chironomus thummi* Kieff" ("On the influence of tiroidine on the development of *Chironomus thummi* Kieff") [11] in the *Boletín de la Real Sociedad Española de Historia Natural*, and another work about sex determinism in *Paramermis contorta* v. Linzt [12] in the *Memorias de la Real Sociedad Española de Historia Natural*.

So, as it was pointed out in the report on her doctoral thesis, Comas showed a "remarkable aptitude for scientific research" [14]. Unfortunately, it was not easy to be a female scientist: such skills were not encouraged in Spain, Europe or America, while her male colleagues had better chances to go on with their careers.

In 1929, having exhausted Comas all possibilities to carry on with scientific research, she returned to the Teachers Training College in Tarragona and focused on her educational task. She revitalized educational methods; she tried to achieve a better-educated society, more cultured, fairer, freer and more egalitarian. She fought for equality between women and men, and one of her key aims was to modernize the Spanish society of that time. So, as many Spaniards did in that time, Comas committed to the Republic's ideals.

In 1931, when the Second Spanish Republic was proclaimed, Comas was appointed Director of the Teachers Training College of the Autonomous Government of Catalonia (*Generalitat de Catalunya*) [14]. Also that year, on March 26, she married photographer Guillem Bestard, an old friend, widower and with a son. Three years later, she became Associate Professor of elementary biology and natural science methodology at the University of Barcelona (Fig. 3).

In July 1936, the Spanish Civil War began. As discussed by Barona [1], the military uprising in Spain in 1936 was a fatal blow to the nascent scientific community in Spain, and Comas

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Fig. 4. Margalida Comas in the 1920s.

was one the many promising scientists who suffered the consequences of the war. Committed to republicanism, in 1937 Comas was appointed by the Ministry of Public Instruction of the Spanish Republic to collaborate with and advise the National Joint Committee and local Committees regarding the education and instruction of the Basque children taken to England to protect them from the war. According to C. Ryan in this journal [17], on May 27, 1937, the ship *La Habana* sailed for Southampton carrying four thousand Basque children. During her years in England, Comas worked for the Republican cause and the welfare of these child refugees [16]. This new occupation was time consuming; she became engaged in full-time teaching and acting as parent for the Basque children who lived in the school. In April 1939, the cruel Spanish Civil War ended with the victory of the fascists. Thus, Comas, as happened with hundreds of thousand other democratic Spaniards, remained in exile until the end of her life (Fig. 4).

Since 1942 until her retirement (in 1959), Comas taught in the innovative Dartington Hall School, in Totnes (Devon County, UK). The first time she could go back to Majorca for some days was in 1955, 19 years after she left the island. Once she retired, she and her husband lived out of a suitcase between Totnes and Majorca. She died in Exmouth due to an acute pneumonia in August 28, 1972, three years after her husband.

It is obvious that Comas was forced into exile at a crucial stage in her career and that this changed her life forever. However, her many years of work as a teacher also reflected the difficulty for women at that time to take up careers in scientific research [13]. Perhaps in response to this challenge, she tried to combine both fields by introducing her students to scientific field. Who knows what the future would have brought her and what science would have achieved if Margalida Comas Camps could have become the scientist she probably wanted to be.

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