

## Margalida Comas Camps (1892–1972): Scientist and science educator

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As discussed in the recent publication by Barona [5], the military uprising in Spain in 1936 was a fatal blow to the nascent scientific community in Spain. Policies that drew on science and technology had been viewed as a way to bring about the country's modernization. At the same time, liberal and Republican policies gave rise to a scientific infrastructure that also provided support for young scientists to travel abroad in order to develop their science knowledge and research skills and to participate in conferences and international research. Science, technology, and education were seen as essential in Spain's transition from its rural conservative past to modernity. One active participant in these changes was Margalida Comas Camps [1], who was born in Alaior Minorca in 1892. She died in Exeter, UK in 1972. As the recent publication *Margalida Comas Camps (1892–1972). Científica i pedagoga* points out, "the Minorcan Margalida Comas Camps (1892–1972) is, possibly, 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." ([23], back cover). This article is concerned mainly with her role as science educator but, as we will see this was closely linked to her development as a scientist. After a brief overview of the scientific work of Margalida Comas Camps, her career in science education and as a science teacher is discussed.

### Margalida Comas Camps as scientist

From early in her education, it was obvious that Margalida Comas Camps (her Spanish first name, Margarita, is often used by authors; see Notes) was an exceptional student with a penchant for science [2]. Her parents, Gabriel Comas Ribas (1864–1942) and Rita Camps Mus, had five other, younger children, one of whom had died at an early age. Gabriel Comas was a teacher and community worker [23] who raised his children to work hard in order to develop their talents [37].

After attending an elementary school for girls, Margalida Comas was accepted to the *Instituto General y Técnico de Baleares* (General and Technical Institute of the Balearic Islands).

Her Baccalaureate (1911) shows that she was an outstanding student in almost every subject. The summer following her graduation from the *Instituto*, she was awarded the Extraordinary Baccalaureate Award of the Sciences Section for her study on the cooperation between plants and insects in pollination. A member of the panel of judges was the zoologist Josep Fuset (1871–1952), who would later be one of her mentors.

In September 1911, she registered for the program that would qualify her as *Maestra Elemental y Superior* (elementary and secondary teacher). This was an unusual route for women at that time, who were expected to attend the *Escuela Normal* then perhaps the institute. Nonetheless, she was eventually accepted and subsequently graduated with outstanding grades. This was only a year after women had been given the right to enter institutes and universities. That summer, she was invited to attend the Second Summer School at Bellver, run by Fuset, which led to her first publication [9]. In the autumn of 1911, she went with her father to Madrid, where she met with his friends and colleagues from the *Junta para Ampliación de Estudios* (JAE, Board for Advanced Studies), including Jose Castillejo. The JAE informed her of a post in Albi, France for an assistant in Spanish language learning and recommended Comas for the job. Teaching in France allowed her to develop her French language skills and to become certified as a *Brévet Elementaire*, the requirement to teach in a French primary school. She spent the years 1912–1915 in Madrid, where she entered the *Escuela de Estudios Superiores del Magisterio* (School of Higher Studies of Teaching), achieving the highest grades in sci-



Fig. 1. Professor Margalida Comas Camps. Ingrid Sintés Comas Collection.

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ence in each year of her studies, during which she was able to intensify her science and professional knowledge and her research and teaching abilities. Her source of income during this time derived from teaching at the International Institute for Girls, a school catering to the children of Madrid's elite. She was also able to improve her English, something that would soon be of great use to her. While in Madrid, she attended practical science courses at the city's Museum of Natural Sciences. She spent several summers at the Balearic Marine Biology Laboratory, with Fuset.

In 1915, she was appointed numerary professor of physics, chemistry, and natural history at the *Escuela Normal* in Santander, where she remained until 1922. Her many years of work as a teacher reflected the difficulty for women at that time to take up careers in research science [22]. Perhaps in response to this challenge, she introduced her students to scientific fieldwork as well as additional practical classes in science, in which she made use of everyday materials. In 1918, she applied to the science faculty at Barcelona as an unofficial student and presented work from her research with Fuset to the department of zoology. In 1919, she also became an unofficial student at the *Central University* in Madrid, which she could travel to more easily than Barcelona. She completed her studies in both cities, obtaining very high grades in mineralogy, botany, algebra, and chemistry.

In 1920, Margalida Comas applied to the JAE for support to work outside Spain in order to further her professional development. This was at the end of five years at the *Escuela Normal* of Santander, where she was frustrated by the difficulties in teaching science to future teachers with very little background in science. According to Comas, while her students were knowledgeable about the basic tenets of science, "they do not reason better, are not more inventive, nor observe better; things which, in my opinion, have greater importance for them and for their future pupils, especially future pupils, as I believe that in the primary school this is almost the only aim of science teaching." ([10], p.142). This statement reflects what Comas considered to be the requirements of science educators and of a science education as well as the contribution of science to general education [33]. In her opinion, science teaches students to observe and to reason. She valued the opportunity to further her theoretical and practical knowledge and her understanding of physics, chemistry, botany, and zoology at University College and Bedford College, both in London, and hoped to follow the methodology of science teaching used by these institutions and by the Primary Teacher Training College.

"The best place it seems to me then is England, which is, of the European countries, the one that has always more closely united education and instruction. There the teaching of science (as a number of authorities have told me and which I have been able to confirm in a variety of publications) is how I would like to be able to teach, that is, by fully considering the education of the student." ([10], p. 144)

In order to achieve these goals while in England, she applied for a three-term visit, arriving a month early for orientation.

These first formal connections with England and her reasons for choosing them reflect her own methods of science practice [43] as well as her identification of the broad range of knowledge that a teacher needs in order to teach, including subject knowledge and pedagogical content knowledge [45]. Indeed, this approach remains the one recommended to professionals to develop their teaching skills [35,21] and it was advocated by Comas in her publications.

During her stay in England, she summarized her learning and professional development in a review for the JAE [10]. While she noted that she now had more questions than at the start, it is nonetheless possible to identify several of her key ideas regarding the teaching of science.

"One conviction that I can state ever more firmly is what is needed, for innumerable reasons, is to turn the attention of our children towards the countryside, not as something static, as one might look at a museum, but as something alive, changing, full of interest. This is the reason for my desires to specialise to some extent in the methodology of *nature study* and physical geography, and so to ask for an extension to my grant." ([10], p. 204)

She believed that not only must the daily instruction of children be reconsidered but also their overall education, arguing that in Spain children are led too carefully by the hand and thus are incapable of learning on their own. A good science education would avoid this problem and encourage autonomy.

In 1922, she arranged a transfer to the *Escuela Normal* in Tarragona, where she served as director from 1931 to 1933. This move allowed her to complete her degree in Barcelona and was followed by doctoral studies, including research at the Sorbonne, in Paris, in the field of genetics. In a review of the discovery of sex chromosomes, Delgado Echeverría [22] highlighted three particular publications in which Margalida Comas Camps contributed to genetics: one on intersexuality in the nematode *Paramermis contorta* [13], one on the role of chromosomes in ovogenesis in the mosquito *Chironomus* [14], and one on the relation between sex and temperature in *Rana temporaria* [15]. The work she did at the Sorbonne contributed to her doctorate, which she was awarded in 1928. Another woman teacher, Catalina de Sena Vives i Pieras, also from the Balearic Islands, had received a teacher's doctorate in natural sciences in 1917. However, Comas is the first Spanish woman to be awarded a research-based doctorate in the natural sciences, which was awarded by the Central University in Madrid, rather than the University of Barcelona as some sources claim [23]. Her thesis topic, on the environmental control of sex, may have provided her with scientific support for her proposals on co-education [17]. In her doctoral dissertation, she commented:

"As I said at the start, the previous pages are the result of more than a year of assiduous work, and despite the support received from competent persons, I realise perfectly that their intrinsic scientific merit is nonetheless limited. .... though

my work is modest and incomplete, it is absolutely sincere and reflects, nevertheless, the best of intentions.” ([14], p. 364)

Although she tried to follow up on this scientific work and was supported by other scientists familiar with her research, she was unable to obtain a job in science [36]. Thus, she continued to work in Tarragona and in 1931 became deputy director of the *Escuela Normal* of the Autonomous Government of Catalonia in Barcelona and in 1933 a member of the Faculty of Philosophy and Literature of the Autonomous University of Barcelona, where she would work until the outbreak of the Spanish Civil War. In December 1936, she was sent by the University of Barcelona to England to present the work being doing in education, arriving probably in the first week of January 1937. By February 2, 1937, *The Times*, on page 15, announced a talk by Margalida Comas on ‘The New Spain,’ at Friends House. On May 27, 1937, the ship *La Habana* sailed into Southampton carrying some 4000 Basque children. During her years in England, Comas worked for the Republican cause and the welfare of these child refugees. Following recognition of the Franco regime by the UK in 1942, Comas sought work in England, becoming a science teacher at the Dartington Hall School. Before analyzing her teaching as perceived by former students, I present an overview of her writings on science education.

## Science Education

From her many books and publications, we have a clear view of Comas’ notion of a good science education. As Bernal Martínez and López Martínez [8] pointed out: in the 20th century, key innovations in science education in Spain came from the work of the New Education Foundation (renamed the World Education Fellowship in 1966) and from translations of work published in other countries, with Comas contributing to both. She was President of the Spanish Section from 1933 to 1947 (New Education Foundation Archive, Institute of Education London), during which she translated a number of books.

Current thinking on science education is characterized by three major approaches [33]. Of these, perhaps the most obvious is *education in science*, specifying the role of science as an introduction to a basic knowledge and understanding of scientific concepts and practice. A second dimension is *education for science*, that is, providing an education for students who will later become scientists. The third dimension, *education through science*, refers to the manner in which science contributes to achieving the general aims of education, such as a respect for evidence and the value of collaboration.

The first approach, education in science, is the one most relevant to school curricula. As Fensham [24] noted, the way that science is taught has important consequences for students’ perceptions of science and their decisions to abandon science study. While students, teachers, and parents recognize the value and importance of science [27], the science they consider important is not often taught in school. Students reject school science when it is disconnected from their own

lives, when it is a depersonalized science in which there is no space for themselves and their ideas.

1. ‘Science teaching is predominantly transmissive.’  
As a student, learning science is simply a matter of being like a sponge, soaking up knowledge as it comes from the teacher or the textbook.
2. ‘Science knowledge is dogmatic and correct.’  
There are no shades of gray in science.
3. ‘The content of school science has an abstractness that makes it irrelevant.’  
So much of what is taught in science is uninteresting because it is not related to our everyday lives. Science in films and in the media is often exciting, but that is not true of the science we are taught in school. There are science topics that would be interesting but these are not part of the school curriculum.
4. ‘Learning science is relatively difficult, for both successful and unsuccessful students.’  
Science is more difficult than a number of the other subjects, and especially compared with ones that can be chosen in the later years of schooling.  
([24], p. 20–21, numbers added for later reference)

Debates about science as content and as a way of working and thinking about the world can be traced back to the debates on school science that took place in the 19th century, with the start of compulsory schooling [30], when knowledge transmission gained the upper hand. But Comas, in 1925, advocated a school science that dealt with both the process and the content of science. In *Las Ciencias en la Escuela* [12] she wrote: “What is interesting is the way, the method, and that is why science should be in schools, for its practical importance.” ([12], p. 57) She also argued [11] that the method does not stand alone.

“The scientific method, that is, the mental discipline produced by studying the sciences, is, in general, what is important; but the method is inseparable from the content. [...] Thus, what is studied must also be worth its while. Consequently, the issue is not only how to teach but also what to teach in order to achieve the desired outcome.” ([11], p. 82)

Thus, hers is not the simplistic approach to the scientific method often propagated in school science [28] but a mental discipline, which was a popular concept during her time. She also added that she was not advocating a discovery approach in which students try to rediscover the concepts of science [3].

“The importance ceded to the method means that the ideal approach to teaching is to provide the students, when they study science, with the same spirit that is unique to the science researcher, but not in order to discover for themselves in a few years what has taken centuries in the life of humanity to discover. Rather, through their own eyes and through manipulating their own equipment, to enable them to subsequently apply to other aspects of their lives the qualities of

observation and proportional reasoning, which are those of the scientist. They experience not only something of the work but also some of the joy in intellectual adventure.” ([11], p. 82)

“In this way, we exclude the acquisition of second-hand concepts. Children will thus do their own science, will feel to some extent the same emotions as researchers or intellectuals, and like them will experience a feeling of responsibility, will put into play all of themselves not just their memory or their intelligence. In a good example of such a class, each child will manipulate materials, will examine, draw and experiment with them, finally to discover something that was until then unknown by the child. Teachers are a guide but should never replace their own activity for that of the child. Their mission is to suggest or direct but it is the child who has to observe, to experiment, to compare, to draw consequences. Therefore, from what we have said, we can deduce that the objects of study should be common and available in the school surroundings (not strange or distant) and that the programme has to adapt itself to the seasons.” ([12], p. 59).

We see here the joining of process and content as well as the affective dimension, so important for encouraging a life-long interest in science [24,47]. Comas is thus addressing points 1–3 of Fensham’s above-cited list. When it comes to the sequence of the science lessons, rather than imposing a sequence that is logical from the point of view of science, Comas points out the importance of considering the sequence from the pupils’ perspectives. The lessons need to be closely related and connected, developed from the learner’s perspective. This ‘constructivist’ approach [28] has its basis in the work of researchers such as Piaget [38] and Vygotsky [48]. However, Comas explores them in 1925, before the work of Vygotsky was published in the West. Although Piaget had by then published his first studies on children’s representations of the world, it is not clear whether Comas was aware of this work. It may be that she was first introduced to it during her stay in Geneva in 1929. Instead, her recommendations seem to be based on her thinking, reading, writing, and practice and on the results of reflection and illuminative evaluation [26].

In the same article, she takes up another of her themes, the importance of fieldwork and excursions. Again she points out the need for pupils to carry out such work and she recommends written records and repeat visits to the same sites over the year, to allow students to experience how the site changes; this recommendation likewise parallels modern thinking [29]. She develops her ideas in detail for both rural and city schools but is also aware of the constraints under which teachers work. While bemoaning the lack of science education available to teachers, she identifies the ways in which the *Escuelas Normales* might address the issues, the large numbers of children in a class, and the scarcity of resources. She claims, however, that “even under current conditions we can do much more than we do now, if we are able to convince ourselves of the importance of science and leave aside some of our worries.” ([12], p. 58).

These quotations served as proposals for an education in science and for educational approaches that have become adopted in current thinking [47, 31]. It is also clear that Comas dealt with many of the issues identified by Fensham as negative aspects of school science that should be avoided. She stated her developing view of education through science.

- “Sciences... humanise the mind of young children; together with literature and art, the sciences are one of the greatest historical expressions of the spirit. Consequently, they have as much right to a prominent place in the school programme” ([11], p.82)
- “There are some facets of the human soul that a science education, better than any other, and thus the school can cultivate, for example:
  - The spirit of observation
  - Serenity
  - Dominion over oneself
  - The habit of searching for the causes of things
  - Order
  - Caution in one’s claims
  - An admiration for nature
  - Modesty
  - Tolerance” [10]

This list is an example of thinking that, until recently, was largely forgotten [47].

Comas continued to develop her methodology, as is evident in her *Contribucion a la metodologia de las Ciencias* [20], where she argues for rational curriculum planning through a series of questions: What are its aims and objectives? And how can we develop the necessary aptitudes, skills, and attitudes? She states that science teaching depends on three factors, our aim, the base or starting point of the child, and the special nature of science. “In effect, it will be very different whether we want to give the child a varnish of general culture or educate them in the widest sense of that word.” ([20], p. 161). She draws on a range of authors, including scientists such as Huxley, to elaborate her ideas, detailing the elements of scientific thinking such as observation, analysis-synthesis, selecting data, hypothesis, deduction through experimental outcomes, reasoning, and judgment. For Comas, scientific judgment should be impartial and impersonal and must be left pending in the absence of sufficient data. These views are very similar to current recommendations in science education (see, for example, [31, 34]), ones that have taken many people significant efforts to reach when, had history been otherwise, they might have become accepted practice in Spain much sooner.

Comas also deals with the issue of the difficulty of school science, as identified above by Fensham. In England, in the first half of the 20th century, the hereditary nature of intelligence was accepted and used to justify the education of students [49]. Comas was able to draw on her scientific work on heredity to analyze the data that had been gathered so far. She authored a number of papers on the subject (see, for example, [18, 19]) and reviewed work on inheritance in addition to drawing on her own research on the impacts of the environment. To



this she added everyday examples such as how environmental influences lead to bees and ants acquiring specific behaviors. She noted that the majority of characteristics lie between nature and nurture, “but are capable of large modifications through environmental differences.” [18] She highlighted the need to study the issue scientifically and offered the work of Piaget, on causality in the child, as an example. In 1935, writing on genetics and eugenics, she reviewed what was known about inheritance and argued that eugenics programs, such as sterilization in Germany and in the USA, failed to yield the intended result. She concluded:

“Nevertheless, we must not forget that all measures that tend to improve the environment and education are in reality eugenicist in the sense that they favour the production of talent, if not genius, and enable each individual to attain the maximum of their inherited possibilities.” ([19], p. 78)

Her proposals are consonant with notions that are only now becoming accepted, i.e., that children can learn to be intelligent [32,44].

### Margalida Comas Camps as teacher

Trying to reconstruct the teaching methods of somebody who retired over 40 years ago is obviously tricky. There are some records of the planned curriculum but less about what Comas actually taught. Differences between the two are normal and often significant [40].

It is clear that from the start of her career as an educator of teachers, Comas introduced science into the *Escuela Normal* at Santander. It was her intention to connect process with content and to relate science to everyday life by using materials encountered daily. She took similar steps in Tarragona and Barcelona. For the latter there are records of the curriculum of teacher education. In 1929, Comas [17] described the *Escuela Normal* as a professional school and she predicted its transition to the *Escuela Universitaria* (University School), which finally occurred 60 years later. The preparatory courses included natural sciences, mathematics, and physics and chemistry. Within the 4-year program, students training to become teachers took courses in general biology, human physiology and anthropology and practiced the methods used in the natural sciences and in physics and chemistry. This represents a remarkable input by Comas into science education compared with the program she encountered upon her arrival in Santander. It was also rather progressive compared to most primary teacher education programs offered today in the UK or Spain. Comas initiated a wide range of activities outside the curriculum, some organized by the students association. There are links and activities with schools and the university, to ensure a lively exchange of ideas and thereby break down traditional isolation on both sides. There is group work and continuous assessment. In this planned curriculum, the relationship to her writing is evident. She writes that in this first year it is difficult to draw definite conclusions, with one exception: co-education.

“Now we are talking of young girls and boys from 14 to 25 or 30 years of age, who come from all backgrounds, who spend all day together, in classes, games, sport, excursions, lectures, meals, and who have been perfect in this respect. They have presented no problem.” ([17], p. 436)

She adds that friendships tend to be by age and that some students “are seen together all the time and we have reason to believe that their friendship has sometimes developed into more tender feelings, but their work has not suffered, on the contrary.” ([17], p. 436)

While we thus have Comas' perspective on the planned curriculum, we have no information on how it was received by her students. This is not the case for her work in England as a biology teacher. In discussing the received curriculum, some clarification is needed. Dartington Hall School, a private residential school, had been established based on a philosophy closely linked with the New Education of Spain and the New Education Foundation. At the time of her appointment, in 1942, students took an active part in running the school and could choose which lessons to attend. There was a serious attempt at equality, with little differentiation between boys and girls [39]. Such an approach would seem to have matched well with the ideas of Margalida Comas Camps [17]. According to Bernal and Comas ([7], p. 24),

“Margarita Comas developed a magnificent analysis of the problems of coeducation from both theoretical and practical perspectives, always based on a thorough knowledge of both, which makes her work one of the most complete of her time on the topic. The positivist foundations of her arguments enabled her to show with ease the weakness of the theses of those opposed to co-education, which were usually based on moral prejudices, or on pseudo-scientific affirmations about the physical and psychological differences between men and women.”

However, when it came to her appointment, she was reportedly not accepted by the students as she was a woman. Nonetheless, she convinced the authorities to give her a week's trial and at the end of the week the students asked for her to be made permanent [36]. Since Dartington Hall students could choose which classes they wanted to attend, their perceptions of the teacher were important. From the respondents, it seems that Comas was perceived as fierce and demanding. Typically, students' ideal teacher tends to be strict, fair, good at explaining, and having a sense of humor [50]. But for some students Comas was too fierce and they avoided her classes, albeit sometimes later regretting their choices. The more positive aspects of her practice are discussed below but here it should be mentioned that she was perceived as favoring girls over boys, with some suggestions that boys felt they were less welcome in her class. However, students, and teachers, often err in their attributions of unequal treatment based on gender as such attributions tend to be colored by the societal norms in which they arise [40].

A second negative aspect was her reputation for controlling bad behavior by pulling the student's hair, and sometimes ejecting him or her from class. While this tactic would not have been unusual in many schools in England at that time, it does not seem to be consistent with the New Education ideals and the goal of working as equals that Dartington espoused. Several of Comas' former students remember having their hair being pulled fiercely but others took a different view of Comas, as expressed in a letter of appreciation written after Comas' death.

"Most of us quickly came to realise how fortunate we were to have this brilliant yet kindly woman to teach us. She imposed discipline that was acceptable and without tyranny and adapted herself to be of immense help in so many ways to children who were foreign to her and of an age group far below her intellectual level and teaching capacity." [6]

Another student recalled, "Margharita was indeed rather fearsome, but I think probably a truly inspirational, character." One of her first students remembered her as follows. "As far as I remember, she had a rather traditional (i.e. somewhat formal) method of teaching: very clear and factual. Coming from parents very knowledgeable on biology and nature generally... I soaked her teaching up effortlessly. In addition to teaching me, she was also assigned as my tutor. I rather dreaded tutorials because she took me as her most promising student, and hinted that I had a great future ahead of me. But I was not ready to think about my future in such an adult way - I only wanted to go on being a child. So I often forgot to go to tutorials." Others highlighted another aspect of Comas' tutoring. She seemed to have a reputation for being particularly good with difficult or disaffected students, who tended to choose her as their tutor (interview 2007).

Turning to the science she taught, many students have recalled the long-term investigations of large areas of the school's grounds, work that often led to an exhibition at the end of the term/year. "Two things she *never* did were (a) dictate notes or (b) write things on the board and tell us to copy them." (Letter from a former student in the early 1950s). The natural habitats chosen by the students for their investigations contrast with those studied in the UK today, which are often only 1 m across and are rarely followed over a longer term. Her students have also referred to Comas' very detailed knowledge of the grounds and that she was easily able to use such knowledge to comment on their work.

There was an emphasis on drawing from life and from specimens, aspects that Comas had advocated in her writing and demonstrated in her dissertation [14]. With younger pupils, she would perform dissections. "It was only after O level [examination at 16 years of age] that I learnt to dissect things myself." (Letter from a former student who later became a teacher). "With hindsight, I believe that without either of us realising it at the time, she actually taught me a lot about how to teach." Another student said: "We had a benign martinet in Margharita, who ruled over the biology lab with a total demand for high standards in our books and her classroom, and I honestly be-

lieve she wouldn't have minded if we had slept in our natural habitats [their study area]. No one's dead guinea pigs were safe from Margharita. They rarely received a decent burial, but ended up pinned on a dissecting board" [25]. Yet another student recalled a brood of feral kittens, found in the school's grounds and ending up stored in jars of formaldehyde. Perhaps this illustrates the rational approach taken by Comas to matters of life and death. The unwanted animals might as well serve a useful purpose by acting as dissection material, as opposed to the students' view of animals as pets.

In her writing, Comas emphasized understanding as key. Today this would be developed through student discussions of their ideas and of those of scientists [4]. According to the students, discussions and questioning by pupils was normal at Dartington and Comas likely followed such an approach. One student described a political dimension to her teaching. In Janet Sayers key work, *Biological Politics* [41], the subject of a re-appraisal 20 years later [42], she reflects on Comas' reaction. "The biology teacher, Margharita Camps, had written a book about evolution which had been banned in Franco's fascist Catholic Spain, from where she was a refugee. To mark the centenary in 1959 of Darwin's *On the Origin of the Species*, she asked me to introduce a discussion about the debate its first publication had unleashed in Oxford." ([42], p. 448)

The long-term impact of her work is reported by many of Comas' former pupils, many of whom went on to develop careers in biological science and to attain prestigious positions, such as Dean of Faculty and high-level jobs in a national museum. All of her students seem to be grateful for the level of education they received, as it was well beyond the norms for schools either then or now. Several report that when they went to university they found that they had already covered significant portions of the material. Others talk of the pleasure they have had from their lifelong interest in natural history. While they often advocate it as an aim in science education, few teachers manage to achieve it in their practice.

## Conclusion

The recollections of Comas' students in England provide us with insights into the influence that she had on the teaching of science in the UK, as evidenced by the later activities of her students. What seems strange at first is the lack of publications once she came to England. In Spain, she had been a prolific writer, with publications appearing typically every six months or so [23]. However, her work with Spanish exiles, especially Basque children, was time consuming [23]. Once she had accepted the post at Dartington, she became engaged in full-time teaching, acting as parent for the students who lived at the school. She also continued her work with the Basque children and promoted the goals of the Republic. The political situation in Spain resulted in her being separated from her husband for ten years during which she expended considerable efforts in ensuring his eventual safe passage to England.

Searches of libraries in Spain show that the Francoist dictatorship was thorough in cleansing texts written by Republican

authors. While copies remain in Latin American libraries, it is only recently that her publications have become more widely available. Her work on science education and her contributions especially to education through science are at last being recognized [47] and made available for others to learn from and to develop further. However, one tends to conclude that exile at a crucial stage in her development as a scientist and educator resulted in paths not taken and in possibilities left unexplored.

## Notes and references

### Notes

1. There are several versions of the name of Margarita Comas Camps depending on whether the source is Spanish, Catalan, Mallorcan, or English. Her wedding certificate shows her Spanish name as Margarita Comas Camps. The recent text on her life and work by Delgado Martínez uses the Catalan version, Margalida Comas Camps. In England, she was known as Dr. Camps and her students at Dartington spell her given name as Margherita or Margharita. While it may be obvious in written texts, in digital texts exact spelling is obviously crucial.
2. The material from the early life of Margalida Comas Camps draws extensively on the work of Delgado Martínez (2009) and Bernal Martínez and Comas Rubí (2001). These sources also provide access to the facsimiles and reproductions of Comas' many writings and serve as a valuable resource in the analysis of her work.

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