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Article

by Cynthia V. Burek[1]* and Bettie Higgs[2]

An investigation into the public awareness of famous women geoscientists

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An investigation was undertaken to establish public awareness and knowledge of famous women in science, and particularly within the geosciences. A questionnaire was used to survey 1815 adults, mainly across western Europe, with minor inputs from elsewhere. The data was analysed to establish public awareness of female geoscientists, within the broader female scientists data set. The results show that the awareness of any women scientists, dead or alive, from history or current times, famous or not, is minimal. The evidence for women geoscientists is almost non-existent, regardless of respondent's background (nationality, age, gender, or academic level). This paper will outline the results and discuss why this is the case. It is proposed that the insights gained from this study could provide pointers for future educational initiatives that support SDG 5 (gender equality).

Introduction

This paper presents the results of a five-year study of public awareness of women scientists. The initial driver for the ongoing research reported here, was the observation of an apparent lack of knowledge of famous female scientists among the general population of Western Europe.

The idea was given impetus following a European Socrates-Comenius funded research project between the UK, Spain and France (Gonzalez, 2002) which concluded that the history of science rarely appeared in European science curricula. It identified a paucity of teaching resources and academic material on female scientists, including mathematics (Boye, 2002), but especially geologists (Burek, 2001, 2002).

To respond to these findings, a survey was initiated to gather evidence on the public awareness of women scientists. In addition, a conference was held on 28th November 2005 at the Geological Society, London (GSL) to uncover relevant research related to women geoscientists. The conference proceedings were published as a resource for educators (Burek and Higgs, 2007). Subsequent actions included a follow-up conference held at the GSL in 2019, coinciding with the centenary of the first GSL female Fellows. Again, the proceedings were published, providing a further educational resource (Burek and Higgs, 2021).

Methodology

To investigate public awareness of famous female scientists a simple questionnaire was devised (Fig. 1) in English, French, Italian and Spanish. Participants were asked to name up to 10 famous female scientists that they could recall over a period of 8 minutes with no outside help or research. A definition of famous was requested as part of the questionnaire, as well as participant demographics, including nationality, age, gender, occupation and educational background. Participants were also asked if they had been taught about women scientists in school, and if so, the scientist's name. All participation was voluntary.

The initial phase of this investigation included a small pilot survey with a group of 35 participants who were asked to name any famous scientist, with no gender mentioned. The objective was to gain insight into public awareness of any scientist. The participants were mainly from the UK (21), but included Ireland (5), Germany (3), Poland (1), Turkey (1) and non-European (4).

Subsequently, working with small groups, 1815 questionnaires were completed where 10 female scientists were requested. Participants included a wide range of ages, nationalities, gender, occupations and educational levels. Most responses were collected in the UK, but significant numbers were derived from surveys in Ireland, France, Germany, Italy and Spain (Fig. 2) with minor inputs from Greece, Netherlands, Belgium, Poland and Portugal. European data was also collected from individuals in Finland, Sweden, Switzerland, Croatia, Slovakia, Bulgaria and Russia. A data set from New Zealand was added in 2017 and compared with the European data.

These questionnaires were administered in person, in both academic and non-academic settings. The former included lectures, conferences and research discussions. The latter included group events such as talks and walks, classroom settings, or shopping centres. In all situations, questionnaires were always distributed and collected before a talk or walk was undertaken. Time limits for completing the questionnaire remained consistent at all events. When a participant could not remember the exact name of a female scientist, they were asked to describe the accomplishment of that person. Each returned questionnaire was anonymous to fulfill ethical considerations and identified only by a number. The system allowed individual groups or events to

Women in science questionnaire

Gender: Male / Female / Other (Please circle) **Nationality**.....
Occupation.....
Age: Teens, 20s, 30s, 40s, 50s, 60s, 70s, 80s, 90s+ (Please circle)
Your definition of **Famous**.....
.....
List your **10** most famous **female** scientists (any order)
•.....
•.....
•.....
•.....
•.....
•.....
•.....
•.....
•.....
Were you **taught** about women scientists in school? Yes / No (Please circle)
If so **who**?.....
How do you know about your **first named scientist** if applicable? (radio, TV, play etc)
.....

Thank you for completing this questionnaire. All information is **anonymous.**

Figure 1. Detail of the questionnaire used in the survey.

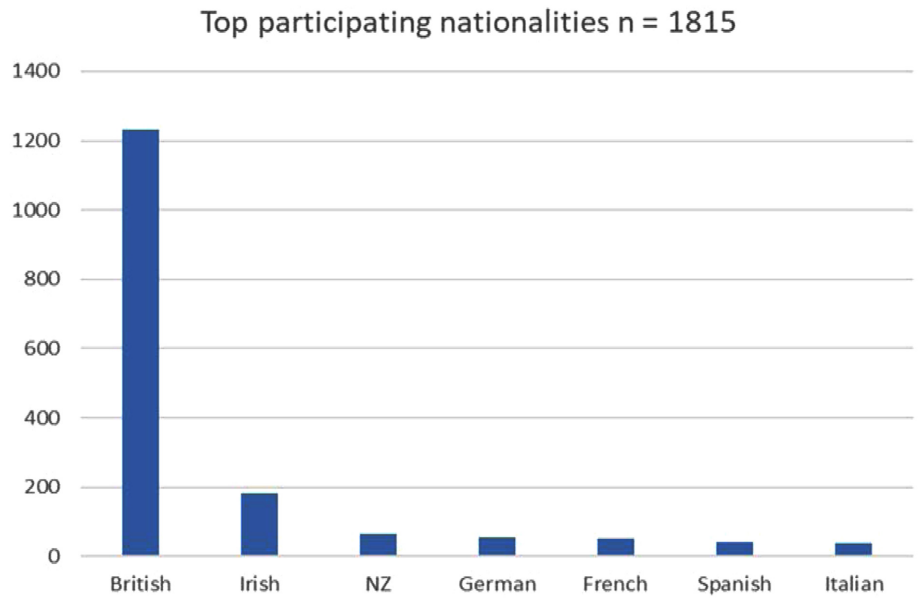


Figure 2. Top participating nationalities.

be analysed and compared, with national and international variation to be highlighted.

A broad definition of scientist was allowed when naming female scientists, and included biologists, chemists, physicists, Earth scientists, conservationists, ecologists, mathematicians, medical scientists, statisticians, engineers, and technologists. Thus, the STEM disciplines were included, but political and social scientist disciplines were excluded. The data collected were entered into an Excel database for subsequent analysis.

Results and Analysis

In the pilot study, where the 35 participants were asked to name 10 famous scientists, either male or female, 81 male scientists and six female scientists (Table 1) were named. One third of the sample could name ten famous scientists. Almost half of the participants, 16 in all, named only male scientists. The majority of those who included a female scientist, included only one. One participant, from Ireland, bucked the general trend by naming four female scientists out of her list of 10.

Table 1. The six women scientists named in the pilot study

Name	Birth/Death	Frequency/35	Nationality of participants
Marie Curie	1867-1934	17	British; Irish; German; Indian; Polish; Columbian
Rosalind Franklin	1920-1958	3	Irish
Barbara McClintock	1902-1992	2	Irish; Indian
Dorothy Hodgkin	1910-1994	1	Irish
Maria Leptin	1954-	1	Indian
Rachel Carson	1907-1964	1	British

For the main survey of 1815 questionnaires, participants were only asked to name 10 female scientists. The ages of participants ranged from 18 to over 90 years, but the most frequent category was 20-29 years. The participants that recorded their gender included 539 male and 1160 female.

Most participants were British citizens with other European countries contributing. A small number of questionnaires (179) were completed by participants from 27 other, non-European, countries, with the majority coming from New Zealand (64), United States of America (21), Australia (6), India sub-continent (8) and Canada (9).

The survey data showed that 16.6% of all participants could not name any female scientists. Among these participants there was no strong correlation with age, gender or educational background. A further 30.7% could name only one female scientist, and 17.4% of the total were able to name only two women scientists. At the other end of the scale, 3% of participants named 10 female scientists.

Taking all questionnaires into account, 77.4% of participants named Marie Curie in their list. Of these participants, 82% named her first. The remaining 18% ranked her high in their list. The 10 most frequently recorded scientists, after Marie Curie, were Rosalind Franklin, Florence Nightingale, Mary Anning, Jane Goodall, Ada Lovelace, Marie Stopes, Dorothy Hodgkin, Dian Fossey, Rachel Carson and Elizabeth Garrett Anderson, in that order (Fig. 3).

In all, over 200 women scientists were named in the questionnaire, but many were mentioned only once or didn't qualify as 'famous', being perhaps a participant's colleague or teacher. A small number of names were eliminated, as they were not female scientists e.g. the novelists Emily Bronte and Enid Blyton, and the fictional scientist, Dana Scully.

Only 8 female scientists were named over 100 times while the top 15 were named more than 40 times (Fig. 3).

In the pilot study participants were able to name 81 male scientists, and 6 female scientists, with some being named multiple times. This gave an indication that in general there is public knowledge of famous scientists. Marie Curie was the third most frequent scientist recorded by participants.

In the main survey, which requested only female scientists, Marie Curie was by far the most frequently named scientist. She was consistently named by people who knew no other woman scientist. In subsequent discussions, participants were aware that Marie Curie had won a Nobel Prize, though some did not know that she is one of the few people to win two Nobel prizes, and in two different categories - Physics and Chemistry, (McGrayne,1993). She is well-known for her work on radioactivity, and the fact that she discovered Polonium and Radium, and was awarded the Davy Medal.

There were 15 other female scientists named as the first and only answer on the questionnaire, the most common being Florence Nightingale (10), Rosalind Franklin (5), Jane Goodall (4), Mary Anning (3) and Marie Pasteur (3). The others were only listed by one or two participants. These included Beatrix Potter, Dian Fossey, Jocelyn Bell Burnell, Marie Stopes, Carol Vordeman and Miriam Stoppard.

Apart from Marie Curie and Florence Nightingale, only 19 female scientists were named at least 10 times and only 13 over 40 (Fig. 3).

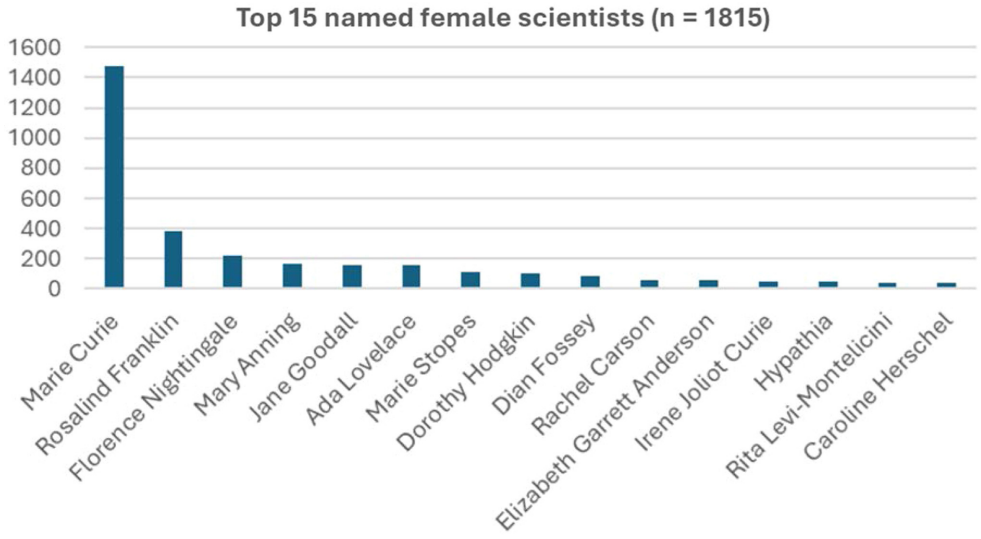


Figure 3. 15 women scientists received over 40 mentions in the survey.

Many of these women were named second after Marie Curie. They are Irene Joliot Curie, Dian Fossey, Mary Anning, Jocelyn Bell Burnell, Jane Goodall, Janet Watson, Mary Leakey, Miriam Rothschild, Mary Somerville, Margaret Thatcher, Rachel Carson, Sophie Germain, Susan Greenfield, Elizabeth Garrett Anderson, Dorothy Hodgkin, Kathleen Lonsdale, Lise Meitner, Helen Sharman, Beatrix Potter, and Caroline Herschel. Looking at this list begs the question, where are the geoscientists? Some female scientists have a loose relationship to the geosciences but only one stands out as a *Bonafide* geologist - Mary Anning.

Discussion

Following statistical analysis of the survey responses, several themes were identified and some key points emerged.

None of the 6 women named in the pilot survey (Table 1) would be thought of as geoscientists. However, it could be argued that several of them had an indirect impact on the geosciences. Rachel Carson, the environmentalist, drove an understanding of environmental protection, including protection of landscapes, soils and habitats. Dorothy Hodgkin's work on crystallography forwarded our understanding of the structure and identification of minerals. Marie Curie's work on radioactive elements was crucial in geoscientists' use of radiometric dating to determine the absolute age of minerals and thus past events. Rosalind Franklin's contribution to DNA research forwarded geoscientists' understanding of human evolution. While professional geologists can make these links, the public are unlikely to do so.

Of those participants who could name 10 famous female scientists, the results indicated that educational background did play a part. Of the attendees at a Royal Society conference entitled 'Revealing lives: Women in Science 1830-2000' a total of 26 delegates completed the survey before the conference began, and 15 named 10 female scientists. It was expected that more respondents would have known at least 10 female scientists. The findings might highlight the lack of female role models and paucity of resources, particularly in engineering, physics and geology, or may indicate that some participants were attending out of interest rather than experience. If the data for these 26 participants are removed from the overall dataset, then the proportion of respondents who could name 10 female scientists falls from 3% to 1.9%.

What were the other factors affecting awareness of female scientists? Amongst groups of university students and lecturers, Marie Curie is well known because her name is used by European grant-awarding bodies, the Marie Curie Foundation and the Marie Sklodowska Curie European Fellowships. It is through regular calls and awarding of funding that her name is kept alive. In addition, a film was released in 1944 detailing her extraordinary life (LeRoy 1943) and an updated British film called *Radioactive* was released at the Cannes film festival in 2019. This was based on the 2010 Redniss graphic novel book - *Radioactive: Marie and Pierre Curie: A tale of love and fallout* which highlighted her life to a more modern audience. Through these initiatives some participants were aware of Marie Curie's work and that she had a tragic life, losing her husband and close colleague at a young age.

In some cases, after a survey was completed with a group, a discussion followed, and women scientists were named. Many participants then realized that they had heard of some of the female scientists but had not been able to bring any names to mind or had not thought of those women as scientists. Sometimes participants had named a female scientist because they had heard the name, but did not know why she was famous. In other cases, participants knew the role the female scientist had played, (e.g., the one who discovered pulsars or the lady who dug up fossils in Lyme Regis or the one who worked on DNA with Crick and Watson) but could not recall the name of the woman.

Other women were well known for their work outside of geoscience, including Marie Stopes, a Manchester University geologist in the early part of the 20th century who is better known for her work on birth control clinics (Falcon-Lang and Miller, 2007). Margaret Thatcher, an Oxford chemist by training, is better known as the first female Prime Minister of the UK (1983-1990). It is a little-known fact that she worked under the only female British Nobel science Prize Laureate Dorothy Hodgkin on her final year dissertation in X-ray crystallography (McGrayne, 1993). Maria Montessori was mentioned 15 times in our survey. She studied as a medical doctor, but she is better known for her educational 'Montessori' method, (Notable Names Database, 2014).

Analysis of the survey responses showed some regional European differences. There was a general divide among Francophile (including France and Belgium) and Germanic (including Germany, U.K and Ireland) nations. This was exemplified by Sophie Germain, Emmy Noether, Rita Levi-Montalcini and Dorothy Hodgkin. Sophie Germain was mainly named by the small group of French participants, while Dorothy Hodgkin is only recognised by the Germanic nations. This may be due to a language barrier. On a similar theme, Claudie Haigneré, the astronaut, is only recognised in her home country of France. She trained as a doctor and became the first European to visit the Space Station in 2002. It was widely publicised at the time, but public memory can be short unless reinforced at a later date. Margharita Hack authored more than 200 scientific papers and in 1964 she became director of the Trieste observatory - the first woman to hold such a position in Italy. She had an asteroid named after her in 1995 called 8558Hack. She is only named by the Italian participants. Jocelyn Bell Burnell, who discovered the first radio pulsars and Kathleen Lonsdale who discovered the structure of benzene and pioneered the use of X-rays in crystallography, were only recognised in the UK, with a single exception, although both had associations with Ireland.

A small number of female scientists are recognized internationally. Rosalind Franklin is recognised across the world for her work on DNA and her omission from the Nobel prize list. However, Lise Meitner, who suffered the same fate for her work on radioactivity and the discovery of nuclear fission and was persecuted during the Nazi time and fled to Stockholm and Copenhagen, - was mainly named by German participants. This is surprising since she has the additional accolade of having Element 109 named after her: *Meitnerium,* (Williams, 2011). Jane Goodall, who died in 2025, with her iconic work on chimpanzees, was named by several European nationalities. Her work was reviewed extensively in the media and so renewed public awareness of her work.

Several initiatives have been undertaken to improve the awareness of women scientists, including publications, awards and media promotion. For example, in 2014 Burek published a paper on the contribution of women to Welsh geological advancement featuring 4 women (Burek, 2014). Of the four geologists mentioned, Gertrude Elles, Ethel Woods, Annie Greenly and Catherine Raisin, only Gertrude Elles was recognised by 8 people and Catherine Raisin by 2.

Table 2. Female Nobel Science laureates and their nationalities up to 2020

Year	Name	Discipline	Nationality	Co-awardees	Cited in this survey
1903	Marie Curie (1867-1934)	Physics	Poland & France	Peire Curie (husband) & Henri Becquerel	1474
1911	Marie Curie	Chemistry	Poland & France	No	
1935	Irene Joliot Curie (1897-1966)	Chemistry	France	Frederic Joliot (husband)	48
1947	Gerty Theresa Cori (1896-1957)	Physiology or Medicine	United States	Carl Cori (husband) & Bernardo Houssay	4
1963	Maria Goeppert-Mayer (1906-1972)	Physics	United States	Hans D. Jensen & Eugene Wigner	4
1964	Dorothy Crowfoot Hodgkin (1910-1994)	Chemistry	United Kingdom	No	106
1977	Rosalyn Sussman Yalow (1921-2011)	Physiology or Medicine	United States	Roger Gullemin & Andrew Schally	3
1983	Barbara McClintock (1902-1992)	Physiology or Medicine	United States	No	22
1986	Rita Levi-Montalcini (1909-2012)	Physiology or Medicine	Italy and United States	Stanley Cohen	44
1988	Gertrude B. Elion (1918-1999)	Physiology or Medicine	United States	James Black & George Hitchings	0
1995	Christiane Nusslein-Volhard (1942-	Physiology or Medicine	Germany	Edward B. Lewis & Eric F. Wieschaus	3
2004	Linda Buck (1947-	Physiology or Medicine	United States	Richard Axel	4
2008	Francoise Barre-Sinoussi (1947-	Physiology or Medicine	France	Harald zur Hausen & Luc Montagnier	0
2009	Elizabeth Blackburn (1948- Carol W. Greider (1961-	Physiology or Medicine	Australia and United States	Jack Szostak	4 0
2009	Ada E. Yonath (1939-	Chemistry	Israel	Venkatraman Ramakrishna & Thomas A. Steitz	1
2014	May-Britt Moser 1963-	Physiology or Medicine	Norway	Edvard Moser (husband) & John O'Keefe	0
2015	Tu Youyou (1930-	Physioloby or medicine	China	William Campbell & Satoshi Omura	3
2018	Donna Strickland (1959- Frances Arnold (1956-	Physics Chemistry	Canada United States	Arthur Ashkin & Gerard Mourou George Smith & Gregory Winter	1 0
2020	Andrea Ghez (1965-	Physics	United States	Roger Penrose & Reinhard Gezel	0
2020	Emmanuelle Charpentier (1968- Jennifer A. Doudna (1964-	Chemistry Chemistry	France United States	Jennifer A Doudna Emmanuelle Charpentier	10 9

While female Nobel Science Prize laureates have been recognised at the highest level amongst their peers, they are not widely known by the public. Only 10 female Nobel science prize-winners were listed in the returned questionnaires, out of 23 female recipients (1903 to 2020), 4 in physics, 7 in chemistry and 12 in physiology or medicine, with 2009 a bumper year as three women were honoured, one in chemistry and two jointly in the physiology or medicine category (Table 2).

Note geoscience is not a category and is often recognised under chemistry or physics, Nationality also played an important part in awareness of female Science Nobel Prize laureates, with publicity likely to be highest in the awardees home country.

There are several famous female scientists that respondents thought had received a Nobel Prize. These are commonly cited as Rosalind Franklin, Lise Meitner, Jocelyn Bell Burnell and Kathleen Lonsdale. All of these women have a link with geoscience. While they did not win recognition by the Nobel Committee, and their collaborators did, they have received other accolades such as Fellow of the Royal Society or other honorary awards and medals. Both Jocelyn Bell Burnell and Kathleen Lonsdale were made Dames of the British Empire and Lise Meitner received the Max Planck medal. It could be argued that while not recognized as primarily geoscientists the work of these four women impacted the development of the geoscientists.

The Royal Society is arguably the most appropriate judge of scientific achievement, being the premier Scientific Society in the world and open to more scientific disciplines than the Nobel Prize. However, the Society did not allow women to receive its Fellowship until 1919. As of 2020, a total of 198 women have been elected fellows.

The first female geoscientist received her Fellowship status in 1945, 26 years after women became eligible. This was Kathleen Lonsdale. In 1946 Agnes Arber received her Fellowship as a botanist. Her daughter, Muriel Arber became a famous geoscientist in her own right in the field of Quaternary geology and landforms. Her mother was her role model for research, (Robinson, 2007). Did the public recognise these three women? The answer is no (Table 3) and recognition outside Britain is almost nonexistent.

Several of the female scientists named in the survey have had a film made of their life. As well as Marie Curie (1943 and 2019) these scientists include Mary Anning portrayed in *Ammonite* (Lee, 2020) and Dian Fossey who was the focus of the film *Gorillas in the Mist* (Apted, 1988) made from the book of the same name (Fossey, 1983). The film *Hidden Figures* (2017) illustrates the lives of female scientists working for NASA and begins to uncover the largely unacknowledged work of women as 'computers'.

A more recent phenomenon has been brought into play. The search engine Google creates 'doodles', which are displayed on its homepage, honouring individuals posthumously who have made a difference and, in some way, have benefited society. As Peck (2014) says "Like a postage stamp, only individuals who have made significant contributions to the world in their lifetimes are considered for the honor."

Google's former Vice-president, Megan Smith decided to use the

Table 3. Early Female Fellows of the Royal Society and recognition in the current survey

FRS	Subject	Date	Total cited in survey	British	Irish	German	Others
Kathleen Lonsdale	Crystallography	1945	12	11			American 1
Marjorie Stephenson	Biochemistry	1945	1	1			
Agnes Arber	Botany	1946	0				
Mary Cartwright	Mathematics	1947	0				
Dorothy Hodgkin	Biochemistry	1947	106	95	3	3	American 1 Slovak 1 Zimbabwean1 NZ 2
Muriel Robertson	Bacteriology	1947	0				
Dorothy Needham	Biochemistry	1948	1	1			
Sidnie Manton	Entomology	1948	0				
Honor Fell	Zoology	1952	0				
Marthe Vogt	Neurology	1952	1	1			
Rosalind Pitt-Rivers	Biochemistry	1954	1	1			

Table 4. Google Doodles featuring women scientists 2011-2022

Date	Name	Cited in the survey Frequency/1815
2022 November 21	Marie Tharp	3
2014 May 26	Rachel Carson	55
2014 May 21	Mary Anning	162
2014 May 12	Dorothy Hodgkin	106
2014 January 16	Dian Fossey	88
2013 July 25	Rosalind Franklin	383
2013 Feb 6	Mary Leakey	31
2012 December 10	Ada Lovelace	155
2012 August 31	Maria Montessori	15
2011 November 7	Marie Curie	1480

search engine's homepage "Doodles" to celebrate the birthdays of women in science and technology who have been overlooked by history (Table 4). By including a short biography, her aim was to influence public knowledge of these women. Megan Smith left Google in 2014 to become the third, and first female, U.S. Chief Technology Officer under President Barack Obama. Since her departure the number of women featured has diminished and they are only occasionally mentioned with a substantial gap between 2014 and 2022. However notably in November 2022 Marie Tharp was featured. A spokesman for Google says: "Too often, the contributions of women in science and technology are left untold, and fade from view. We hope our Doodles will honour those remarkable women's lives and work and, in turn, inspire more women to enter the fields of science and technology." (Marsh, 2014). The impact of the Google Doodles on the public perception of women scientists has yet to be measured.

American science educator Ann M. Martin has been tracking Google Doodles since 2011 at her blog Speaking Up (Martin, 2012). She noted and raised awareness of the absence of a balanced representation from 2001 to 2011. "For years, I have watched Google Doodles contribute to the viewpoint that it is men who create the world we live in and innovate to improve it. I continued to hope that Google would recognize and address this obvious bias" (Martin, 2012). That is, from 2001 to 2011, Google was lacking in its recognition of not just women scientists but women *per se*. Martin believes that the company could have honoured more women, and that it matters because if women don't see themselves represented or celebrated for accomplishments they're less likely to think they can succeed in those fields.

There are still other initiatives that are beginning to take place, including naming streets, institutions, buildings, lecture halls, journals and projects after female scientists. For example, Keele University, U.K. has the Dorothy Hodgkin lecture theatre (named in 1988) and Dorothy Hodgkin Building (2002). The Universities of Surrey and Bristol have similar, and Oxford University renamed a biochemistry building, in the heart of the science area, the Dorothy Crowfoot Hodgkin Building. Oxford University also has Somerville College, named after a female mathematician. The annual Dorothy Hodgkin lecture is held there, as she studied at this college. At SOAS, University of London, The Brunei Lecture Theatre was renamed after Jane Goodall in 2024. King's College London and Birkbeck College London have a lecture theatre and laboratory respectively named after Rosalind Franklin. Birkbeck College also hosts an annual Rosalind Franklin Lecture as part of its Science Week. Several annual events and awards are named after her, including The Royal Society Rosalind Franklin Award and associated Rosalind Franklin lecture. A separate Rosalind Franklin Lecture and Medal presentation is hosted annually by Humanists UK for International Women's Day. The Geological Society of London named its lecture theatre and Lower Library the Janet Watson Lecture Theatre in 2009, in honour of geologist Professor Janet Vida Watson FRS (1923-1985), the Society's first female President. The Royal Institution Christmas Lectures are prestigious and popular with the public and have seen an increase in the number of female presenters in recent years. In 2025 Maggie Adarin-Pocock, a charismatic leading astrophysicist, named in our survey, gave the lectures. In a further development, UNESCO now insist that women are represented at all levels in any proposal for funded geological research projects with a view to reaching parity. The Athena Swan project has prompted Higher Education institutions to demonstrate greater equality and parity of esteem for women. The British Federation of Women Graduates, through Carrie de Silva (bfwg.org.uk), are supporting a project to identify and encourage the naming of

streets after women, to increase recognition. All of these recent initiatives, and others, could lead to a more balanced circulation of scientist's names in the public sphere.

The teaching of the history of science is a gateway to stimulating an interest in science itself. It also provides a potential opportunity to highlight the significant achievements of women scientists. However, the public awareness of women to the development and enhancement of the geosciences is largely missing from curricula. The contribution of a small number of female geoscientists is starting to be recognised. For example, the important contribution of geoscientist Marie Tharp has been highlighted by national bodies in the US, in a recent biography, journal articles, and public lectures (Higgs, 2021). She is now not only widely recognised but highly respected for her pioneering work. It has taken some time, but perhaps the pendulum is starting to swing. However, the need to update the content of 2nd and 3rd level curricula is evident in the results of the current research.

The one exception to the invisibility of female geoscientists is Mary Anning, who is recognised by name as well as by achievement. In the survey she was often named second or third after Marie Curie (Fig. 4). She was listed by 12.8% of British participants (Fig. 5).

The tongue twister "She sells seashells on the seashore" is often attributed albeit wrongly to Mary Anning. In 2018, an 11-year-old schoolgirl fossil hunting in her hometown of Lyme Regis found there was no statue of Mary Anning in the town. She and her mother set up Mary Anning rocks to raise money by public subscription to create one (Khatwa, 2025). By 2022 they had raised £150,000 and the resulting erection of a Mary Anning statue (Fig. 6) was widely covered by the press.

This indicates that the public is starting to acknowledge and value Mary Anning's achievements more widely. In 2015 Mary Anning was one of a trio of scientific women (with Miriam Rothchild, Rosalind Franklin) who were the subject of a 2-day Edinburgh Festival Fringe choral event on 22nd and 23rd August, produced by Minerva Scientifica, (www.electricvoicetheatre.co.uk). This acting and choral work was well received at the festival and raised Mary Anning's profile to a very different audience. In 2021-2, this act featured at the Sidmouth Science schools' festival with good feedback from children and teachers. It was followed up by further productions at the Lyme Regis fossil festival in 2022 (https://www.electricvoicetheatre.co.uk/mary-anning-megasongs-2/).

In the widest context a case can be made for several scientists cited in the survey to be recognized for their contribution to geoscience though

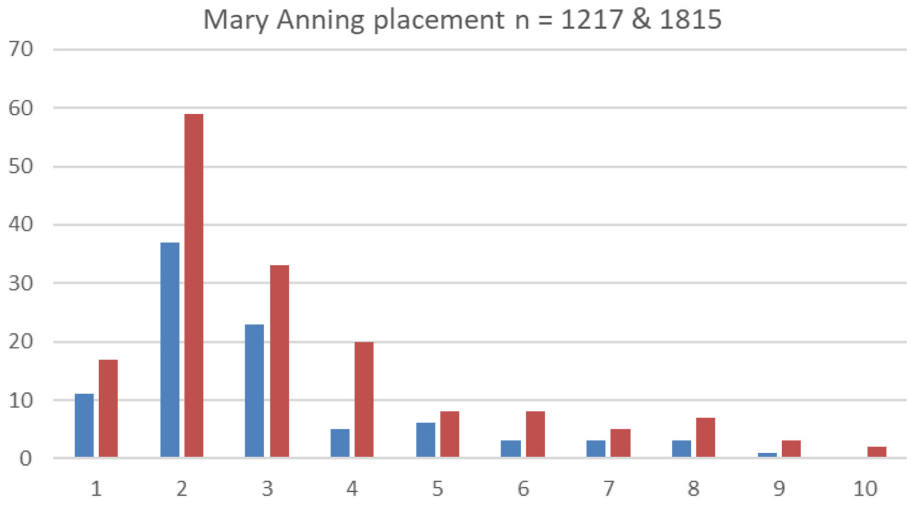


Figure 4. Mary Anning positions in listings She was most often listed as second (blue=1217; red=1815).

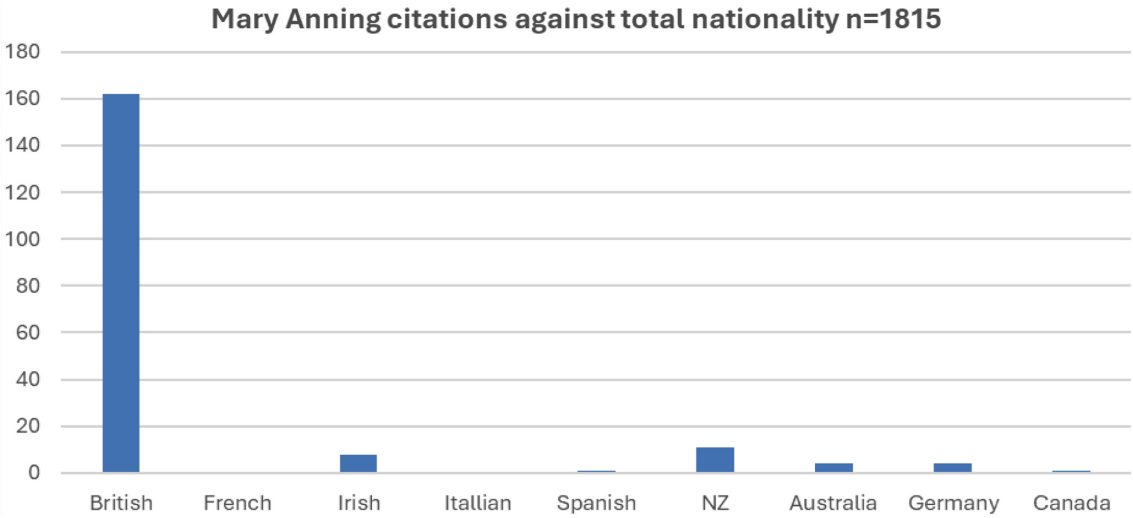


Figure 5. The nationalities which recognized Mary Anning in their survey listings.



Figure 6. Mary Anning statue in Lyme Regis, Dorset, UK.

this may not be realized by the wider community. For example, Dorothy Hodgkin with her work on crystallography falls into this category. It could be argued that Marie Curie with her discovery of radioactive elements allowed radiometric dating of minerals and therefore rocks to proceed. With the rise of environmental geology, Rachel Carson's work is fundamental. Mary Leakey could be cited as a palaeontologist or Quaternary geologist and Dian Fossey has helped understand human evolution in the broadest context. As geoscientists we can often make these links, but non-geoscientists may not. Are we failing in our messaging about the interconnectedness of the sciences? By recognizing this, we could improve the recognition by the public of the contribution of female scientists to the geosciences. Role models are important, to attract women into science, and to ensure they persist. The importance of role models within the Earth Sciences was discussed by Burek and Higgs (Burek, 2007, 2021, and Wyse-Jackson, 2005). Could any gains retreat if we are not vigilant? Teachers in the UK, have reported that history of science has been dropped from the curriculum due to lack of time.

The history of science should be more intentionally taught as part of a fundamental science education. Students benefit from acquiring some understanding of the broader context of the science they are studying. Resources must be developed to assist teachers in re-balancing the reporting of famous scientists who have shaped our world. In 2025 Burek was asked by UNESCO to provide a biopic on Catherine Raisin for their online journal (Burek, 2025). This resource could be used to raise the profile of this female geoscientist, the first female to be made Head of a geology department at Bedford College, London and the first female to receive an award from the Geological Society of London in 1893.

Communities should be proactive and find opportunities to highlight the contribution of women to science and especially geoscience. The statue of Mary Anning in Lyme Regis is a good example of this. By highlighting women such as these, teachers will be encouraged to find out more themselves, have resources to redress the gender balance, and present role models to reflect the diversity of students they teach. This will support our driving of SDG 5.

Started in 2018, the IUGS INHIGEO Anniversary Series (https://inhigeo.org/anniversaries/) has begun to highlight female geoscientists through online publishing. Several female geoscientists have featured on this platform, the first being Charlotte Murchison in December 2018 (Marianne Klemun, 2018) followed by Inge Lehmann (Martina Kölbl-Ebert, 2021), Marie Tharp (Sally Newcomb, 2022), Maria Graham (Martina Kölbl-Ebert, 2022), James and Sarah Hall (Joanne Bourgeois, 2023), Kono Yasui (Michiko Yajima, 2023), BAAS 1st female members (Martina Kölbl-Ebert, 2023), Florence Bascom (Renee M. Clary, 2024), Catherine Raisin (Burek, 2025) and Maria Fernanda Campa (Lucero Morelos Rodriguez, 2025). Table 5 shows that the women selected by IUGS were poorly represented in the survey. It will be interesting to see if these publications make any difference to public perception of female geoscientists.

Conclusions and Implications

It was noticeable that the main findings of the survey were established by the time 1000 questionnaires had been completed and analysed. The additional responses have confirmed the findings and have not altered the conclusions.

The public are aware that 'famous' female scientists must exist but can't always remember their names or what they did. More than 50%

Table 5. IUGS INHIGEO online anniversaries compared with public awareness database

Female geoscientist cited	Date	Recognition number in database
Maria Fernanda Campa	July 2025	0
Catherine Raisin	April 2025	2
Florence Bascom	December 2024	1
BAAS 1st female members (Barbara Hastings)	November 2023	0
Kono Yasui	May 2023	0
Sarah Hall	February 2023	0
Maria Graham	October 2022	0
Marie Tharp	July 2022	3
Inge Lehmann	November 2021	0
Charlotte Murchison	December 2018	0

of those surveyed could name only one female scientist, from all time, or none at all. Of those named, Marie Curie stands out head and shoulders above the rest.

Insights into the reasons for this level of public awareness suggest that publicity at a number of levels (film, grant awarding bodies and social media) may have a greater impact than the teaching of science in schools. Today, the history of science is not a priority topic in the curriculum, and when it is taught, women scientists are underrepresented.

The result is that there are few famous female role models acknowledged across all sciences, and this can affect the ambitions and aspirations of the female science students themselves. In the case of female geoscientists, it is even more problematic with only Mary Anning having any fundamental awareness in today's society. When role models are presented, they are most often male, even though relevant women scientists exist. This suggests that apart from any other bias that may exist, teachers themselves are often unfamiliar with the important roles of women scientists in the past and present.

This paper is a continuation of a long uphill battle to raise the awareness of the hidden and forgotten women of geoscience in the public consciousness across Europe by asking the participants to name10 famous female scientists.

Many times, the survey participants expressed surprise, dismay and embarrassment at not being able to answer the questionnaire fully. They stated this verbally or wrote it on the questionnaire itself. This showed that they had never been asked the question and did not know that they did not know. If participants had been asked to name 10 famous female geoscientists, the results would have been even more disturbing starting with What is Geoscience?.

The survey described in this paper represented a snapshot in time. We recommend that a follow-up survey is carried out to see if the recent awareness initiatives have made a difference.

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