

Maria Matilda Ogilvie Gordon (1864–1939): a Scottish researcher in the Alps

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Abstract: Maria Ogilvie Gordon was one of the most prolific researchers of the later 19th century. Born and bred in Scotland she was the first woman to obtain a DSc from the University of London and a PhD from Munich University. Much of her research was in the Tyrol, in the high Alps between Austria and Italy. By 1900 she had published over 19 papers, many of them in German. However, it was not until later in life that she received recognition for her work. This paper explores her background, context and the work she undertook, and the contribution she made to the advancement of structural geology and palaeontology in the Alps.

Maria Ogilvie's childhood

Maria Matilda Ogilvie (Fig. 1) was born in Monymusk, Aberdeenshire, Scotland, on 30 April 1864 to Reverend Alexander Ogilvie LLD, headmaster of the Robert Gordon's Hospital (later Robert Gordon's College) in Aberdeen, Scotland, and his wife, Maria Matilda Nicol. She was one of eight children and the eldest daughter. Her uncles included Dr Robert Ogilvie, Chief Inspector of Schools; Dr Joseph Ogilvie, Rector of the Established Church Training College, Aberdeen; and Dr George Ogilvie, headmaster of George Watson's College, Edinburgh. Her five brothers, who all became eminent Victorian leaders, included a doctor, a minister of the Church, an engineer, a military lieutenant and a scientist, with her eldest brother, Francis, being knighted. Even her own sister, Emma, married the Inspector of Schools in Perthshire. Her youngest sister, Ida, died when she was an infant. Thus Maria was born and surrounded by eminent educationalists and high-flying siblings. It is not surprising that she had high aspirations and strove for acknowledgement of her research work in later years.

At the age of 9 years she was sent to one of the guild boarding schools – the Merchant Company Schools' Ladies College, Edinburgh – where she stayed for 9 years, becoming both head girl and the best academic pupil in the school. Later her sister Emma joined her at the college (1881 census). During the holidays at their country home in Ballater, near Balmoral Castle, she spent many hours exploring the landscapes of the Highlands in the company of her eldest brother Francis, who was also destined to become a geologist (Creese 1996).

Initially, Maria, or May as she was known, aspired to become a musician. At the age of 18 years, she went to London to the Royal Academy of Music, becoming a promising pianist. Within a year she had decided against this in favour of a science degree. After matriculating in London, she returned to Heriot-Watt University in Edinburgh, where her brother was principal. Here she pursued the first part of her BSc, returning to University College London (UCL) to finish it, specializing in geology, botany and zoology. She obtained her degree in 1890 (Burek 2005).

At this point in her life Maria could have chosen to go back to UCL or to Cambridge but she chose instead to go to Germany, hoping for Berlin University, but eventually settling for Munich.

Maria Ogilvie in Germany

Thus the year 1891 was to be a turning point in the life of the young Scotswoman Maria Matilda Ogilvie. Despite assiduous efforts by her friends, at the beginning of that year she was refused admission to lectures at Berlin University, as women were still not permitted to enrol for higher education in Germany. Even the famous Baron Ferdinand Freiherr von Richthofen (1833–1905) was unable to procure her a special permit. This was also in spite of the intercession of influential friends and relations. Disappointed, the Baron and his wife Irmgard personally accompanied the 27-year-old Maria Ogilvie, who was equipped with a grant from the Royal Society, to Munich. There the German palaeontologist Karl von Zittel (1839–1904) and the zoologist Richard von Hertwig (1850–1927) had agreed to let her carry out



Fig. 1. Maria Ogilvie, an early photo taken around 1900 (Michael Wachtler Archive).

research work in their institute privately, but not actually within the university. The precedent had already been set here by a Russian listening to von Zittel's lectures through an open door. To Maria's chagrin, at the very beginning, Paul Groth, the mineralogist, refused to allow the young woman to enter his laboratory (Creese 1996). Nevertheless, Maria Ogilvie came into contact with the world of corals through the very best contemporary scientists.

At the end of July 1891 Baron and Baroness von Richthofen invited the attractive young lady and nature enthusiast to join them on a 5-week trip to the Dolomites. Consequently this travel group met each other in St Ulrich (Ortisci), the main village of the Gröden Valley (Val Gardena). The Baron, who was almost 60 years old, was a famous scientist who had made history when, 30 years earlier, he was the first to discover that the Dolomites were nothing more than fossilized coral reefs, while she was the young British graduate with an immense thirst for knowledge who had been refused admission to doctorate courses both in the United Kingdom and in Germany. Maria Ogilvie was given the task of keeping Baroness Irmgard company and the Baroness had asked her not to

open the curtains in the morning until she was called for. At last, around 9 o'clock, breakfast was served on the balcony of the small inn and Maria Ogilvie was quietly led outside:

That was when all of a sudden I saw the Dolomites before me, a wonderful sight such as I had never experienced before. So captivating, it made an impression that stayed with me in later life like a sign from God. (Kleblsberg 1932)

First research work in the Dolomites

Maria Ogilvie was immensely impressed by the majestic wild and jagged mountain massifs of the Langkofel, the Plattkofel and the Sellastock. The Richthofens immediately entrusted her to the care of a good mountain guide, who introduced her to the techniques of rock climbing. Based in the Gröden valley she also travelled the entire Dolomite area and examined anew places which by then had become well known among geological researchers. In Predazzo she visited the 'Nave d'Oro' (*Golden Ship*) Inn and its famous (at least in geological and climbing circles) landlady, who by then was advanced in years and whose guest book bore the signatures of many great scientists, including Alexander von Humboldt, Roderick Impey Murchison and Leopold von Buch, to name but a few.

Thirty-three years earlier, the young Baron Ferdinand von Richthofen had stayed there before drawing up his groundbreaking interpretations on the evolution of the Dolomites. He had risen to become Vice President of the German and Austrian Alpine Association, which was gaining in reputation and status, and thus he wanted to return to those same mountains for the first time in three decades. He introduced the young Maria Ogilvie to numerous local guides, innkeepers and fossil collectors, which proved very useful to her future work.

The party went to Corvara and hiked to the Störeswiesen meadows which, for decades, had yielded a wealth of fossils that had increased geological knowledge of the area. It was the Baron who introduced her to alpine field geology. He advised her to become a geologist rather than a zoologist and urged her to start by mapping the area around San Cassiano. Since 1830 this area on the Austro-Italian border had produced a sensational yield of fossilized shellfish, corals and sponges discovered by researchers Georg Graf zu Münster, von Wissmann and August Klipstein.

Maria Ogilvie accepted this suggestion. The Richthofens then left and she started work, based at Corvara in Val Badia. Years later she recalls this time:

When I began my field work, I was not under the eye of any Professor. There was no one to include me in his official round of visits among the young geologists in the field, and to subject

my maps and sections to tough criticism on the ground. The lack of supervision at the outset was undoubtedly a serious handicap. (Ogilvie Gordon 1932)

However, it did mean that she had no preconceived ideas and used only her own observations and reached her own conclusions.

Thus began a very long lonely research path which became her destiny. The terrain was very difficult and there were no proper inns or roads. However, she met Josef Kostner, who was later to form part of the famous climbing dynasty with his

brother Franz. However, at the time he was just 20 years old and eager for knowledge and advancement. He was a gifted climber, teaching Maria how to climb safely and often accompanying her into the field. Franz and Josef Kostner, together with Gottfried Merzbacher, were later to explore the Caucasus and Tian Shan. After a hard field season Maria travelled back to Munich.

Maria Ogilvie returned to the Dolomites in the summer of 1892. In the company of Josef Kostner she went on hiking tours in the area around Störes

18ten August 1898

Joseph Costner hat mich und meinen Mann eine Woche in der Gröden- u. -Enneberger Gegend geführt. Der Zweck war geologisch, und die Art u. Weise mit welcher Costner alle Schwierigkeiten, Umwege, getroffen hat, verdient unsern besten Dank. Der Verstand den er ^{darin} für wissenschaftliche Fragen bewies, hat uns auch gefallen; und ich finde dass er die Karten hinsichtlich ^{der} Lauf viel höherem Standpunkt steht als er vor sechs Jahren bei früheren geologischen Touren mit mir. In diesen Touren war er immer zuverlässig u. sorgfältig.

Dr. Maria M. Gordon
geb. Ogilvie
Aberdeen, Schottland

Fig. 2. Entry by Maria Ogilvie-Gordon in Josef Kostner's mountain guidebook, dated 18 August 1898 (Renata Pizzinini Archive, Hotel Cappella).

(Fig. 2), then went to the Settsass, to Falzarego and on to Cortina d'Ampezzo. She was also active in the Prags Dolomites, as well as the Plätzwiese with its Alpine lake landscape. This latter area was becoming increasingly famous for the variety and excellent state of preservation of the Triassic corals and sponges it yielded. She instructed local collectors to keep accurate records of the location of the finds within the beds, and to particularly note the horizons. At the time, little was known of the evolutionary and environmental conditions prevalent in the worldwide development of the Alpine Triassic. This system was later to become important because of the evolution of organisms in the wake of the devastating Permian catastrophe. As stratigraphic research was in its infancy, she deemed it necessary to separate the various strata in order to understand the constantly changing and evolving animal and plant life.

As a result of her research Maria Ogilvie produced a 78-page article for the Geological Society's Quarterly Journal in February 1893, illustrated with plenty of drawings and entitled 'Contributions to the geology of the Wengen and St. Cassian Strata in southern Tyrol' (Ogilvie 1893). She had accomplished what other geologists before her had failed to do, namely to connect in an integrated manner the various stratigraphic horizons. She had also discovered sites which allowed her to draw conclusions about the development of corals and sponges and other marine life which took place 230 million years ago in this tropical world. She had accomplished the task in 1 year. For the first time she succeeded in separating the Wengen strata and fossil assemblage, which were deposited during the Triassic era in a period of volcanic activity, from the younger St Cassian strata with their infinite abundance of fossils. She had described 345 different faunal species, an impressive number. Today, 100 years later, over 1400 kinds of sponges, corals and crustaceans have been found, in some cases still preserved with their original colourings. However, Maria Ogilvie provided the baseline for this work. Her detailed research work is impressive and reveals how she frequently visited remote sites far apart in difficult terrain. The precision of the many detailed and accurate landscape descriptions became characteristic of all her work, and her conclusions are still relevant today.

The first woman DSc in the United Kingdom

For the first time British experts took notice of the young and ambitious female scientist. The research paper, submitted as a thesis entitled 'The geology of

the Wengen and Saint Cassian Strata in southern Tyrol' earned her a DSc degree from the University of London, and she became the first female DSc in the United Kingdom (Kölbl-Ebert 2001). Although she was secretly hoping for recognition it came as a surprise for her and everyone else. 'No one could be worse prepared than I was at the beginning in 1891-93', she remarked later (Pia 1939).

Maria returned to the Dolomites to continue her research work in the summer of 1893. She became above all fascinated by two different questions: 'how had the Dolomites formed?' and 'how had the corals evolved in this mountainous terrain?'. However, difficult times lay ahead for Maria Ogilvie, psychologically as well as physically. She spent the winter in Munich and learned to speak German fluently. As soon as the weather permitted, she left Munich and headed straight for the Dolomites. In those days, working in the mountains was hardly a luxurious undertaking. There were few refuges or huts providing food or accommodation and she often found it necessary to set out from Corvara at 2 o'clock in the morning in the direction of the Boè-Spitze, Settsass or other sites, to return late in the evening completely exhausted, often alone and heavily burdened with all kinds of samples and fossils.

Being a single woman in this area she attracted attention, but she was ambitious and determined, as is shown in her perseverance to forward knowledge, even when she received no acknowledgement or recognition. This is something she highlighted in her reply to the President of the Geological Society years later, when she received her Lyell Medal (Ogilvie Gordon 1932), and once she had set her mind on something; nothing and nobody could distract her. The fact that she carried on her research in later years as a married woman showed the determination she had; she often took her husband and children with her into the high Alpine areas. In those days a professional woman still had enormous problems fitting into such a rural society. Indeed, she found a considerate helper in Rottonara from Corvara, the old landlady of the Post Inn, who advised and supported her, even to the point of sending farm hands up to her at the mountain huts with food, youths who, eager to help, would return out of breath with a heavy load of specimens.

However, in her scientific publications, she only described the 'Alpenhütten' and 'Kochhütten', to interested persons throughout the world, as places where one could spend a night alone in reasonable comfort. She did, however, hint at the uncomfortable conditions in which she was living, but did not go into further explanation (Ogilvie 1893). The mountains could be dangerous places and once, on the Störeswiesen pastures, a bolt of lightning struck and killed two cows a short distance away

from her. Apparently, she lived thereafter in dread of thunderstorms.

Maria became a meticulous researching and passionate scientist, who was driven by her boundless curiosity to encroach on territory that until then had been only researched by men. Luckily, conditions of access improved in 1894, when a driving road was opened up from Brunico (Creese 1996) which would have eased the travelling to the research areas.

The same year, she had yet another article, entitled 'Coral in the Dolomites of south Tyrol', published in an English specialist periodical (Ogilvie 1894). Thus she started her next important project, which was to absorb her energy for numerous years: the environmental conditions under which corals, both modern and extinct, develop.

Marriage and family life

In autumn 1895 she returned to the city from where she had started out: Aberdeen, where a long-standing admirer, the physician Dr John Gordon was waiting patiently for her return. They married in 1895. They took a house in Rubislaw Terrace, a suitably distinguished address for a doctor and his future family (Morgan 2004).

Maria Ogilvie found in Dr John Gordon a sympathetic and, for the times, remarkably easy-going husband. Perhaps the age difference might account for his tolerance; he was 14 years her senior. He even accompanied her to the Dolomites in August 1898, where they went on hikes in the surrounding mountains in the company of Josef

Kostner. Maria was full of praise for her former guide and how he had developed (Figs 2 & Fig. 3). She wrote the following in his mountain guide book in perfect German:

18th August 1898. Joseph Costner has guided me and my husband in the area of Gröden and Enneberg. The purpose was geological and the way Costner met all difficulties and impassable routes merits our heartfelt gratitude. We also appreciated the understanding he showed for scientific questions; and he has progressed considerably with regard to maps compared with the point he had reached six years ago when he joined me on earlier geological field trips. On high mountain hikes he always proved most reliable and solicitous. Dr Maria M. Gordon, née Ogilvie, Aberdeen, Scotland.

Her husband also found words to praise the mountain guide Kostner, who was in the process of preparing to take part in an expedition to the distant Caucasia to penetrate unknown territories:

18th Aug. 1898. I found Joseph Kostner during the week he acted as our guide, kind, considerate and most capable in every way. John Gordon Med. Aberdeen Scotland.

Maria Ogilvie gave birth to a daughter and a son in quick succession in 1897 and 1899 (1901 census) – the first two of her four children. She named her eldest Coral, a name which caused dismay among the social circles she frequented. Her second child was called John after his father, but was also called Ogilvie after his mother. He attended the Robert Gordon's College from 1907 to 1912. Here he wrote several articles for the school magazine, 'The Gordonian', about family holidays to the Tyrol in Austria (Robert Gordon College archives). In spite of her commitments as a caring

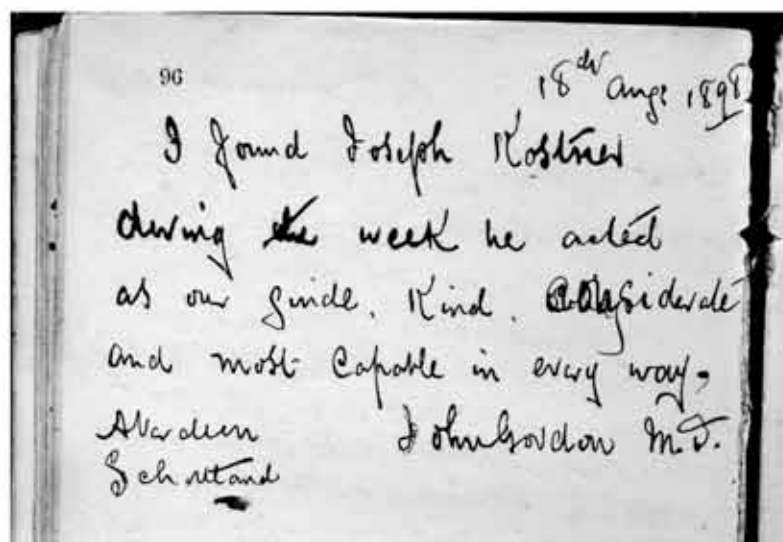


Fig. 3. The entry on the same date by her husband Dr John Gordon (Renata Pizzinini, Archive, Hotel Cappella).

mother and her responsibilities as a respected member of Aberdeen society, she never tired of writing and publishing. On the 1901 census return, for example, she is listed as student and investigator in science (1901 census).

Royal Society paper

In 1897 Maria Ogilvie Gordon had written a zoological paper entitled 'Microscopic and systematic study of madreporarian types of corals', which was so well thought out that Professor Edwin Ray Lankester and Sir Archibald Geikie put all their efforts into having it published in the exclusive journal of the Royal Society of London, a very special honour and achievement. It was during this period that she continued seeking advice on publication from Sir Archibald Geikie:

Oct 21st 1895. I received on Saturday the 19th a printed intimation that the Royal Society Committee of Papers had directed mine to be published in the Philosophical Transactions. Allow me to thank you for this pleasant fulfilment of my hopes and of your kind promise to help the paper through. I have simply acknowledged the Secretary's formal notice and feel now rather in the dark as to my next step. (Robert Gordon College archive)

It is obvious that Sir Archibald held her work in great esteem as he had helped the paper through the various editorial boards.

What was Maria Ogilvie Gordon's contribution to this unknown territory of research into corals? She explained it best:

... the genus can, as a rule, only be identified with certainty after a careful microscopic investigation. (Ogilvie Gordon 1872)

Researchers before her had tried to classify corals, whether living or fossilized, entirely by their outward appearance, a system which Maria Ogilvie Gordon showed to be defective on the basis of detailed examination. Building on the intricate internal structure of fossilized corals she decided to introduce some order into the chaotic system. For evidence she could only draw on her extensive collection of corals from the Dolomites, in the so-called Cassian strata from the Triassic period. Why the abundance and preservation of these corals is so great is not entirely clear. The causes could be the unfavourable ecological conditions prevailing at the time, relating to nutrients in the secluded tropical lagoons. In any case they provided excellent objects for study for this scientist who never tired of posing questions. An explosion of the most diverse types of corals from the Triassic period came to light.

Availing herself of the latest state-of-the-art equipment, such as improved microscopes, Maria Ogilvie Gordon succeeded in fundamentally improving knowledge about these organisms of

such importance for marine life, in particular by realizing the necessity for examining all parts of modern corals, including their soft parts, polyps, as well as their fine skeletal structures. As a result, in 1897, she enthused scientific circles and consolidated her reputation as a meticulous researcher. However, in spite of having published her papers in German (Ogilvie Gordon 1987b), none of this sufficed to secure her a place on a DSc course at Munich University.

Women finally admitted to higher education in Germany

At the turn of the 20th century women were still excluded from higher education in Germany (Kölbl-Ebert 2001). In those days many people still held on to the belief about the inferiority of the female sex. Maria Ogilvie had been based mainly in Munich while carrying out research, although in reality she had only been tolerated at this university. Once her well-disposed supporter Karl von Zittel, head of the Palaeontology Institute had died, even the famous cartographer August Rothpletz (1853–1918), the well-known Alpine mapper, dissociated himself from her. Other celebrated university professors likewise opposed her and did everything in their power to prevent this woman with a thirst for knowledge from attending lectures even secretly. Finally, in 1900, women were admitted to higher education at Munich University, albeit half-heartedly. Initially female foreign students from abroad were allowed to enrol, from Russia, the United States and the United Kingdom, for the authorities were confident that they would return to their home countries after graduation. Likewise, the Scottish zoologist Agnes Kelly decided to take advantage of the situation and be the first to graduate.

Nevertheless, it was Maria Ogilvie-Gordon's two longstanding mentors, Karl von Zittel and Richard von Hertwig, who in their turn sided with her and ensured that she would be the first woman to qualify for a doctor's degree, on the basis of the long periods she had spent there earlier studying at the University of Munich, and of her research work and publications. In spite of being a mother, she spent several months in Munich in early summer 1900, preparing for the difficult examinations, which she passed with flying colours, becoming the first woman to obtain a PhD at Munich University. She thanked Karl von Zittel – by then old and ailing (he died in 1904) – in her own way: she painstakingly translated into English his work *Geschichte der Geologie und Palaeontologie (History of Geology and Palaeontology)*, a monumental history of the progress of earth

sciences. She even gained the praise and respect of the inveterate misogynist August Rothpletz, who otherwise continued to look down on women all his life. The reason for this was that, on his own field trips to the Dolomites, and in front of crowds of students, he was forced to confirm many of Maria Ogilvie Gordon's observations and conclusions. In fact, he even became one of her closest advisers and fatherly friend, who from then on directed her curiosity towards several unresolved questions in the spheres of plate tectonics, thrust faults and folds in the Dolomites, to the point of stimulating her to regard those mountains as the focus of her research work.

Inner turmoil

At the age of 36 years, Maria Ogilvie Gordon could look back on a wealth of achievements, although scant notice was taken of her, either in the United Kingdom or Germany. She had broken new ground and furthered the cause of equal rights for women in two countries, but in spite of her achievements she remained basically a housewife with three children and, although her husband was considerate and receptive, Maria still looked beyond domesticity. She remained ambitious, with ideas for work in various areas. She had also become engaged in civic and social issues and the newly founded 'National Council of Women', especially in matters relating to the advancement of women and the welfare of children. This placed demands on her time, which was already in short supply. Nevertheless her passion for geological research remained undiminished. Perhaps her husband, John Gordon, characterized her dedication best:

It is a lonely furrow you are ploughing, Mary; for your own sake I wish you had chosen some other interest for your hard work.

Between her geological research work and her involvement with social issues (which amounted to a second career), Maria found herself working day and night. She was plagued by doubts of all kinds, as she confided plaintively to the great geologist Julius Pia (Pia 1940) who later became a fatherly friend and curator of the Vienna Natural History Museum:

In my own country I never count at all. I am made to feel a complete outsider [1929]. (Pia 1940)

This melancholy was to grow year by year:

Here in this country no one ever refers to my work at all [1931]. She simply failed to attract the attention of other British researchers to her work:

Here it is obvious none of the British geologist have any interest in my work [1932].

Nevertheless she was swamped with work from other sources, as well as pointless activities:

I am not particularly happy this winter as I have had no time to do any scientific work [1934]. (Pia 1940)

As a result, inwardly, Maria Ogilvie Gordon became increasingly split and torn, although this did not prevent her from being prolific all those years. She was an amateur, working in a professional world in a subject far removed from the local British geologist in both language and location. Thus, despite appearances to the contrary (when doing her committee and social work, she seemed happy and contented) she was not.

I keep toiling hard at public work, meetings of all kind, while knowing inwardly that it is geology in my heart that I wish to do [1936].

From 1900 until the outbreak of World War I she continued to explore the Dolomites, as if drawn there by some irresistible force (Fig. 4). She researched the various valleys, from Val di Fassa to Gröden (Val Gardena), Val Badia, Cortina d'Ampezzo and Buchenstein (Ogilvie Gordon 1903). She had local mountain guides scale sheer, open rock faces for her and bring down rock samples, while they in turn became enthusiastic, trained collectors.



Fig. 4. Maria Ogilvie Gordon with the mountain guide Josef Kostner on a field trip around 1910 (Renata Pizzinini Archive, Hotel Cappella).

After numerous single publications on the subject of the Dolomites (Ogilvie Gordon 1903, 1906, 1909, 1910, 1911, 1913) she began formulating in her mind a lifetime's dream: to produce a comprehensive study of the area with special emphasis on geological features, the thrust faults and folds which she had already researched extensively. She wanted it to be a further milestone following Ferdinand von Richthofen's pioneering work *Geognostische Beschreibung der Umgegend von Predazzo, Sankt Cassian und der Seisser Alpe in Süd-Tyrol* (A geonostical description of the area of Predazzo, San Cassiano and the Seiser Alp in South Tyrol) published in 1860, in which he was the first to arrive at the correct conclusions with regard to the history of the origins of this area. That is, following the grandiose 1879 work by Edmund von Mojsisovic, one of the founders of the Austrian-German Alpine Association entitled *Die Dolomitriffe von Südtirol und Venetien* (The dolomite reefs of South Tyrol and the Veneto). She later went into even greater detail and publish her own cartographic and deduced facts on this area.

Tragic losses of a lifetime's work

By 1913 Maria Ogilvie Gordon's geological surveys, countless analyses and sample collections had progressed to the point where the time had come to publish a general account of the geomorphological processes which had led to the formation of the Dolomites. She had produced hundreds of hand-written pages in English, although she intended to publish the work in German. She had personally produced a hand-coloured geological map in great detail and submitted everything to the capable hands of August Rothpletz, by then the head of the Palaeontological Institute of the University of Munich, the same man who had earlier opposed her, but with whom she had subsequently developed an affectionate and co-operative friendship. Rothpletz had found a student proficient in languages to translate the work. The first maps were already prepared on lithographic stone, ready to be printed, when World War I broke out in 1914. Germany and Austria were suddenly enemies of Britain. The work came to a halt. During the war, Maria Ogilvie Gordon was inundated with social responsibilities back home. She occupied herself with the distribution of food and clothing to the needy and supplies of food to hospitals, as well as doing her utmost for the wounded (Anon. 1939; Matheson 1939). There was very little room for geological work.

For Maria Ogilvie Gordon, two important people died in 1918 and 1919. Both had long-term consequences. In 1918, August Rothpletz died,

and after the war neither her manuscript nor the name of the student who was translating it could be traced. This was a depressing blow for Maria Ogilvie Gordon.

A further even more fateful blow came in 1919, when her husband and understanding companion John Gordon died suddenly on 23 March. He was 68 years old. Figure 5 shows the Aberdeen granite tombstone and burial place for Dr John Gordon, and later Maria, in Allendale Cemetery, by the banks of the River Dee in Aberdeen. It also shows that two of their four children are buried there.

By then Maria was 54 years old, an age at which many others in her position would have given up, but in spite of these disheartening setbacks she threw herself anew into her work, full of enthusiasm and courage. She returned to the Dolomites in 1922. The political landscape had changed and the area now belonged to Italy. She gathered the few old records and notes which remained, went into the field, compared, reconstructed and described. She found a friend in the young Julius Pia rather like she had earlier in Ferdinand von Richthofen. Julius was an enthusiastic palaeontologist and geologist who, during the war, had carried out research in the Prags Dolomites. He even visited her for several months in London during the winter of 1921/2 and together they planned innumerable hikes in the Dolomites between 1922 and 1925. Another famous Austrian geologist, Otto Ampferer, and his wife also accompanied her. Ampferer was to make history with his work on the origins of the Campanile Basso in the Brenta massif.

'Hunting for thrust-planes' is how she once described her methods in conversation with Julius Pia. Nothing could divert her from her conviction that all geological questions could be explained unequivocally through the power of one's own intellect. She could not accept that ultimately many questions must remain strewn with doubts. Still she treated her much younger colleagues as equals, remaining an unpretentious woman, able to fit in immediately with any kind of company in spite of her mature years and experience (Anon. 1923; Matheson 1939).

By then her children were reasonably independent. Her two eldest children, Coral and John, had decided to settle in India, while her third child, a daughter, married a medical doctor from London. She was now in a position to devote herself entirely to geological research.

Finally, in 1927, her major scientific work, voluminous, large-format and almost 400 pages long, was published as a treatise by the Geological Survey of Austria institute in Vienna, entitled *The Gröden, Fassa and Enneberg areas in the South Tyrolean Dolomites* with the subtitle *'Geological Descriptions with emphasis on overthrust fault*



Fig. 5. The Aberdeen granite tombstone by the River Dee in Aberdeen marking the burial place of Dr John Gordon, his wife Maria Matilda Ogilvie Gordon, and two of their children: Mary Monica who died as an infant and their son, Dr John Ogilvie Gordon.

phenomena' (Ogilvie Gordon 1927). She completed this work a year later along with two geological guidebooks for amateurs: *Geological Tour Guide to the Western Dolomites* (Ogilvie Gordon 1928a) and *Guide for Geological Tours in the South Tyrolean Dolomites* (Ogilvie Gordon 1928b). Her knowledge and enthusiasm would, it was hoped, rub off on the increasing numbers of tourists who were visiting the region. The abstruse conclusions

she had arrived at were to become common knowledge. She hoped that many people interested in the conclusions of her work on the history and formation of the Dolomites would travel there from the cities as tourists and hike to the important geological sites (Fig. 6). Her geological guide books were forerunners to the innumerable natural science guides which became popular much later and in this respect she also broke new ground.



Fig. 6. The famous Störeswiesen pastures near Corvara, destination of many of Maria Ogilvie's field trips (Photo Martin Schönegger; Michael Wachtler Archive).

She can be described as one of the first to recognize geotourism as an important activity.

Her works were based on her brilliant powers of observation, and her razor-sharp intellect, and they attested to the endurance and enormous amount of effort she had put into her work (Pia 1940). She noted the time required to walk or climb to the places indicated as well as the altitude above sea level. These details in a guidebook of this sort also broke new ground, even though one critic opined that fossils were nothing like as common as Maria Ogilvie Gordon had described in her exuberant enthusiasm.

She was now 63 years old, still tireless, still unrecognized and dedicated to a thorny niche domain.

Modest fame and a tough struggle for women's rights

At last, for the first time, scientific circles began to pay attention to and honour Maria Ogilvie Gordon. She became an honorary member of the Geological Survey of Austria Institute (*Geologische Bundesanstalt*) in Vienna (1931), of the University of Innsbruck and of the Natural History Museum of Trento. The Geological Society of London awarded her the much-coveted Lyell Medal in 1932. She was particularly thrilled by the recognition from her own people

All the more, Mr. President, because my work had to be done outside Great Britain, and was humanly of so isolated a character,

I derive very special pleasure to-day in this recognition from the geologists of my homeland. (Ogilvie Gordon 1932)

In her address she mentions several key people who had helped her; Sir Archibald Geikie, William Topley and Professor Charles Lapworth. She also acknowledges the help of the two Scottish geologists Peach and Home.

They accepted my work, so to say, on the bona fides of my thrust planes, which they said did precisely what thrust planes ought to do

... and from their work in the Highlands they should have been familiar with the problems Maria had encountered in the Alps. However, it was a breakthrough which would certainly not have been forthcoming without the support of her sympathetic German-speaking friends. She had to admit to her German-speaking colleagues:

I attribute its coming entirely to the previous generous treatment given me by your Geological Society.

She had found a new sphere of activity at the Geological Survey of Austria Institute, and it was from there that news of her reputation and audacious geological evaluations sped to the United Kingdom, where she was at long last taken seriously in scientific circles. Even her home country commemorated her in 1935 by awarding her an honorary doctorate from Edinburgh University. She had always regarded herself first and foremost as a Scotswoman and loved her homeland. She was invited to geological congresses in Canada and

Vienna and, in 1931, the Australian government even invited her to Perth, Melbourne and Adelaide.

However, in 1931, she received more bad news: she had to undergo major surgery. She had hardly recovered when she threw herself into her work once again. Ever since her student days she had experienced first hand how women everywhere were discriminated against and unfairly treated. Maria Ogilvie Gordon never became a militant campaigner but became first vice president of the International Council of Women, president of the National Council of Women and honorary president of the National Women's Citizen's Association (Anon. 1939). Her strength lay in constantly drawing attention to the unequal treatment of women. She supported the cause for working women to be protected during pregnancy and for men, women and children to be regarded as equal partners with equal rights. As early as 1908 she had aroused interest by publishing a *Handbook of Employment for Boys and Girls*, in which she expounded her view that children should grow up in a socially tranquil environment. She organised touring exhibitions to make adults aware of the importance of childcare. She drew attention to the importance of quality health insurance, general hygiene and safety measures in factories. Sometimes for weeks and even months she was away on selfless missions. Wherever she went she led from the front, met politicians, was on countless committees and sacrificed her time to create a better world.

Nothing could discourage her. She put her name forward as an MP candidate for the Liberal Party in seats with hardly any hope of success for the sole purpose of gaining votes for the movement, which she believed would campaign for sexual equality. Thus she was engaged in persuading more women to become involved in politics, to convince them not to fear expressing their opinions, to imbue them with a more active appreciation of democracy.

She herself was a Justice of the Peace and the first woman Chairman of the Marylebone Court of Justice. She served as honorary presidents of both the Associated Women's Friendly Society and the National Women's Citizens' Association and became president of the National Council of Women of Great Britain and Ireland in 1916 (and much later, in July 1936, first vice chair of the International Council of Women) and chair of the Mothercraft and Child Welfare Exhibitions Committee in 1919. She played a strong part in the negotiations following World War 1 at the Council for the Representation of Women in the League of Nations. For all this work she received a DBE in 1935 from King George V, thus becoming a Dame. The same year she received an honorary LL.B from Edinburgh University. By then she was 75 years old.

In 1935, she had travelled to the Langkofel massif in Val Gardena (Gröden) and undertaken field trips with Julius Pia to (*On the Geology of the Langkofel massif in the South Tyrolean Dolomites*) study the area's folds and thrust faults, followed by a trip to Vienna to go through the manuscript *Zur Geologie der Langkofelgruppe in den Südtiroler Dolomiten*. The intellectual analysis of the content visibly tired her out, and the food in local inns also took its toll on her:

I am oh! So very keen to have this work published soon.

Storm clouds gathered once again over Europe, a development which must have depressed Maria Ogilvie Gordon, given that she had spent such a large part of her life exploring and working in German-speaking regions and where she had large numbers of friends. Ailing, she returned to London.

She died on 24 June 1939 at Hanover Gate Mansions, NW London, but her ashes are buried in Aberdeen in the Scotland she loved.

It is a tribute to the high esteem in which she was held that, on the Continent, her colleague Julius Pia wrote a long obituary to her *after* the outbreak of World War 2 in 1939 in German in Vienna – surely a great tribute to a great lady.

What is Maria Ogilvie Gordon's legacy?

In a forceful letter to Julius Pia, dated 14 March 1937, Maria Ogilvie Gordon wrote:

But the work was a joy and I look back on the days of expecting discovery at every corner as my happiest time.

Despite all the other calls on her time, in her heart she always remained a geoscientist. All her life she was fascinated by Mother Nature, many of her other activities becoming mere irksome chores. She was worn down but at the same time spurred on to great achievements by her inner conflicts.

I am rather in despair about getting on with my work. [1925]

Following on from the classification of strata in the Dolomites, the nature and structure of corals and tectonics, she had wanted to break even more new ground in her geological research work. But time was running out for her. Certain Earth science enthusiasts soon began to call her the 'Dolomite Geologist'.

'Endless work to do in several of the women's Societies and have had no attempt at finding time for geology' [1927].

She had ventured into a field of activity which could yield no natural resources, and no powerful industries sponsored her in the hope of making vast profits – a fate shared by many other scientists. The fact that she had made inroads into new and uncharted territory was completely immaterial. She faded beneath a veil of oblivion.

Table 1. The memorable highlights and achievements of Maria Ogilvie Gordon (after Burek 2004, 2005)

Date	Achievements
1893	First woman to receive a DSc from University of London
1900	First woman to receive a PhD from Munich University
1901	English translation of Zittel's German <i>History of Geology</i>
1908	Publishes <i>Handbook of Employment for Boys and Girls</i>
1916	President of the National Council of Women of Great Britain and Ireland
1919	Formed the Council for the representation of women in the League of Nations
1919	In first group of women to be elected to the Geological Society of London
1920	First JP and chairman of the Marylebone Court of Justice
1928	First geological guidebooks to the Dolomites Honorary membership of the University of Innsbruck Honorary correspondent of the Geological Survey of Austria
1931	First female honorary member of the Geological Survey of Austria Institute
1932	Received Lyell Medal from Geological Society of London
1935	DBE from King George V Honorary LL.B degree from Edinburgh University
1939	Died in London; ashes buried in Aberdeen with her husband
2000	A new fern genus named after Maria Gordon. The type specimen is called <i>Gordonopteris lorigae</i> ; a tripinnate fern frond with a pinnule absent from the bases of the pinnae of the first and second order with small pinnules.

The movement for women's rights in which she had played a pivotal role in the early years progressed so agonisingly slowly that the early pioneers were soon forgotten. Today, when higher education for women is taken more for granted, nobody remembers the women who had to struggle even to be admitted to university courses because of their sex. Maria Ogilvie Gordon was a century ahead of her time. Her husband was right; she ploughed a lonely and arduous furrow all her adult days. She could certainly have chosen an easier path through life. However, Maria Matilda Ogilvie Gordon is an outstanding example of a highly intelligent woman who believed passionately in her research work but also had the foresight and sensitivity to fight for the rights of women in education, politics, peace and society at a time when many less determined women would have failed to rise to the challenge. She is considered one of the most prolific and original Scottish women of science during the 19th century with over 35 original scientific papers.

Honoured after 60 years

It is fitting that, at long last, Maria Matilda Ogilvie Gordon is honoured through palaeontological nomenclature, even if it is over 60 years after her death.

In the year 2000, the first author of this paper, Michael Wachtler, found an abundance of fossilized plants in the Prags Dolomites; among which was an unknown species of fern (Fig. 7). In 2005, Johanna van Konijnenburgh-van Cittert, Michael Wachtler and Evelyn Kustatscher in honour of the two female scientists and explorers Maria Ogilvie Gordon and Carmela Loriga Broglio (Michael Wachtler



Fig. 7. *Gordonopteris lorigae*, a fern from the Triassic period found in the Prags Dolomites by Michael Wachtler. It was named '*Gordonopteris lorigae*' by Johanna van Konijnenburgh-van Cittert, Michael Wachtler and Evelyn Kustatscher in honour of the two female scientists and explorers Maria Ogilvie Gordon and Carmela Loriga Broglio (Michael Wachtler Archive).

and Evelyn Kustatscher named it '*Gordonopteris lorigae*' in honour of the two women scientists, Maria Ogilvie Gordon and Carmela Loriga Broglio (Van-Konijnenburg-Van Cittert *et al.* 2006). The citation states: 'After Dr Marie Ogilvie Gordon who was one of the pioneers of Triassic palaeobotany in the Dolomites. She would have been pleased and honoured.'

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References

- ANON. 1923. Value of organisation shown by improvement of woman's status. *Christian Science Monitor*, 23 April.
- ANON. 1939. Dame Maria Ogilvie Gordon – geologist and champion of women's causes, Obituary, *The Times*, 24 June.
- BUREK, C. V. 2004. Gordon, Maria Matilda (née Ogilvie) (1864–1939) In: LIGHTMAN, B. (ed.) *Dictionary of Nineteenth Century British Scientists*. Thoemmes Press, Bristol.
- BUREK, C. V. 2005. Who were they? The lives of geologists. 5. Dame Maria Matilda Ogilvie Gordon – A Britisher – and a woman at that (1864–1939). *Teaching Earth Science*, 30(4).
- CREESE, M. R. S. 1996. Maria Ogilvie Gordon (1864–1939). *Earth Sciences History*, 15(1), 68–75.
- KLEBELSBERG, R. VON. 1932. Die Dolomitengeologie [The Dolomite Geologist]: Maria M. Ogilvie Gordon. *Der Schlern, Bozen*.
- KÖLBI-EBERT, M. 2001. On the origin of women geologists by means of social selection: German and British comparisons. *Episodes*, 24(3), 182–193.
- MATHESON, C. M. 1939. *Dame Maria Ogilvie Gordon*. Robert Gordon School, archives, newspaper article.
- MORGAN, D. 2004. *Lost Aberdeen*, Birlinn.
- OGILVIE, M. M. 1893. Contributions to the geology of the Wengen and St. Cassian Strata in southern Tyrol. *Quarterly Journal of the Geological Society, London*, 49(1), 4.
- OGILVIE, M. M. 1894. Coral in the Dolomites of South Tyrol. *Geological Magazine*, 1, 1–10, 49–60.
- OGILVIE GORDON, M. M. 1903. The geological structure of Monzoni and Fassa. *Transactions of the Edinburgh Geological Society*, 8, 1–180.
- OGILVIE GORDON, M. M. 1897a. Microscopic and systematic study of madreporian types of corals. *Philosophical Transactions of the Royal Society*, 187 B, 83–345.
- OGILVIE GORDON, M. M. 1897b. Die Korallen der Stramberger Schichten. *Palaeontographica*, 7, 73–282.
- OGILVIE GORDON, M. M. 1906. Interference phenomena in the Alps. *Abstracts of the Proceedings of the Geological Society, 1905–6*, 118–120.
- OGILVIE, GORDON. 1908. Handbook of Employment for Girls and Boys.
- OGILVIE GORDON, M. M. 1909. Die Ueberschiebungsmassen am Langkofel und im oberen Groder Tal. *Verhandlungen der kaiserlich-königlichen geologischen Reichsanstalt, Wien*.
- OGILVIE GORDON, M. M. 1910. The thrust masses in the western district of the Dolomites, Tyrol. *Transactions of the Edinburgh Geological Society*, 9, 1–91.
- OGILVIE GORDON, M. M. 1911. Ueber Lavadiskordanzen und Konglomeratbildungen in den Dolomiten Südtirol. *Verhandlungen der Kaiserlich-Königlichen Geologischen Reichsanstalt, Wien*, 212–222.
- OGILVIE GORDON, M. M. 1913. Leithorizonte in der eruptivserie des FassaGrodengebietes. *Verhandlungen der Kaiserlich-Königlichen Geologischen Reichsanstalt, Wien*, 163–172.
- OGILVIE GORDON, M. M. 1927. *Das Groden, Fassa und Ennerberggebiet in den Südtiroler Dolomiten*, Geologische Beschreibung mit besonderer Berücksichtigung der Ueberschiebungsecheinungen, Vienna.
- OGILVIE GORDON, M. M. 1928a. *Geologisches Wanderbuch der Westlichen Dolomiten*. G. Freytag & Berndt, Wien.
- OGILVIE GORDON, M. 1928b. *Guide for Geological Fours in the South Tyrolean Dolomites*.
- OGILVIE GORDON, M. 1932. Anniversary meeting: Lyell Medals. *Proceedings of the Geological Society, London*, 88, 59–60.
- PIA, J. 1940. Maria Matilda Ogilvie Gordon. Alenlaend. *Geologischen Gesellschaft, Wien*, 32, 173–186.
- STACUL, P. 1969. Die Dolomitengeologie [The Dolomite Geologist]: Maria M. Ogilvie-Gordon as Palaeontologist. *Der Schlern, Bozen*, 43(12), 535–538.
- VAN KONIJENBURG-VAN CITTERT, J. H. A., KUSTATSCHEK, E. & WACHTLER, M. 2006. Middle Triassic (Anisian) ferns from Kühwiesenkopf (Monte Prá Della Vacca), Dolomites, Northern Italy. *Palaeontology*, 49(5), 943–968.