

*This is the pre-print version of a paper published on Rendiconti Online della Società Geologica Italiana, Vol 62 (2024). The paper is available at <https://doi.org/10.3301/ROL.2024.19>*

**Clarence Bicknell (1842-1918): botanist, archaeologist, Esperantist, and... citizen geologist**

Luca Barale<sup>1\*</sup> & Marcus Bicknell<sup>2</sup>

*1: National Research Council of Italy, Institute of Geosciences and Earth Resources, Via Valperga Caluso 35, 10125 Torino (Italy).*

*2: Clarence Bicknell Association ([www.clarencebicknell.com](http://www.clarencebicknell.com)).*

*\*Corresponding author: [luca.barale@cnr.it](mailto:luca.barale@cnr.it)*

**Abstract**

Clarence Bicknell (1842-1918) was an eclectic naturalist, archaeologist, artist and Esperantist. Born from a wealthy English family, in 1878 he moved to Bordighera on the Western Ligurian Riviera (Italy), where he spent the rest of his life and where, in 1888, founded the *Museo Bicknell* that still hosts a part of his collections. He was particularly versed in botany and made substantial contributions to the study of the local flora. However, Bicknell's most significant scientific achievement is the systematic inventory and study of the prehistoric rock engravings of the Merveilles and Fontanalba valleys (Maritime Alps), to which he dedicated himself for twenty years, from 1897 until his death. Bicknell established relationships and maintained correspondence and collaboration with several scientists, including some geologists such as Alberto Pelloux (1868-1948), Federico Sacco (1864-1948), Arturo Issel (1842-1922), and Achille Tellini (1866-1938). Over the years, Bicknell had also put together an important collection of Pliocene fossils — mainly molluscs— from various outcrops in Western Liguria. Bicknell willingly shared these fossils with the palaeontologists Luigi Bellardi and Federico Sacco and donated a large part of them to the Geological Museum of Torino. To acknowledge Bicknell's contribution to the study of Pliocene faunas of Western Liguria, two Pliocene mollusc species were dedicated to him: the bivalve *Aequipecten bicknelli* Sacco, 1897 and the gastropod *Epitonium bicknelli* (Hornung, 1920).

**Keywords:** *history of geology; palaeontology; Clarence Bicknell; Federico Sacco; Pliocene; Liguria*

## INTRODUCTION

Clarence Bicknell (1842–1918; Fig. 1a, b) was born in Herne Hill, a suburb of London, the youngest of the thirteen children of Elhanan Bicknell (the information on Bicknell’s life and work, unless otherwise specified, are from Bicknell P., 1989; Bicknell M., 2003; Lester, 2018). Clarence’s mother, Lucinda Browne Bicknell, was the third of Elhanan Bicknell’s four wives; she was the sister of Hablot Knight Browne, the principal illustrator of the works of Charles Dickens under the pseudonym “Phiz”. Elhanan Bicknell had made his fortune trading in refined sperm whale oil, and the family lived in a mansion surrounded by a vast park. Elhanan Bicknell had also become an art collector, particularly interested in modern English painters. His collection counted, among the others, more than thirty works of William Turner, and the artist himself was a frequent guest at Herne Hill.

After his father’s death in 1861, Clarence Bicknell was admitted to Trinity College at Cambridge University, where he graduated in mathematics in 1865. Bicknell then entered the Church of England, being ordained as a deacon in 1866 and as a priest in 1868. He first served at Walworth, a poor parish in Southern London, then moved to Stoke-upon-Tern in the Shropshire countryside, to join the *Societas Sancti Spiritus*, a religious community that counted among its confreres some of Bicknell’s Cambridge friends (Maitland, 2003). Over the years, Bicknell grew restless and less firm in his religious vocation and decided to use a part of the inherited fortune to travel abroad.

In 1878, Bicknell arrived in Bordighera, a locality in the westernmost part of the Italian Riviera, at the invitation of the Fanshawes, a wealthy English family who had settled in Bordighera some years earlier. The Fanshawes wanted him to become chaplain of the new All Saints Church (known in Italian as “*Chiesa Anglicana*”), built to serve the needs of the English community, which was in want of a proper place of worship. In the second half of the 19<sup>th</sup> century, Bordighera had indeed become a popular tourist destination, frequented in particular by English people, in the wake of other localities of the nearby French Riviera. The rise of Bordighera as a tourist locality had followed the publication in 1855 of the novel *Doctor Antonio* by the Italian writer and exile

Giovanni Ruffini. The novel, written in English language and published in Edinburgh, tells of the tragic love between an Italian patriot and a noble English girl and had the intention to attract the sympathy of the international community to the cause of the Italian Risorgimento. The book, however, also contained charming description of the landscapes of Bordighera and its surroundings and had the effect of arousing the interest of foreign travellers towards this locality. The English community in Bordighera grew rapidly and at the end of the century outnumbered the local population; the community was organised with its own shops, hotels, banks, and tea rooms. The 1878, the same year of Bicknell's first visit to Bordighera, saw the foundation of the Bordighera Lawn Tennis Club (still in activity), the oldest tennis club outside the British territory.

Bicknell accepted the proposal of the Fanshawe family and became the chaplain of the All Saints Church. But, after a few months, due to his growing disillusionment with the Church and following the attacks he received because of his attitude judged too friendly towards local Catholics, Bicknell definitively abandoned his position as chaplain. However, in the autumn of 1879, he decided to settle in Bordighera, and soon bought from the Fanshawe family their mansion, *Villa Rosa*, that was his home for the rest of his life.

Freed from his pastoral duties, Bicknell started to indulge his old passion for botany. In many years of meticulous work, he progressively widened his research area from the neighbourhood of Bordighera to a much larger sector including part of the Maritime and Ligurian Alps. He realised rich herbaria containing thousands of dried specimens and thousands of watercolours of plants and flowers (Arobba et al., 2020; Caramiello & Arobba, 2020a). Bicknell was indeed an excellent watercolourist, and he made the beautiful illustrations of his botany texts himself (Fig. 1c), together with a series of other artistic realizations (e.g., Bicknell, 2017; Lester, 2018; Caramiello & Arobba, 2020a). The botanical research made by Bicknell in Western Liguria are condensed into two volumes published a decade apart: *Flowering plants and ferns of the Riviera and neighbouring mountains* (Bicknell, 1885) and *Flora of Bordighera and San Remo* (1896). These were followed by a later book on *The common fig tree* (Bicknell, 1912).

Bicknell participated actively in the life of Bordighera, and promoted numerous charitable activities aimed at the local community (e.g., Béguinot, 1931; Marcenaro, 2003), including a fundraising for the victims of the earthquake that struck the Western Riviera in 1887. He was one of the promoters and sponsors of the construction of the local library (Marcenaro, 1998; Covezzi, 2003) and paid for the conservatory studies of Pietro Zeni (1870-1932), a promising young mason who would become an acclaimed tenor. As time went by, the enormous amount of botanical material collected began to take up too much space in *Villa Rosa*; at the same time, Bicknell felt that Bordighera needed a place where the community could gather for cultural and social events. He thus decided to build a museum, which was opened in 1888 (Pallarés, 1989; Marcenaro, 1998). The Museo Bicknell ([www.museobicknell.com](http://www.museobicknell.com)) still hosts a part of Bicknell collections and is today part of the *Istituto Internazionale di Studi Liguri*.

In 1891, Edward Elhanan Berry, son of Bicknell's sister Ada, moved to Bordighera for health reasons. He initially ran an agency for Thomas Cook<sup>1</sup>, then founded his own bank and became involved in many commercial activities and services aimed at the English community. In 1897 Edward E. Berry married Margaret Serocold Berry; in 1904, they laid the foundation stone of their new home, *Villa Monte Verde*, on the first hillside of Bordighera above the Roman Road. The Berrys lived in close contact with Bicknell, helping him in all his activities. After Bicknell's death, they ensured the continuity of his legacy and took over the management of the museum. In 1931, following the death of the husband, Margaret published *At the Western Gate of Italy* (Berry & Berry, 1931), an excellent guide to the history, art and archaeology of Western Liguria written by them in two hands.

In 1897, Bicknell discovered Esperanto and soon became an enthusiastic supporter of this universal language (Mano, 1990; Capano, 2003). He took part to several international and national congresses, participated to the funding of the Esperantist group of Milano and was the principal

---

<sup>1</sup> Thomas Cook (1808 –1892) was an English businessman. He is best known as the founder of the first travel agency, the Thomas Cook & Son, and considered the inventor of modern tourism.

founder and president of the Esperantist group *Antaŭen!* (“Ahead!”) in Bordighera. Over the years he dedicated himself to the dissemination of the language and composed numerous texts and poems in Esperanto. He also translated various texts and literary works from English and Italian to Esperanto, and to Esperanto Braille. The short abstract in Esperanto at the end of this paper is an homage to Bicknell’s commitment to the dissemination of this language.

Starting from 1897, Bicknell devoted himself to the study of the prehistoric rock engravings of the Maritime Alps, an activity that adsorbed him intensely for the next twenty years, until his death (Fig. 1d, e). These engravings are found around the Mont Bego massif in the Merveilles and Fontanalba valleys and in adjoining localities (see de Lumley, 1995; Barfield & Chippindale, 1997; Huet, 2017; and references therein). The area lies in the municipality of Tende (Tenda, in Italian), that is today part of France, but was in Italian territory at that time. The engravings were realized on Permian reddish and greenish pelites, mainly on surfaces polished by the glacial action, but also on fracture surfaces and detached blocks. Even though the presence of the engravings had already been reported by previous scholars, Bicknell was the first to engage in a systematic work of search, cataloguing and reproduction of the engravings. With the help of his assistant Luigi Pollini, Bicknell discovered thousands of engravings (more than 12,000 according to Bicknell, 1913), which he reproduced by rubbings on paper obtained directly on the rock surfaces (“frottages”), drawings, and photographs (e.g., Chippindale, 1985; Garibaldi et al., 2003). Together with several articles, Bicknell published three books where he documented the progress of his work, including new findings and interpretation: *The prehistoric rock engravings in the Italian Maritime Alps* (Bicknell, 1902), *Further explorations in the regions of the prehistoric rock engravings in the Italian Maritime Alps* (Bicknell, 1903) and his last and most important work, *A guide to the prehistoric rock engravings in the Italian Maritime Alps* (Bicknell, 1913).

To study the engravings, Bicknell spent almost every summer since 1897 in Casterino (1550 m asl), the nearest hamlet to the sites of the engravings. Initially he rented a house, but later he decided to build his own mountain home, *Casa Fontanalba* (Chippindale, 2003). The home was completed in

the late spring of 1906; over the years Bicknell personally decorated the house walls, doors and shutters with floral motives and decorations inspired to the rock engravings, as well as Esperanto proverbs, and created a rich garden around it. *Casa Fontanalba* saw every summer numerous guests, as recorded in two documents, the *Casa Fontanalba Visitors' Book* and the *Book of Guests in Esperanto* (see below). Bicknell died peacefully on the balcony of *Casa Fontanalba* on 17 July 1918 and was buried in the cemetery of Tende.

Clarence Bicknell is universally praised for his contributions to botanical studies (e.g., Béguinot, 1931; Martini, 1981; Caramiello & Arobba 2020a, 2020b), and for his research on prehistoric engravings, a work much appreciated by both his contemporaneous and modern scholars (e.g., Barocelli, 1918, 1926; Sacco, 1930; Chippindale, 1984, 1985). He has been recently defined as a “*citizen scientist*” (Mariotti, 2019), for his commitment to several scientific disciplines for which he did not receive an academic training. This absence of a specific scientific formation in some fields was admitted with great humility by Bicknell (“...*since I'm not a geologist, nor an historian, nor an archaeologist, my words cannot have much value.*”; Bicknell, 1897, p. 393) and he always sought the advice of, and maintained exchanges and correspondence with, many academics and specialists. These include, for example, the botanists Augusto Béguinot, Émile Burnat, John Briquet, Stefano Sommier, Lino Vaccari, Renato Pampanini, Henry Correvon and Harold Stuart Thomson (e.g., Lester, 2018; Caramiello & Arobba, 2020b; Avery, 2022) and the palaeoethnologists and prehistory scholars Arturo Issel (e.g., Parodi, 2004) and Émile Cartailhac (e.g., Machu, 2006-2007; Lester, 2018).

Of lesser extent, and generally unknown, are his contributions to other fields of the natural sciences, which he became also interested in during the four decades of his life in the Italian Riviera. Since his first days in Bordighera, for example, Bicknell started to collect fossils in the richly fossiliferous Pliocene deposits of the neighbourhood. Over the years, he put together a large collection from Bordighera and other Western Liguria localities that served as reference material for the study of

these faunas by the palaeontologists Luigi Bellardi and Federico Sacco of Torino. A large number of the specimens studied by the two palaeontologists, including the types of all newly described species, were donated by Bicknell to the Geological Museum in Torino, whereas the other are still kept in the Museo Bicknell in Bordighera. Bicknell's library of natural history, kept in the Museo Bicknell and consisting of more than 300 volumes (Anonymous, 2003; Russo, 2020), also contains about fifteen geological works. These are mainly palaeontological treatises on Cenozoic fossils, including the *Conchiologia fossile subapennina* [Fossile subapennine conchology] by Giambattista Brocchi, the *Malacologia Pliocenica Italiana* [Italian Pliocene malacology] by Cesare d'Ancona, Frederic William Harmer's monograph on British Pliocene molluscs, and the monumental treatise in 30 volumes *I Molluschi dei Terreni Terziarii del Piemonte e della Liguria* [The molluscs of the Tertiary sediments of Piemonte and Liguria] by Luigi Bellardi and Federico Sacco, which contains the descriptions of several specimens collected by Bicknell (see below).

More in general, the close relationships between the rock substrate and the main targets of Bicknell's research (initially plants and then the rock engravings), the large amount of time spent on the field, and his natural curiosity, inevitably led him to take some interest in the geological constitution of the region. In his works on the prehistoric rock engravings of the Merveilles and Fontanalba valleys we find, indeed, some general notes on the geology of the district and lithological description of the rock outcrops hosting the engravings (e.g., Bicknell, 1913). The 'rock landscape' of the Maritime Alps and of the Bordighera neighbourhood was also the subject of many watercolours by Bicknell (Fig. 2a-c). These watercolour landscapes have been recently recognized as an important iconographic source for the study of the landscape evolution in Western Liguria, especially in the coastal region that underwent deep modifications during the last century (Bruzzone et al., 2019). Figure 2c shows a watercolour realized by Bicknell in 1900 depicting the rocks of the Sant'Ampeglio promontory in Bordighera. These rocks are made up of coarse arenite and micro-conglomerate, belonging to the Upper Cretaceous Bordighera Sandstone of the Western Ligurian *Helminthoides* Flysch succession, which Bicknell described as follows in his 1878-1879 diary:

*“here & there very suddenly & deeply shelving banks - rock a large coarse yellow limestone or sandstone, with here & there beds with little angular pieces of many kinds of rock cemented together - higher up above the town is a coarse conglomerate, with very big pebbles, looking like artificial concrete”* (Bicknell, 1878-1879, Vol. 1, entry for Thursday Oct. 3<sup>rd</sup>, 1878). The Bordighera Sandstone, extracted from the quarries in Arziglia, was chosen by Bicknell years later for the construction of his museum, along with Jurassic limestone from La Turbie near Monaco (Pallarès, 1989).

### **BICKNELL’S FREQUENTATION AND CORRESPONDENCE WITH GEOLOGISTS OF HIS EPOCH**

*“The summer of 1902 saw us again in Casterino, where we had the pleasure of a visit from Prof F. Sacco of Turin, and Prof. Issel and his son Dr R. Issel, also from the learned mineralogist Captain A. Pelloux.”* (Bicknell, 1913, p.27).

This sentence from Bicknell’s main work on the prehistoric rock engravings of the Merveilles and Fontanalba valleys is a good example of the close network of relationships woven by Bicknell with some of the most influent geologists of the time as the cited Federico Sacco, Arturo Issel and Alberto Pelloux. Some of these connections are testified by dense correspondences consisting of dozens of letters, such as those with Pelloux (Bernardini, 1993, 2003) and Issel (Scati, 2003; Tagliafico & Vicino, 2003; Parodi, 2004). Other precious sources of information on Bicknell’s frequentations of geologists are two documents related to his mountain home, *Casa Fontanalba*: the *Casa Fontanalba Visitors’ Book* and the *Book of Guests in Esperanto*. The former is a vellum-bound album consisting of 60 pages; in 1906, Bicknell decorated each right-hand page with a watercolour of a wildflower, leaving empty the opposite pages for the signatures of his guests. The *Book of Guests in Esperanto* is a small vellum-bound album featuring short pieces of information about the visitors who spent at least one night at *Casa Fontanalba*. The short text about the guest, in Esperanto, is on the left-hand page, accompanied by a decorated monogram combining the guest’s

initials; on the right-hand page is a watercolour of an Alpine plant in blossom. In these two documents we find the record of several geologists who, over the years, had visited Bicknell in his mountain home, alone or accompanied by members of their families (see below). The original copies of the two books are kept in the Bicknell Family collection. A facsimile edition of the *Casa Fontanalba Visitors' Book* has been published on the centenary of Clarence Bicknell's death (Bicknell, 2018). Recently, a reproduction of the *Book of Guests in Esperanto* has been also published (Bicknell, 2022).

This work briefly outlines the exchanges and relationships of Bicknell with geologists and naturalists of his time and presents his contributions to the advancement of the geological knowledge, largely related to the study of Pliocene molluscs of Western Liguria.

### **Alberto Pelloux**

Alberto Pelloux (1868–1948) was a mineralogist, President of the Italian Geological Society in 1934 (for more details on Pelloux's life and work see Magistretti, 1948; Abbolito, 1949; Sanero, 1951). He had initially undertaken a military career following the footsteps of the father, General Luigi Pelloux, Senator of the Kingdom of Italy, Prime Minister in 1898-1900 and several times Minister of the Interior and Minister of War. Before his definitive discharge from the Army in 1919, A. Pelloux had earned the rank of Captain. Pelloux was a regular visitor of Bordighera, where he stayed in the family house, *Villa Caterina* (Fig. 3a). The building, located between the streets *Corso Italia* and *Via Pelloux* (named after Alberto's father, Luigi), is still present even though it has been completely rebuilt.

During his stays in Bordighera, Pelloux became friends with Clarence Bicknell. We do not know exactly when they made their acquaintance, but the relation between them is testified by dozens of letters, cards, and postcards (Fig. 3b) written by Bicknell between 1902 and 1917 and presently kept at the *Istituto Internazionale di Studi Liguri* in Bordighera (Bernardini, 1993, 2003; Gandolfi, 2003). Bernardini (1993, 2003) published a list of the contents and several excerpts of this

correspondence: the themes vary from accounts of daily life, travels, and excursions, to updates on Bicknell's activities and studies, to comments on the political events, including, in the last years, the facts and daily life during World War I. The letters also contain invitations to excursions to be made in the vicinity of Bordighera, or in Casterino. In the summer of 1902 Pelloux joined Bicknell at Casterino and on 18 July they made an excursion to the lakes in the upper Fontanalba Valley, still encumbered by floating ice, together with Luigi Pollini and Bicknell's dog Mahdi. The excursion was humorously recounted by Bicknell in a letter, entitled "*Racconto abbreviato adatto al 20° secolo del viaggio del Tenente Pelloux verso il Polo Artico*" [Abridged account fit for the 20<sup>th</sup> century of Lieutenant Pelloux's journey towards the Arctic Pole], mimicking the tones of the popular accounts of polar expeditions (Bernardini, 1993). The photograph attached to the letter shows a lake with abundant floating ice (Fig. 3c) and bears the following caption on its back: "*upper lake near Bassa di Fontanalba – Spedizione del Tenente Pelloux verso il polo artico 18 luglio 1902.*" (Fig. 3d).

On the August of 1913 Pelloux visited again Clarence Bicknell in Casterino, accompanied by his wife Bianca Terni de Gregory Pelloux (1880-1964) and their son Luigi (1906-1959) (the second son of the couple, Riccardo, would have born in 1917). On that occasion, the three members of the Pelloux family posed for a famous photograph in front of Casa Fontanalba, together with Bicknell and Marco Novella, a forester from Bordighera and guest at Casa Fontanalba (Fig. 4a). The four guests left their signatures on the *Casa Fontanalba Visitors' Book* (Fig. 4b), and Bicknell made an entry for each of them in the *Book of Guests in Esperanto*. The one dedicated to A. Pelloux (Fig. 4c) goes as follows: "*Alberto Pelloux, Captain. Initially he was for many years in the Alpini, and later a staff officer, but was glad to leave the army and dedicate himself entirely to mineralogical studies. In 1912 he classified and recorded in a wonderful way the minerals in the new municipal museum of Genova. His father, Generale Luigi Pelloux, has been Minister of War*".

Figure 4d shows another famous image of Bicknell and Pelloux, pictured together during a field excursion. The location of this image has long remained unknown and has been only recently

spotted by one of the authors (see Bicknell, 2021). The image was shot on the southern side of Monte Bellenda, near Mortola (Ventimiglia) during winter, as evidenced by the copious snow cover of the Mont Agel (1148 m) ridge on the background. The photograph was probably shot in the first years of 1900, as a second copy of it, kept in the archives of the *Istituto Internazionale di Studi Liguri* in Bordighera, was attached to a letter of 1905 (Bernardini, 2003). In the historical photograph, the place appears relatively barren, and the two gentlemen pose comfortably seated on an outcrop of middle Eocene Nummulite Limestone. The same outcrops are instead today immersed in a thick Mediterranean scrub, with numerous pine trees that partially mask the view. The timelapse view (Fig. 4e) realized by superimposing the historical photograph on the present-day panorama from the same point was chosen as a representative image for the scientific session “*Geology is coming home. A renewed interest in Italian geoscientific tradition*” at the joint congress of the *Italian Geological Society* and the *Italian Society of Mineralogy and Petrology*, held in Torino in September 2022 (see Argentieri, 2022).

The goal of the excursion of Bicknell and Pelloux at Monte Bellenda may possibly be explained by a piece of information incidentally reported by Arturo Issel in a paper about prehistoric and protohistoric findings in Liguria and Provence: “...*Gaudin e Moggridge signalled in the Lower Eocene deposits of Monte Bellenda above La Mortola grains of amber, which, no matter how much I searched, I could not find, nor did Messrs. C. Bicknell and Pelloux, who also went looking for them.*” (Issel, 1904, p. 57). The original report of grains of amber (“*succino*” in the Italian text) in the Eocene succession of Monte Bellenda, never later confirmed, was not actually due to Gaudin & Moggridge (1864), as indicated by Issel, but to Fontannes (1877), who cited Gaudin and Moggridge’s work but presented the observation about the amber grains as his own.

### **Federico Sacco**

Another lasting friendship linked Bicknell to Federico Sacco (1864–1948), geologist and palaeontologist of Torino, one of the most important geoscientists of the epoch and President of the

Italian Geological Society in 1907 and 1924 (Fig. 5a-e). Sacco was the author, among other important works, of a monumental treatise on the Cenozoic molluscs of Piemonte and Liguria. Bicknell had contributed to this work, since he "*donated a rich collection of Pliocene fossils from Liguria to the Geological Museum of Torino, and [...] always shares liberally with me all the material of the valuable collection put together by him and kept in the nice Museum he built in Bordighera*" (Sacco, 1897; see below the chapter about Bicknell's fossil collection). Another theme of connection and exchange between the two scholars was that of the prehistoric rock engravings, as remembered by Sacco in a paper about the "Marvels" of Monte Bego: "*Since thirty years, after having studied geologically the Argentera Massif, I came up from time to time, almost in pilgrimage, to examine the Marvels of Monte Bego; the death of my dearest friend Clarence Bicknell interrupted this almost ritual custom of mine, which I resumed the last year upon the kind invitation of his nephew Ed. Berry, who asked me to be a guest at the pleasant home in Fontanalba, full of so many memories!*" (Sacco 1930: footnote at p. 41)

Sacco had indeed visited Bicknell at Casa Fontanalba many times, as indicated by the signatures in the Casa Fontanalba Visitors Book on the following dates: 15/7/1908; 8/7/1909, and in company of his son Mario Sacco; 22/7/1916; and 28/6/1918, just about twenty days before Bicknell's death, with his son Vittorio Sacco and his wife Giuseppina Campora (who signed as "*Giuseppina Sacco Campora*"; Fig. 5c). On 8/7/1909 Federico and Mario Sacco made an overnight stay at Casa Fontanalba, as we find two pages dedicated to them in the Book of Guests in Esperanto (Fig. 5a,b). The page dedicated to Federico Sacco bears the following text: "*Federico Sacco, doctor of science, professor of geology in Torino and director of the Museum of Geology. He wrote many important books, especially on the Tertiary fossils of Liguria and Piemonte*".

After Bicknell's death, Sacco remained into contact with Bicknell's nephew Edward Berry, as indicated by a few letters exchanged by them (see Pozzar, 2003) and by the fact that Sacco gave a talk about The Moon ("La Luna") at the Museo Bicknell in 1924 (see Fiore, 2003). Sacco paid a visit to Casa Fontanalba eleven years after the death of Bicknell, as testified by his signature dated

2-5/8/1929 in the *Casa Fontanalba Visitors' Book* (Fig. 5e), and as remembered in his 1930 paper (see excerpt cited above). At the end of the same page in the *Casa Fontanalba Visitors' Book*, a pencil annotation, not in Sacco handwriting, records the last visit of the geologist to Casa Fontanalba during the summer of 1930: “*Prof. Sacco – Aug 4<sup>th</sup>*”. In the early 1930’s Federico Sacco was among the promoters of a commemorative plaque dedicated to Bicknell, to be realized in bronze from an original of the sculptor Carlo Conti. The plaque should have been placed on Casa Fontanalba, or in the city of Cuneo, but the project did not materialize. The bronze plaque was finally made in 1939 and placed at the entrance of the Museo Bicknell in Bordighera (Mano, 1990).

### **Achille Tellini**

Achille Tellini (1866-1938; Fig. 6a) was a Friulan naturalist, who obtained his degree in Torino and then moved to the University of Rome following his mentor Alessandro Portis (1853-1931), of whom he became the assistant (Stefanutti, 1989). He initially dedicated himself to palaeontology and published some studies on Italian nummulitids (Tellini, 1888, 1890). In 1894, Tellini moved back to Friuli, where he had won the position of professor of Natural Sciences at the *Regio Istituto Tecnico Antonio Zanon* of Udine, and began to take an interest in various geological problems related to the territory of that region. He later abandoned the natural sciences, due to family problems, and in 1908 he moved to Bologna, where he started an antiquarian bookshop. In those years Tellini approached the themes that would accompany him for the rest of his life, namely the study of Ladin and Friulan philology, linguistics, and culture, as well as the dissemination of Esperanto. The Esperantist activity of Tellini was very intense and probably one of the main points of contact between him and Bicknell, even if we do not know much about their relationship.

We find traces of Achille Tellini both in the *Casa Fontanalba Visitors' Book*, where he left his signature, written in Esperanto, on 31/08/1915 (Fig. 6b), as well as in the *Book of Guests in Esperanto* (Fig. 6c): “*Achille Tellini, Doctor of Natural Sciences. Initially he was assistant to the Geology Professor in Rome. Later professor of geology, botany, etc., in the Udine High School.*

Afterwards he became an enthusiastic Esperantist, founded the 'Cattedra Italiana di Esperanto', and wrote, travelled and worked much to diffuse the international Language". However, the contacts between the two must have started many years earlier, before Tellini became involved in the diffusion of Esperanto. In fact, we do know that, at the time of Tellini's studies on nummulitids, Bicknell had provided him with specimens (Fig. 6d) from two localities on both sides of the Italian-French border: "The specimens that I describe, together with numerous others were collected in the neighbourhood of Mentone and La Mortola by the eminent English botanist Clarence Bicknell, who settled down in Bordighera where he is expanding with great love a local Museum of natural history and relevant library which he founded by his own initiative, He furnished to me abundant nummulitic material of the Riviera and the Maritime Alps" (Tellini, 1890, p. 368-369). Moreover, during the time Tellini was teaching at the *Regio Istituto Tecnico Antonio Zanon* of Udine, Bicknell donated some botanical and palaeontological collections for the natural sciences cabinet of the school: "CLARENCE BICKNELL of Bordighera: magnificent herbarium comprising 509 species of plants from Italy and other districts of Europe (March 27, 1894) - 67 determined species from the Pliocene of Bordighera (October 19, 1894) - a polished greenstone axe from Oceania (September 1896) - a collection of fucoïds from the Ligurian of the Bordighera neighbourhood (November 1896)" (Tellini, 1896, p.135).

### **Relations with other geologists**

Bicknell shared an intense scientific exchange and a lasting friendship with Arturo Issel (1842–1922), palaeoethnologist and one of the most influent geologists of the time (he was president of the Italian Geological Society in 1893), author of the monograph *Liguria Geologica e Preistorica* (Issel, 1892) and of a detailed study on the earthquake that struck the Western Italian Riviera in 1887 (Issel, 1888). The main area of interaction between Bicknell and Issel was that of the prehistoric rock engravings, the main theme of their extensive correspondence, already analysed in detail in precedent contributions (Scati, 2003; Tagliafico and Vicino, 2003; Parodi, 2004).

However, Bicknell also did some “geological field work” on behalf of Issel, as he carried out observations and temperature measurements of the sulphureous waters of the Giuncherello (today Giunchetto) source between Bordighera and Ospedaletti, following the 1887 earthquake: “*Mr. Clarence Bicknell, who wanted to measure for me the temperature of this source, did find it twice, at an interval of a few days, during the winter of 1887-1888, of 19° ½ (cent.)*” (Issel, 1888, p. 72); “*According to Mr. Bicknell, residing in Bordighera, the flow of the sulphureous spring called of Giuncherello, near that village, increased by about one third after the earthquake. It does not seem that its temperature has changed.*” (Issel, 1888, p. 128).

Another Ligurian geologist who frequented Bicknell was Gaetano Rovereto (1870-1952), author of the important monography *Liguria Geologica* (Rovereto, 1939). Not much is known about the relationship and exchanges between the two men, and there is no trace of Rovereto either in the *Casa Fontanalba Visitors' Book* or in the *Book of Guests in Esperanto*. But they must have met around 1890, as we learn from the commemoration written by Rovereto a few months after Bicknell's death: “*Among the memories of my youth, there is the acquaintance that I had the good fortune to make, more than twenty-five years ago, of this English gentleman, jovial because a man of heart, studious because a man of intellect, and handsome because a man of sport, who was interested in the flora of the Riviera, and collected fossils in the neighbourhood of Bordighera; but who, moreover - it was said in confidential communications because otherwise he would have been annoyed - encouraged, protected, subsidised every good work, whether it was a scientific publication or an altruistic action.*” (Rovereto, 1918, p. 183). The same year 1890 saw the foundation of the *Società ligustica di scienze naturali e geografiche* (Ligurian Society of natural and geographic sciences), a scientific institution which counted among its members Bicknell and Rovereto, together with Arturo Issel and the geologist and palaeontologist Senofonte Squinabol (1861-1941) (Quaini, 2003).

Another geologist we may list among Bicknell's acquaintances is (F.) Edward Norris, who was his guest at *Casa Fontanalba* in 1911 together with the mother, Rosalind Norris, an old friend of

Bicknell. Both mother and son received an entry in the *Book of Guests in Esperanto*. The few lines about Edward Norris are curiously humorous: “*Edward Norris son of Mrs Norris. He is an enthusiastic seismologist, and says that although he does not pray for the occurrence of earthquakes, he accepts their tremors willingly*”. The monogram made with the initials of Edward Norris is decorated with undulated lines recalling seismic waves (Fig. 7a). We do not know much about F. Edward Norris, except that he was an English geologist and seismologist, based in Woodbridge Hill, Guildford, where he had set up and run a small seismological observatory in the years 1910-1915 (Lovell & Henni, 1999).

Bicknell had probably some contacts also with Alessandro Roccati (1872-1928), a geologist from Torino who at the beginning of the 20<sup>th</sup> century worked extensively in the Maritime Alps. Roccati’s research was mainly dedicated to the petrography of igneous rocks on the northern side of the Argentera Massif, but he also made some publications on the geology of the Roja Valley, and one in particular about the geology of the basin of the river Beonia (today Bieugne) and the Mont Bego massif (Roccati, 1916). It is probable that Bicknell and Roccati came into contact during Roccati’s work in the region, even if we have not found any record of this. Indeed, in his 1916 paper, Roccati reproduced several images obtained from Bicknell’s negatives (Fig. 7b-d).

Since 1897 Bicknell had also been in contact with Fritz Mader (1872-1921), son of the pastor and founder of the German Lutheran church of Nice (Bellone, 1999), who obtained his doctoral degree at Leipzig University with a thesis entitled *Die Höchsten Teile der Seealpen und der Ligurischen Alpen in physiographischer Beziehung* [*The physical geography of the highest parts of the Maritime and Ligurian Alps*] (Mader, 1897). Bicknell contacted Mader on the summer of 1897, looking for information about the prehistoric rock engravings of the Vallée des Marveilles, which he had first seen a dozen years earlier and now intended to study. The correspondence between Bicknell and Mader in the year 1897 has been analysed by Avery (2020); the same author is currently preparing a biography of Mader. Mader was a talented mountaineer and made numerous ascents in the Maritime Alps, often in company with his friend Alberto Viglino (dates unknown), geologist and

author of some studies on the loess of Northern Italy (Viglino & Capeder, 1898) and of Shanxi in China (Viglino, 1901). Their explorations in the Maritime Alps were accompanied by scientific observations that resulted in a series of pioneering works on the glaciers of that region (Viglino, 1897; 1898; Mader, 1896; 1897; 1909).

Mader, whose studies at Leipzig University in 1890-97 had included geology, was the first to describe in detail the characteristics of the rock surfaces on which the prehistoric figures were engraved. He wrote to Bicknell in 1897: *‘The figures at both Meraviglie and Fontanalba are cut in hard schistose rock of the Permian period, smoothed by glacial action, whose surface has undergone a transformation resulting in a light red-yellowish crust, consisting mostly of ferrous oxide. These rocks were not covered by vegetation, and at a time when they were surrounded by dense woods and alpine meadows, they must have appeared strange. The engravings were made by boring holes which are almost circular, quite wide, not deep, and irregular. This shows that they were made with stone chisels. If a metal instrument, even blunt, had been used, the holes would be deeper, and narrow towards the base, and the figures could have been depicted with continuous outlines. So it may be supposed that they were made by people of the Stone Age’* (Mader, 1897, in Avery 2020).

To Mader’s initiative is due the dedication to Bicknell of a peak in the Maritime Alps, at the head of the Fontanalba Valley: *“I think it appropriate to give a name to this peak, and certainly one cannot do better than to think of the distinguished associate Mr. Clarence Bicknell, founder of the Bordighera Museum, who with great patience, for several summers, has been exploring, copying and illustrating the numerous prehistoric engravings of the rocks in those surroundings.”* (Mader, 1908, p. 102). In the same note Mader proposed to dedicate a peak to Viglino *“who, against his will, was obliged to abandon the studies and the explorations”* (Mader, 1908, p. 102) in the Maritime Alps. We do not know exactly what had happened to Viglino, but we do know that he died a few years later, as in 1912 Roccati cited him as *“the lamented Engineer Alberto Viglino”* (Roccati, 1912, p. 141), and that he fell victim to a *“deadly disease”* (Parona, 1916, p. CVII).

In 1918, just a few months before his death, Bicknell proposed to dedicate a peak, very close to Cima Bicknell, to his faithful assistant Luigi Pollini: “*On the northern ridge of M. Bego, dominating the Baisse de Fontanalba and the Baisse de Valmasque, separated from the summit of M. Bego by a large depression, there is a marked peak, 2748 metres high, triangular in shape, utilized in 1901 by the military cartographer, whose tent I could see pitched there for several consecutive days in the summer of that year. I would like to give this peak the name of Cima Pollini, to honour Sig. Luigi Pollini, for all these years my assistant and faithful companion. Going through my notes, I find that he was almost always the one who discovered new and interesting figures, and he was the one who took the pictures that now form my rich collection. Without him I could not have finished my explorations in a satisfactory way, nor I could have published what I published about the whole region.*” (Bicknell, 1918, p. 77). The names of both Cima Bicknell and Cima Pollini (Fig. 7e) were adopted in the official cartography and are currently in use. The same is not true for the proposal, made by Bicknell in the same article, to dedicate two small lakes in the Fontanalba Valley to Emanuele Celesia (1821-1889), a Ligurian man of letters who had published some pamphlets on the prehistoric rock engravings (Celesia, 1885, 1886). Indeed, the two lakes are presently unnamed, and the only use of the toponym “*Laghetti Celesia*” proposed by Bicknell is found in a few works by Piero Barocelli (e.g., Barocelli, 1926, 1937).

### **BICKNELL’S COLLECTION OF PLIOCENE FOSSILS**

“*To be remembered are the fossils and plants collected by him in Riviera, which were a valuable material for the publications on the Tertiary molluscs by Sacco, for the “Flore des Alpes Maritimes” by Burnat...*” (Rovereto, 1918). This acknowledgement, contained in the obituary of Clarence Bicknell prepared by Gaetano Rovereto for the journal of the Italian Alpine Club, attests the scientific relevance of the collection of Pliocene fossils from Western Liguria put together by Bicknell, also remembered in Arturo Issel’s *Liguria Geologica e Preistorica* (Issel, 1892) and in Gaetano Rovereto’s *Liguria Geologica* (Rovereto, 1939). The fossils collected by Bicknell were

indeed the base for the description of the Pliocene faunas of Western Liguria contained in *I Molluschi dei Terreni Terziarii del Piemonte e della Liguria* [The molluscs of the Tertiary sediments of Piemonte and Liguria], a monumental treatise on the Cenozoic molluscs from Piemonte and Liguria regions started by Luigi Bellardi (1818-1889) and completed by Federico Sacco after Bellardi's death. The treatise consists of 30 parts, published between 1872 and 1904 in Torino, initially by the publisher Stamperia Reale (parts 1-2), then by Loescher (parts 3-5) and Clausen (parts 6 -30).

Both the authors, in different parts of the treatise, acknowledged Bicknell for having donated or provided access to the fossils in his collection: "*The Mitrids coming from Bordighera and the adjoining areas were collected by the illustrious Mister Clarence Bicknell who lives in that village, and by the same kindly donated to the Royal Museum of Geology of Torino, together with a rich series of other fossils from the same regions.*" (Bellardi, 1887, footnote at p. 15); "*Concerning the materials shared with me, I have to remark that, besides those usual and very important ones coming from the collections of the geological Museums of Turin, Rome, Modena, Genoa, Pavia, Milan, and from the Rovasenda private collection, I could also study other very rich collections kindly made available to me by their owners, Clarence Bicknell (for Liguria)...*" (Sacco, 1893a, p. 3). The specimens donated to the Royal Museum of Geology of Torino are now part of the Bellardi and Sacco Collection kept at the Museo Regionale di Scienze Naturali of the same city.

In the volumes of *I Molluschi dei Terreni Terziarii del Piemonte e della Liguria* authored by Bellardi, the origin of the specimens illustrated from Bordighera is always specified, and Bicknell is indicated as the collector even for the specimen that had been donated to the Geological Museum of Torino (Fig. 8a,b). Sacco, on the contrary, did not specify the collector/donor for the specimens kept in the museum collections, and explicitly mentioned Bicknell only for the specimens kept in the Bicknell collection. However, we can safely assume that all the Pliocene specimens from Bordighera illustrated in Sacco's volumes of the treatise (Fig. 8c) were collected by Bicknell, since no other possible source for that material is cited in Sacco's acknowledgements. It is not possible to

know exactly the number of the Pliocene fossils described in Bellardi and Sacco's treatise that were collected by Bicknell, because, in addition to those from Bordighera, a part of those from other Western Liguria localities were also collected by him. This number certainly amounts to several dozen; however, beyond the mere numbers, the importance of Bicknell's specimens is testified by the high number of them which represent types of new species or varieties described by Bellardi and Sacco. Not all the taxa introduced by Bellardi and Sacco are still considered valid today<sup>2</sup>. On the other hand, taxa based on Bordighera specimens that were not elevated to the status of species by Sacco and Bellardi, are now recognized as such; an example is the gastropod *Chenopus uttingerianus* var. *peralata* Sacco, 1893 (Fig. 8c), considered a variety by Sacco, which is now accepted as species as *Aporrhais peralata* (Sacco, 1893) (Manganelli et al., 2008). In any case, Bicknell's Pliocene specimens from Bordighera kept in the Bellardi and Sacco Collection in Torino are still being studied and illustrated by specialists (e.g., Solsona i Masana, 1999; La Perna et al., 2004; Brunetti et al., 2008; Brunetti and Forli, 2013; Pavia et al., 2022).

The fossils collected from the Pliocene outcrops of Bordighera and other Western Liguria localities were also donated to other European specialists. The French palaeontologists Depéret and Roman (1912, p. 142) acknowledged the reception from Bicknell of specimens of *Flabellipecten alessii* for their studies on Neogene pectinid bivalves: "*It exists in the Piacentian of Bordighera, whence Mr. Bicknell sent to us very nice specimens*". A specimen of the gastropod *Bonellitia serrata* was sent to the English palaeontologist Frederic William Harmer, who illustrated it (Fig. 8d) in his treatise on the Pliocene molluscs of Great Britain: "*the Italian fossil illustrated for comparison, with which it closely corresponds, I owe to the kindness of Mr. Clarence Bicknell of Bordighera*" (Harmer 1914–19, p. 404; a copy of it is present in Bicknell's library). Specimens collected and donated by Bicknell are also cited by Antonio Neviani in a paper on the Pliocene bryozoans of Liguria "*To the*

---

<sup>2</sup> In this paper, the original specific attributions of Bellardi and Sacco are reported, independently from their present status. Moreover, the indicated status of type specimens (holotype, syntype) conforms to the rules used in the catalogue of the types of the Bellardi and Sacco Collection (Ferrero Mortara et al., 1981, 1984; Merlino, 2007).

*very few species known so far I add some others, collected by Mr. Clarence Bicknell of Bordighera...*" (Neviani, 1898, p. 99).

Lastly, Jones (1897, p. 392) acknowledged the reception of Pliocene sediments to be used for the extraction of foraminifera: "*The Foraminifera of the Plaisancian Beds of Bordighera and Albenga, here recorded for the first time, were obtained from material kindly supplied to us by Mr. Edward Berry, of Bordighera*". Edward E. Berry, Bicknell's nephew, together with his wife Margaret Berry, lived in close contact with Bicknell and helped him in all his activities. For this reason, we may suspect some involvement of Bicknell himself in the collection of these samples, even if he is not expressly cited by Jones. Bicknell not only sent fossil specimens to specialists for academic research, but also donated entire collections for teaching purposes; is the case of the collections of Ligurian fossils provided to the *Regio Istituto Tecnico Antonio Zanon* of Udine, where his friend Achille Tellini was teaching (see above).

Bicknell had not been the only one among the English people in Bordighera, nor probably the first, to indulge in the collection of shells from the fossil-rich Pliocene deposits of the area. We know, for example, from Hamilton (1883, pp. 273-274) that "*Dr. Goodchild, the English physician practising at Bordighera, has presented the British Museum with no less than 415 specimens of Pliocene fossils collected by him in the neighbourhood of Bordighera and Vallecrosia*". The same Goodchild also compiled a list of fossils found in the Pliocene of Bordighera for the volume "*San Remo climatically and medically considered*" by Hassall (1883). Bicknell's 1878-1879 diary, containing the records of his first stay in Bordighera (Bicknell, 1878-1879), also includes a few accounts of his first 'expeditions' to collect fossils in the Pliocene deposits of the Bordighera neighbourhood. The three relevant excerpts are reported hereafter:

1) "*Br. and I then went out to look for fossils in the Borghetto valley - the rain washes down mud in strange fashion in a certain place, forming most fantastic pinnacles & caves, thus [sketch] - bricks or tiles are made at the bottom - we saw a deal white & tawny owl sitting perched up on a piece of*

*rock in a cave looking very wise & more weird - [sketch] on seeing us it flew lazily away & about the place - we climbed up to the top & presently in the rock came upon layers of fossils - bivalve marine shells (pecten I think) by the million – we only saw 4 kinds, all much alike, but I never saw fossils so thick- We had a glorious sunset & walked home down the pine-covered slopes of ancient beach, into the old Roman road.”*<sup>3</sup> (Bicknell, 1878-1879, Vol. 1, entry for Monday Oct. 28<sup>th</sup>, 1878; Fig. 9a);

2) “*A walk after some gardening, (putting out geraniums, veronicas, carnations, salvias, ageratums &C &c) to the brick fields near Mrs Boyes in search of fossils, of which we found several kinds- a much larger variety than before up the Borghetto valley.*” (Bicknell, 1878-1879, Vol. 1, entry for Tuesday Nov. 5<sup>th</sup>, 1878);

3) “*Monday 30th Mr French came to luncheon, & then I took him to the brick-fields & fossil-ground.*” (Bicknell, 1878-1879, Vol. 1, entry for Monday Dec. 30<sup>th</sup>, 1878).

The locality indicated in the first excerpt (Fig. 9a) can probably be identified as an area located on the right side of the Borghetto Valley, to the Southeast of the summit of Monte Bauso, where relatively large outcrops of Pliocene marly claystone are still present (43°47'35.2"N 7°39'16.3"E; Fig. 9b), though covered by a thick vegetation. No record was found about the presence of an ancient quarry in this place, but its morphology seems to suggest the presence of past excavation works.

The second excerpt refers to “*brick fields near Mrs Boyes*”. No reference was found for a Mrs Boyes in Bordighera in that period. However, we may suppose that “Boyes” is a misspell for “Boyce”. In 1866, Louise Murray Boyce had built a villa (today *Villa Poggio di Ponente*; 43°47'20.9"N 7°38'54.3"E) on the southern slope of Mount Bauso, on the uphill side of the Old Roman Road (e.g., Taggiasco, 1930; Merello, 1995). The villa stands in the territory of Vallecrosia municipality close to the border with Bordighera and is also indicated in the sketch plan of

---

<sup>3</sup> The “*Br.*” cited by Bicknell in this excerpt of his 1878-1879 diary is Brother Frederick Parret, another member of the *Societas Sancti Spiritus* who accompanied Bicknell during his first travel to Bordighera (Lester, 2018).

Bordighera made around 1885 by Mrs. Goodchild —the wife of the above-cited Dr. Goodchild— and kept at the Museo Bicknell (a scan is available online at <https://catalogo.beniculturali.it/detail/HistoricOrArtisticProperty/0700101961>). No outcrops are visible today in this place, due to the urbanisation of the area. The presence of a quarry exploiting the Pliocene marly claystone to produce bricks and other earthenware objects is further confirmed by the presence, some 200 meters to the East, of *Villa La Cava*, which took its name from the presence of a nearby quarry (Biancheri, 1992).

The first-hand accounts contained in Bicknell's diary are of interest because they allow the localization of the outcrops —in part no longer visible today— that provided the abundant material described by Bellardi and Sacco, whose provenance is generically indicated as "*Pliocene of Bordighera*". These outcrops were already disappearing at Bicknell's time, due to the fast-growing urbanisation of the Bordighera hinterland: "*I have just heard from my friend Mr. Clarence Bicknell, of Bordighera, that the interesting sections at that place which formerly yielded so many fossils are now covered with buildings, terraces or gardens.*" (Harmer 1914–19, footnote at page 459). Moreover, Bicknell's accounts about the "*brick fields*" are a precious testimony of an old economic activity now completely abandoned and largely forgotten (i.e., the production of bricks, tiles and other earthenware objects exploiting the Pliocene marly claystone<sup>4</sup>) and allow to locate some of the ancient quarries, presently disappeared.

The undoubted contributions that Bicknell made to palaeontology, especially for the knowledge of the Pliocene fauna of Western Liguria, earned him the dedication of two fossil species of Pliocene molluscs. The first species is *Aequipecten bicknelli* Sacco, 1897, a small clam characterised by a nice ornamentation of small spines, described by Sacco in the 24<sup>th</sup> volume of *I Molluschi dei Terreni Terziarii del Piemonte e della Liguria* (Sacco, 1897) (Fig. 10a). In the species description, Sacco gave a sincere tribute to Bicknell's work: "*I am glad to dedicate this elegant as well as*

---

<sup>4</sup> In Vallecrosia, the *Vaseria Fratelli Tonet* produced pots and other garden objects until 1983. The factory used local clay quarried in situ. Both factory and quarries do not exist anymore and were recently replaced by new commercial buildings.

*interesting species to Clarence Bicknell, who donated a rich collection of Pliocene fossils from Liguria to the Geological Museum of Torino, and who always shares liberally with me all the material of the valuable collection put together by him and kept in the nice Museum he built in Bordighera, an example for us Italians of what could and should be done in all the small towns of our beloved peninsula”* (Sacco, 1897, p.21). The species description is based on four syntypes, all from the Pliocene deposits of Bordighera, and most probably collected by Bicknell himself. Two of these specimens are presently part of the Bellardi and Sacco Collection hosted in the *Museo Regionale di Scienze Naturali* of Torino (Fig. 10b,c), the other two are in the Bicknell Collection at the Museo Bicknell. Sacco also described a variety of this species, *A. bicknelli* var. *pseudovaria* Sacco, 1897, based on two specimens from the Pliocene of Andora. The two syntypes of this variety are kept in the Bellardi and Sacco Collection at the *Museo Regionale di Scienze Naturali* of Torino (Fig. 10c). *Aequipecten bicknelli* Sacco, 1897 is presently an unaccepted species and considered a junior subjective synonym of *Mimachlamys angelonii* (Meneghini, 1878), according to the online repository MolluscaBase (MolluscaBase eds., 2023). However, this species was still considered valid in recent works which signalled it from the Pliocene deposits of Tuscany (Chirli, 2014) and of Borzoli near Genova (Brunetti & Sosso, 2016).

Another Pliocene fossil species was dedicated to Bicknell by Antonio Hornung, Swiss malacologist originally from Geneva, and Conservatore Onorario of the Natural History Museum “G. Doria” in Genoa from 1920 to 1935 (Sosso et al., 2018), and author of a series of studies on the Rio Torsero Pliocene molluscs (Hornung, 1920, 1923, 1927). The species is *Epitonium bicknelli* (Hornung, 1920), originally described as *Scalaria (Parviscala) bicknelli* Hornung, 1920 (Fig. 10d), whose holotype is kept at the Museo Civico di Storia Naturale “Giacomo Doria” in Genova (Fig. 10e); the new diagnosis of the holotype is reported in Sosso et al. (2018). In the original description by Hornung, the dedication to Bicknell is not explicit, but it is self-evident considering that he had largely contributed to the knowledge of the Pliocene mollusc faunas from that locality (many of the Rio Torsero fossils described in Federico Sacco’s “*I Molluschi dei Terreni Terziarii del Piemonte e*

*della Liguria*” are indeed from “Collezione Bicknell”). The same Hornung, in a later pamphlet about the Rio Torsero fossils, stated that “*Mr. Bicknell, the amiable English philanthropist and naturalist who lived for a long time in Bordighera, told of the intense joy he experienced at that time whenever he came back from his expeditions to the Torsero, overloaded with beautiful specimens...*” (Hornung 1923: 658).

These two fossil species add to several others named after Clarence Bicknell, which include different plant species as well as an Australian ant, *Iridomyrmex bicknelli* Emery, 1898 (Averey 2016; Caramiello & Arobba, 2020c).

## **Discussion and conclusions**

Clarence Bicknell was a multi-talented man who made his mark in each of the numerous activities and fields of research in which he engaged. Pursuing his diverse interests, “*he roamed over the hills seeking rare flowers, but noticing everything – small insects, birds, stones, light and cloud effects...*” (Edward & Margaret Berry, in Bicknell, 1989). Following Mariotti (2019), who defined him as a “*citizen scientist*”, we can safely state that Clarence Bicknell was also a *citizen geologist*. His curiosity and passion for classification led him to make a large collection of Pliocene fossils from localities in Western Liguria, which constituted a basis for the studies of the palaeontologists Bellardi and Sacco—two of the many geologists that Bicknell knew and frequented during his life. The new research on Clarence Bicknell as a “*citizen geologist*” is of great interest not only to archaeologists and geologists but also to those amazed by the scope of the career and output of Clarence Bicknell. Who knew that rich Pliocene fossil-bearing outcrops were within a few minutes’ walk of his home in Bordighera? Who knew that there are two fossil species named after him?

It would be tempting to joke that here we have one ‘old fossil’ with his name on two old fossils. Indeed, in the hundred years after his death, Clarence Bicknell was not only forgotten to the world except Bordighera, but was considered more like a vicar who dabbled in botany. After the start he had to life, born to a rich 19th century family in London, formal schooling at Cambridge University

and then the obligatory service to the church, Clarence could have so easily become an insignificant clergyman biding his time in an English parish; an 'old fossil'.

The opposite is the case. Clarence Bicknell bucked the trend. He had found himself in such an extreme, pious and liturgical religious sect in England (the Societas Sancti Spiritus) that he really did not know what he believed anymore. His writings on God in the late 1870s are intellectually-chaotic and self-doubting. When he arrived in Bordighera in 1878 at the age of 36 to become chaplain to the British community there, his Road to Damascus moment triggering the radical changes in his beliefs was the sight of the sun, the flowers, the colours, the mountains and the sea. He was totally blown away by the environment and these new sensations. Was he looking at God's creations? Or was it just nature? Was he looking at a new life opening up for himself? Within a year, he had thrown off his dog collar and left the church, preferring an ecumenical approach to all beliefs. The books in his library show that he studied Darwin and other proponents of the new natural order; he developed an intense interest in every aspect of nature. He dedicated himself to his new career (which we now know as a citizen scientist) and didn't look back.

He attacked many disciplines of science and culture with extremely high levels of energy and a good dose of talent. Polymath can be an overused term; someone who exercises their scientific and intellectual endeavours in many different domains. Now that we realise how much Bicknell achieved in so many different areas, we can see how suitable the term polymath is to describe him. His botanising, the collecting of flowers, the pressing of samples, mailing them all to collectors around Europe, his respect for Linnaean classification and nomenclature, his brilliant technical illustrations, and the publication of them in a fabulous colour book, *Flowering plants and Ferns of the Riviera*, made him a botanist that like-minded experts from around Europe wanted to visit and work with. A huge number (3,428) of these academically-perfect watercolours are stored in the University of Genova (alongside with 10,146 pressed flowers).

His dedication to the discovery, logging, copying, classifying, and interpretation of the rock engravings of the Vallée des Merveilles and the Val Fontanalba became so obsessive that he chose

to build his own house within a few hours walk of them, so that he could work on them every day of summer for 12 years. The house, the Casa Fontanalba, became a communications hub for many leading scientists whose signatures and dates are recorded for all to see in the now-celebrated Visitors' Book. Archaeology led naturally to geology and the collaboration he forged with the experts referenced in this paper; Pelloux, Sacco, Issel, Tellini and others.

In the last 10 years of his life, Bicknell's art developed into an extraordinary arts-and-crafts style where the colours and forms of each flower develops into patterns and borders; where the flower is the art; where stylised flowers illustrate poems and stories for children; where botany is humorous. About 1000 of those watercolours are in a dozen albums, seven of which are treasured in the Fitzwilliam Museum in Cambridge University.

The list of Bicknell's creations, things he made with his hands, from 1878 to his death in 1918, add up to an astonishing 40,000 items. That includes drawings, paintings, pressed flowers, rock engravings, 771 rocks and fossils in the Museo Bicknell, letters and other writings. That's three a day. Every day. Margaret Berry writes of Bicknell arriving back at the Casa Fontanalba with Pollini from six hours climbing and a day's work on the engravings and then sitting down to perfect the rubbings taken and doing a few watercolours of flowers before the light faded.

New research programmes started in 2013 by the Clarence Bicknell Association, dozens of experts in various subjects ([www.clarencebicknell.com/documents](http://www.clarencebicknell.com/documents)) and the Museo Bicknell in Bordighera, contributed to Bicknell's legacy and to the excitement around the centenary of his death in 2018. We could see and read about all this and other features of his polymath's output; sketchbooks and diaries of his travels; poems and hymns in Esperanto; support for this universal language; philanthropy; constructions of his two libraries in Bordighera; help for the poor; the construction of hospitals in England and Italy; sponsorship of talent from under-privileged backgrounds, like Pietro Zeni, the La Scala tenor. This contribution adds geology to this list. We never knew much about Bicknell's geology, and so it is refreshing and exciting to have this new research shading light on this part of his work. Bicknell was no 'old fossil'!

## **Resumo en esperanto**

Clarence Bicknell (1842-1918) estis eklektika: naturalisto, arkeologo, artisto kaj esperantisto. Ano de riĉa angla familio, en 1878 li translokiĝis al Bordighera, ĉe la Okcidenta Liguria marbordo, kie li pasigis la reston de sia vivo kaj kie li fondis la Muzeon Bicknell, kiu ankoraŭ tenas parton de liaj kolektoj. Li komence interesiĝis pri la studo de la loka floraro; poste, de 1897 ĝis sia morto, li dediĉis sin al la sistema studo de la prahistoriaj rokaj gravuraĵoj de la valoj de Merveilles kaj Fontanalba, en la Apudmaraj Alpoj. Bicknell formis longedaŭrajn rilatojn kaj amikecojn kun multaj fakuloj, inkluzive de geologoj Alberto Pelloux (1868-1948), Federico Sacco (1864-1948), Arturo Issel (1842-1922), kaj Achille Tellini (1866-1938). Tra la jaroj, Bicknell kunmetis riĉan kolekton de pliocenaj fosilioj kolektitaj en diversaj lokoj en Okcidenta Ligurio, kaj disponigis ĝin al paleontologoj Luigi Bellardi kaj Federico Sacco, donacante multajn specimenojn al la Reĝa Geologia Muzeo de Torino. Pro liaj kontribuoj al la studo de la pliocena faŭno de okcidenta Ligurio, du specioj de fosiliaj moluskoj estis dediĉitaj al Bicknell: la bivalvo *Aequipecten bicknelli* Sacco, 1897 kaj la gastropodo *Epitonium bicknelli* (Hornung, 1920).

## **Authors' contributions:**

LB made the original research on Clarence Bicknell's geological work and connections with geologists and prepared the manuscript and illustrations except for the *Discussion and conclusions* chapter. MB provided the original material from the Bicknell family collection and wrote the concluding remarks (*Discussion and conclusions* chapter).

## **Acknowledgements**

The authors thank Graham Avery for his comments on the text and for the information about Fritz Mader and the relationships of Bicknell with other botanists. We thank Humphrey Tonkin and Michela Lipari for their revision of the abstract in Esperanto. We also thank the Museo Regionale di Scienze Naturali of Torino and in particular Annalaura Pistarino, Curator of the Palaeontology Section, for allowing the photographing of the fossil specimens in the Bellardi and Sacco Collection. We thank Maria Luisa Tavano (curator of the Museo di Storia Naturale Giacomo Doria of Genova) and Maurizio Sosso (Società Italiana di Malacologia)

for providing the images of the holotype of *Epitonium bicknelli* and allowing their reproduction. The Istituto Internazionale di Studi Liguri, Bordighera, is thanked for the permission to reproduce the photograph attached to a letter from Bicknell to Pelloux, here reproduced in Fig. 3c,d. The Roberto Malaroda Library (Department of Earth Sciences, University of Torino) is acknowledged for allowing reproduction of Bicknell's handwritten dedication on the frontispiece of the copy of *A guide to the prehistoric rock engravings in the Italian Maritime Alps* kept in the library. Thanks to Elisabetta Massardo for providing a copy of the magazine "Novel Temp" dedicated to Bicknell. Reviewers Edoardo Martinetto, Giovanni Repetto and Marco Romano and Associate Editor Alessio Argentieri are acknowledged for their comments on the manuscript.

## References

- Abbolito E. (1949) - Alberto Pelloux (necrologia). *Periodico di Mineralogia*, 18, 1-6.
- Anonymous (2003) - La Biblioteca Naturalistica. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 337-347.
- Argentieri A. (2022) - Sezione Storia delle Geoscienze. Settembre 2022: un mese intenso per la Storia delle Geoscienze. *Geologicamente*, 9, 58-59.
- Arobba D., Caramiello R. & Russo G. - (2020) Le vicende dell'Erbario Bicknell e la sua attuale struttura. In: D. Arobba, R. Caramiello, D. Gandolfi (eds.), *L'erbario di Clarence Bicknell tra Riviera e Alpi Marittime*. Istituto Internazionale di Studi Liguri, Bordighera, pp. 41-46.
- Avery G. (2020) - 'Egregio Signore' - Fritz Mader's correspondence with Clarence Bicknell in 1897. Available online at [https://clarencebicknell.com/wp-content/uploads/mader\\_bicknell\\_correspondence\\_1897\\_avery\\_2020.pdf](https://clarencebicknell.com/wp-content/uploads/mader_bicknell_correspondence_1897_avery_2020.pdf)
- Avery G. (2022) - Botanists in the Book of Guests in Esperanto. Available online at [https://clarencebicknell.com/wp-content/uploads/botanists\\_in\\_the\\_book\\_of\\_guests\\_in\\_esperanto\\_g\\_avery\\_2022.pdf](https://clarencebicknell.com/wp-content/uploads/botanists_in_the_book_of_guests_in_esperanto_g_avery_2022.pdf)
- Barfield L. & Chippindale C. (1997) . Meaning in the Later Prehistoric Rock-Engravings of Mont Bégo, Alpes-Maritimes, France. *Proceedings of the Prehistoric Society*, 63, 103-128.
- Barocelli P. (1918) - Necrologio – Clarence Bicknell. *Bollettino della Società Piemontese d'Archeologia e Belle Arti*, 2(3-4), 65-69.
- Barocelli P. (1926) - Val Meraviglie e Fontanalba (Note di escursioni paleontologiche). *Atti della Società Piemontese d'Archeologia e Belle Arti*, 10(1), 1-51.
- Barocelli P. (1937) - Concetti religiosi delle genti mediterranee al finire della civiltà del bronzo e agli inizi di quella del ferro. *Rivista Ingauna e Intemelia*, 3(3-4), 43-58.
- Béguinot A. (1931) - L'opera scientifica e filantropica di Clarence Bicknell. *Atti della Società Ligustica di Scienze e Lettere*, 10, 223-245.
- Bellardi L. (1887) - I Molluschi dei Terreni Terziarii del Piemonte e della Liguria. Parte V, Mitridae. Loescher, Torino.
- Bellone M. (1999) - Fritz Mader: chi era costui? *Alpidoc*, 31, 21-26.

- Bernardini E. (1993) - Carteggio di Clarence Bicknell con Alberto Pelloux. Lettere scelte dal 1902 al 1916. *Rivista Ingauna e Intemelia*, 44 (1989), 9-16.
- Bernardini E. (2003) - Il carteggio di Clarence Bicknell con Alberto Pelloux. Lettere scelte dal 1902 al 1917. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 172-179.
- Berry E.E. & Berry M. (1931) *At the Western Gate of Italy. The Western Italian Riviera: a sketch of its history, art, and architecture.* John Lane - The Bodley Head Ltd., London.
- Biancheri A. (1992) - I Baussi. *La Voce Intemelia*, 47(9).
- Bicknell C. (1878-1879) - Diary, Stoke-upon-Tern to Bordighera and back, 25 September 1878-7 June 1879. Transcript available online at [https://clarencebicknell.com/wp-content/uploads/clarence\\_bicknell\\_diary\\_1878-9\\_vols\\_1-4\\_lp\\_compiled\\_mb.pdf](https://clarencebicknell.com/wp-content/uploads/clarence_bicknell_diary_1878-9_vols_1-4_lp_compiled_mb.pdf)
- Bicknell C. (1885) - Flowering plants and ferns of the Riviera and neighbouring mountains. Trübner & Co., London.
- Bicknell C. (1896) - Flora of Bordighera and San Remo. Gibelli, Bordighera.
- Bicknell C. (1897) - Le figure incise sulle rocce di Val Fontanalba. *Atti della Società Ligustica di Scienze Naturali e Geografiche*, 8, 391-411.
- Bicknell C. (1902) - The prehistoric rock engravings in the Italian Maritime Alps. Gibelli, Bordighera.
- Bicknell C. (1903) - Further explorations in the regions of the prehistoric rock engravings in the Italian Maritime Alps. Gibelli, Bordighera.
- Bicknell C. (1912) - The common fig tree. Bessone, Bordighera.
- Bicknell C. (1913) - A guide to the prehistoric rock engravings in the Italian Maritime Alps. Bessone, Bordighera.
- Bicknell C. (1918) - Per alcuni nuovi toponimi nelle Alpi Marittime. *Club Alpino Italiano, Rivista Mensile*, 37(4-5-6), 76-77.
- Bicknell C. (2018) - Casa Fontanalba Visitors' Book. Art reproduction of the original created in one copy only, in 1906, by Clarence Bicknell. Matador, Leicester.
- Bicknell C. (2022) - The Book of Guests in Esperanto. Reproduction of the original created by Clarence Bicknell between 1906 and 1918. Amazon KDP.
- Bicknell M. (2003) - Clarence Bicknell, l'homme. Londres 1842 - Casterino 1918. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 15-20.
- Bicknell M. (2021) - Photographic/geological forensic research: Alberto Pelloux and Clarence Bicknell. Available online at [https://www.clarencebicknell.com/images/downloads\\_news/pelloux\\_bicknell\\_photo\\_luca\\_barale\\_may\\_2021.pdf](https://www.clarencebicknell.com/images/downloads_news/pelloux_bicknell_photo_luca_barale_may_2021.pdf)
- Bicknell P. (1989) - Clarence Bicknell, his family and his friends. *Rivista Ingauna e Intemelia*, 44, 4-8.
- Bicknell S. (2017) - Clarence Bicknell's Passion for Flowers Revealed in his Art. Available online at [https://clarencebicknell.com/wp-content/uploads/clarence\\_bicknell\\_his\\_art\\_susie\\_bicknell.pdf](https://clarencebicknell.com/wp-content/uploads/clarence_bicknell_his_art_susie_bicknell.pdf)
- Brunetti M.M., Forli M. & Vecchi G. (2008) - Una nuova specie di *Gibbula* per il Pleistocene italiano: *Gibbula (Forskalea) sirigui* n. sp. (Mollusca: Gastropoda). *Bollettino Malacologico*, 44(7-11), 1-4.
- Brunetti M.M. & Forli M. (2013) - The genus *Aporrhais* Da Costa, 1778 (Gastropoda Aporrhaidae) in the Italian Plio-Pleistocene. *Biodiversity Journal*, 4(1), 183-208.
- Brunetti M.M. & Sosso M. (2016) - Note sul giacimento del Pliocene Inferiore di Borzoli (Genova). *Bivalvi. Bollettino Malacologico*, 52, 122-136.
- Bruzzone R., Hearn R. & Piana P. (2019) - Clarence Bicknell (1842-1918) dans les Alpes Maritimes: entre paysage et botanique. In: Valette P., Carozza J.-M. (eds) *Géohistoire de l'environnement et des paysages.* CNSR, Paris, pp. 107-116.
- Capano A. (2003) - L'attività esperantista di Clarence Bicknell. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 167-171.

- Caramiello R. & Arobba D. (2020a) - Clarence Bicknell: scienziato e pittore-botanico. In: D. Arobba, R. Caramiello, D. Gandolfi (eds.), *L'erbario di Clarence Bicknell tra Riviera e Alpi Marittime*. Istituto Internazionale di Studi Liguri, Bordighera, pp. 31-40.
- Caramiello R. & Arobba D. (2020b) - I rapporti con i più importanti botanici contemporanei italiani e stranieri. In: D. Arobba, R. Caramiello, D. Gandolfi (eds.), *L'erbario di Clarence Bicknell tra Riviera e Alpi Marittime*. Istituto Internazionale di Studi Liguri, Bordighera, pp. 67-76.
- Caramiello R. & Arobba D. (2020c) - Le specie dedicate a Clarence Bicknell. In: D. Arobba, R. Caramiello, D. Gandolfi (eds.), *L'erbario di Clarence Bicknell tra Riviera e Alpi Marittime*. Istituto Internazionale di Studi Liguri, Bordighera, pp. 87-90.
- Celesia E. (1885) - I Laghi delle Meraviglie in Val d'Inferno. Ciminago, Genova.
- Celesia E. (1886) - Escursioni Alpine. *Bollettino ufficiale del Ministero di pubblica istruzione*, 5, 1-27.
- Chippindale C. (1984) - Clarence Bicknell: archaeology and science in the 19<sup>th</sup> century. *Antiquity*, 58(224), 185-193.
- Chippindale C. (1985) - 'Una vita sacra': Clarence Bicknell and the discovery of Alpine rock-engravings. In: C. Malone, S. Stoddart (eds.), *Papers in Italian archaeology 4, Part II Prehistory*. British Archaeological Reports – International Series 244, pp. 177-204.
- Chippindale C. (2003) - La "Casa Fontanalba": la vie de Clarence Bicknell. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 21-26.
- Chirli C. (2014) - Malacofauna pliocenica toscana vol. Bivalvia Pteriomorphia Beurlen, 1884. Tipografia Vanzi, Colle Val d'Elsa, Siena.
- Covezzi S. (2003) - La Biblioteca Civica Internazionale: un'altra istituzione inglese attiva a Bordighera. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 59-70.
- de Lumley, H. (1995) - *Le grandiose et le sacré*. Edisud, Aix-en-Provence.
- Depéret C. & Roman F. (1912) - Monographie des Pectinidés néogènes de l'Europe et des régions voisines. *Mémoire 26, II Genre Flabellipecten (suite)*. Mémoires de la Société géologique de France, Paléontologie, 19(1), 139-168.
- Ferrero Mortara E., Montefameglio L., Pavia G. & Tampieri R. (1981) - Catalogo dei tipi e degli esemplari figurati della collezione Bellardi e Sacco. Parte I. Museo Regionale di Scienze Naturali, Cataloghi, 6, 1-327.
- Ferrero Mortara E., Montefameglio L., Novelli M., Opesso G., Pavia G. & Tampieri R. (1984) - Catalogo dei tipi e degli esemplari figurati della collezione Bellardi e Sacco. Parte II. Museo Regionale di Scienze Naturali, Cataloghi, 7, 1-484.
- Fiore L. (2003) - Locandine e Programmi di Sala. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 314-317.
- Fontannes C.F. (1877) - Note sur le terrain nummulitique de La Mortola, près de Menton. *Bulletin de la Société Géologique de France*, 5, 857-862.
- Gaudin C.T. & Moggridge M. (1864) - Menton. *Bulletin de la Société Vaudoise des Sciences Naturelles*, 8, 187-197.
- Gandolfi D. (2003) - Riordinando le sue carte. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 301-306.
- Garibaldi P., Isetti E. & Rossi G. (2003) - La collezione genovese di Clarence Bicknell. Disegni, frottages e incisioni originali del Museo Civico di Archeologia Ligure di Genova. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 85-90.
- Hamilton F.F. (1883) - *Bordighera and the Western Riviera*. Stanford, London.
- Harmer F.W. (1914-19) - *The Pliocene Mollusca of Great Britain: being supplementary to S.V. Wood's monograph of the Crag Mollusca. Part II*. Palaeontographical Society, London.
- Hassall A.H. (1883) - *San Remo climatically and medically considered*. Longmans, Green, and Co., London.
- Hornung A. (1920) - Gastéropodes fossiles du Rio Torsero (Cériale). Pliocène inférieur de la Ligurie. *Annali del Museo Civico di Storia Naturale Giacomo Doria*, 49, 70-92.

- Hornung A. (1923) - Le collezioni del Museo Civico di Storia Naturale. I Fossili del Torsero. Il Comune di Genova, Bollettino Municipale, 3 (6), 657-661.
- Hornung A. (1927) - Pélécypodes fossiles du Rio Torsero (Ceriale). Pliocène inférieur de la Ligurie. *Annali del Museo Civico di Storia Naturale Giacomo Doria*, 52, 293-309.
- Huet T. (2017) - New Perspectives on the Chronology and Meaning of Mont Bégo Rock Art (Alpes-Maritimes, France). *Cambridge Archaeological Journal*, 27(2), 199-221.
- Issel A. (1888) - Il terremoto del 1887 in Liguria. Tipografia Nazionale, Roma.
- Issel A. (1892) - Liguria Geologica e Preistorica. Donath, Genova.
- Issel A. (1904) - Sulla scoperta di una antica stazione ligure in Provenza. *Atti della Società Ligustica di Scienze Naturali e Geografiche*, 15, 51-61.
- Jones T.R. (1897) - A monograph of the foraminifera of the Crag. Part IV. Palaeontographical Society, London.
- La Perna R., Ceregato A. & Tabanelli C. (2004) - Mediterranean Pliocene protobranchs: the genera *Jupiteria* Bellardi, 1877, *Ledella* Verrill & Bush, 1897 and *Zealeda* Marwick, 1924 (Mollusca, Bivalvia). *Bollettino Malacologico*, 40(1-4), 49-78.
- Lester V. (2018) - Marvels. The life of Clarence Bicknell. Botanist, Archaeologist, Artist. Matador, Leicester (UK).
- Lovell J.H. & Henni P.H.O. (1999) - Historical Seismological Observatories in the British Isles (Pre-1970). Version 3. British Geological Survey, Technical Report WL/99/13. British Geological Survey, Edinburgh.
- Machu P. (2006-2007) - Clarence Bicknell, Émile Cartailhac et les autres... au pays des Merveilles. *Antiquité nationale*, 38, 203-224.
- Mader F. (1896) - Escursioni e studi nelle Alpi Marittime. *Bollettino del Club Alpino Italiano*, 29(62), 205-212.
- Mader F. (1897) - Die Höchsten Teile der Seealpen und der Ligurischen Alpen in physiographischer Beziehung. Fock, Leipzig.
- Mader F. (1908) - Ascensioni Varie. Nelle Alpi Marittime. *Club Alpino Italiano, Rivista Mensile*, 27(3), 100-103.
- Mader F. (1909) - Appunti sui ghiacciai delle Alpi Marittime. *Rivista del Club Alpino Italiano*, 28(6), 189-196.
- Magistretti L. (1948) - Alberto Pelloux. *Rendiconti della Società Mineralogica Italiana*, 5, 29-38.
- Maitland S. (2003) - Clarence Bicknell e la sua attività pastorale in Inghilterra (1866-1876). *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 27-34.
- Manganelli G., Spadini V. & Fiorentino V. (2008) - The lost *Aporrhais* species from the Italian Pliocene: *A. peralata* (Sacco, 1893) (Gastropoda: Caenogastropoda). *Journal of Conchology*, 39(5), 493-515.
- Mano L. (ed., 1990) - Nel Paese delle Meraviglie. Clarence Bicknell e le incisioni rupestri di Monte Bego. *Novel Temp, Quaderno di cultura e studi occitani alpini*, 37, 1-67.
- Marcenaro M. (1998) - Bordighera e il Museo-Biblioteca dell'Istituto Internazionale di Studi Liguri: da Clarence Bicknell al rinnovamento attuale. *Rivista Ingauna e Intemelia*, 49-50(1994-1995), 1-42.
- Marcenaro M. (2003) - Clarence Bicknell e Padre Giacomo Viale: la "Questione Sociale" a Bordighera. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 35-58.
- Mariotti M. (2019) - Clarence Bicknell, botanico e *citizen scientist*. Proceedings of the meeting: Clarence Bicknell e Thomas Hanbury, due grandi vittoriani in Riviera. Giardini Botanici Hanbury, Ventimiglia (Italy), 26 January 2019. Available online at <https://iris.unige.it/handle/11567/1000062?mode=full.961>
- Martini E. (1981) - Notizie sull'erbario "Bicknell" di Bordighera. *Annali del Museo Civico di Storia Naturale di Genova*, 83, 407-416.
- Merello G. (1995) - L'immagine turistica di Bordighera attraverso le cartoline illustrate e la letteratura. Istituto Internazionale di Studi Liguri, Bordighera.

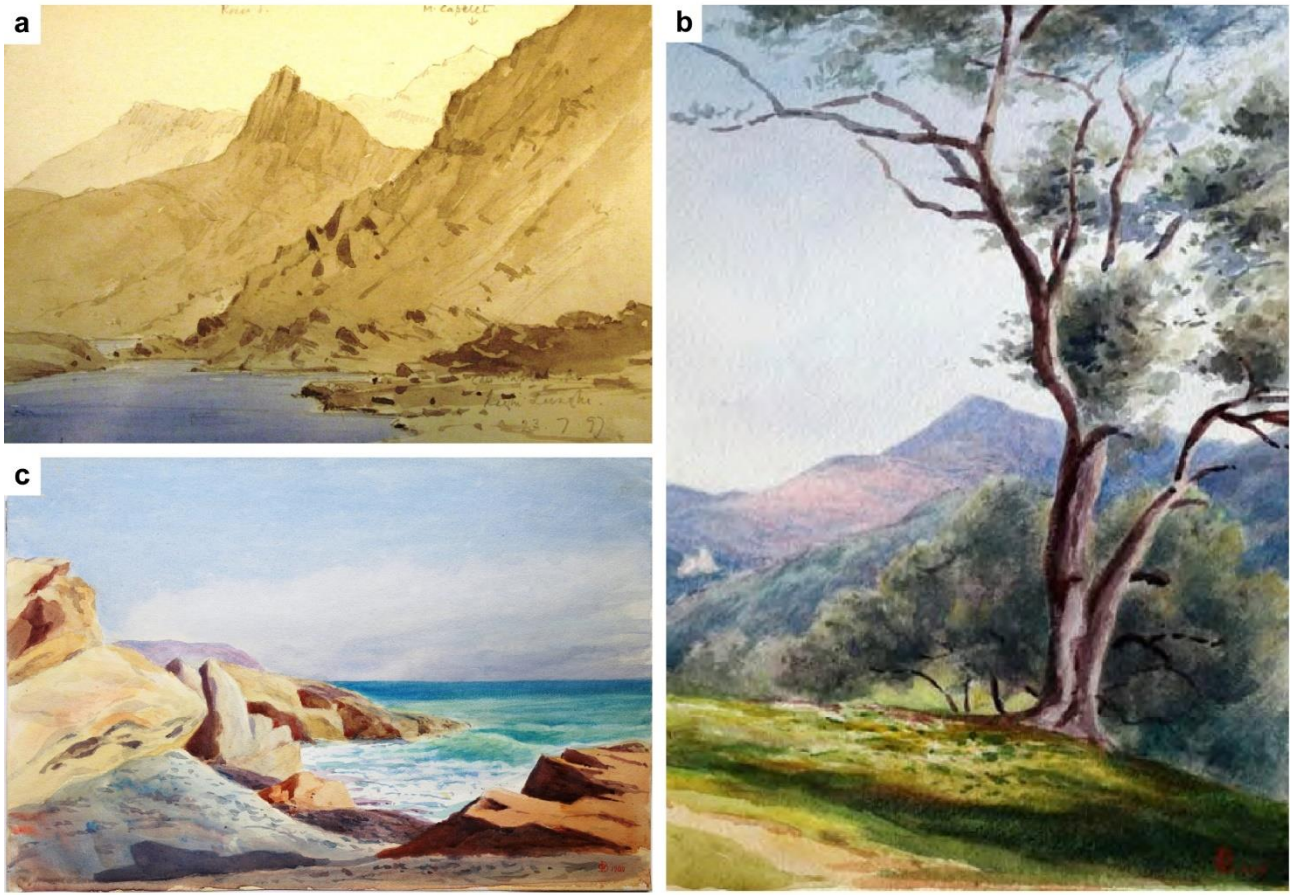
- Merlino B. (ed., 2007) - Catalogo dei tipi e degli esemplari figurati della collezione Bellardi e Sacco. Parte III. Museo Regionale di Scienze Naturali, Cataloghi, 17, 1-271.
- MolluscaBase eds. (2023) - MolluscaBase. *Aequipecten bicknelli* Sacco, 1897 †. Accessed on 2023-04-07 at: <https://www.molluscabase.org/aphia.php?p=taxdetails&id=1640731>
- Neviani A. (1898) - Briozoi neozoici di alcune località d'Italia. Parte Quinta. Bollettino della Società Romana per gli Studi Zoologici, 7(3-6), 97-109.
- Pallarés F. (1989) - Il Museo Bicknell. Rivista Ingauna e Intemelia, 44, 17-21.
- Parodi G. (2004) - Il laboratorio paleontologico di Arturo Issel e le lettere di Clarence Bicknell: dalle "Carte Issel" conservate nell'Archivio dell'Istituto Mazziniano di Genova. *Ligures: rivista di archeologia, storia, arte e cultura ligure*, 2, 273-286.
- Parona C.F. (1916) - In memoria di Pietro Zuffardi. Bollettino della Società Geologica Italiana, 35(1), CVII-CXIII.
- Pavia G., Dulai A., Festa A., Gennari R., Pavia M. & Carnevale G. (2022) Palaeontology of the Upper Pliocene marine deposits of Rio Vaccaruzza, Villalvernia (Piedmont, NW Italy). *Rivista Italiana di Paleontologia e Stratigrafia*, 128(1), 129-210.
- Pozzar M. (2003) - Corrispondenza tra Edward E. Berry e altri interlocutori sulle incisioni rupestri della Valle delle Meraviglie. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 307-311.
- Quaini M. (2003) - La geografia. Una disciplina all'incrocio delle scienze naturali e umane. *Atti della Società Ligure di Storia Patria, Nuova Serie*, 43(2), 229-335.
- Roccati A. (1912) - I ghiacciai del gruppo Clapier-Maledia-Gelas (Alpi Marittime). *Club Alpino Italiano, Rivista Mensile*, 31(5), 141-148.
- Roccati A. (1916) - Il bacino della Beonia ed il massiccio del Monte Bego (Alpi Marittime). *Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale in Milano*, 55, 5-68.
- Rovereto G. (1918) - Clarence Bicknell. *Club Alpino Italiano, Rivista Mensile*, 37(10-11-12), 183-184.
- Rovereto G. (1939) - Liguria Geologica. *Memorie della Società Geologica Italiana*, 2, 1-768.
- Russo G. (2020) - La Biblioteca Naturalistica di Clarence Bicknell. In: D. Arobba, R. Caramiello, D. Gandolfi (eds.), *L'erbario di Clarence Bicknell tra Riviera e Alpi Marittime*. Istituto Internazionale di Studi Liguri, Bordighera, pp. 23-30.
- Sacco F. (1893a) - I Molluschi dei Terreni Terziarii del Piemonte e della Liguria. Parte XIII (Conidae). Clausen, Torino.
- Sacco F. (1893b) - I Molluschi dei Terreni Terziarii del Piemonte e della Liguria. Parte XIV (Strombidae, Terebellidae, Chenopidae ed Haliidae). Clausen, Torino.
- Sacco F. (1897) - I Molluschi dei Terreni Terziarii del Piemonte e della Liguria. Parte XXIV (Pectinidae). Clausen, Torino.
- Sacco F. (1930) - Le Meraviglie del Monte Bego. *Bollettino della Società Piemontese di Archeologia e Belle Arti*, 14(1-2), 39-63.
- Sanero E. (1951) - Alberto Pelloux. *Annali del museo civico di storia naturale Giacomo Doria*, 64, 331-334.
- Scati P. (2003) - Un nuovo carteggio inedito tra Clarence Bicknell e Arturo Issel. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 71-76.
- Solsona i Masana M. (1999) - Sistemàtica i descriptiva de les famílies Tonnidae, Ficidae i Cassidae (Tonnoidea, Gastropoda) del Pliocè del Mediterrani nord-occidental. *Butlletí de la Institució Catalana d'Història Natural*, 67, 69-90.
- Sosso M., Dell'Angelo B. & Tavano M.L. (2018) - I tipi della Collezione Hornung depositati nel Museo Civico di Storia Naturale "G. Doria" di Genova (Mollusca, Gastropoda). *Annali del Museo Civico di Storia Naturale "G. Doria"*, 111, 325-356.
- Stefanutti R. (1989) - Achille Tellini (1866-1938) geologo, naturalista, folclorista. *La Panarie*, 82, 35-47.
- Taggiasco D. (1930) - Bordighera. Gandolfi, Sanremo.

- Tagliafico M. & Vicino G. (2003) - Considerazioni a margine di alcune lettere inviate da C. Bicknell ad A. Issel. *Rivista Ingauna e Intemelia*, 54-55(1999-2000), 77-84.
- Tellini A. (1888) - Le nummulitidee terziarie dell'alta Italia occidentale. *Bollettino della Società Geologica Italiana*, 7, 169-230.
- Tellini A. (1890) - Le nummulitidi della Majella, delle Isole Tremiti e del promontorio garganico. *Bollettino della Società Geologica Italiana*, 9, 359-422.
- Tellini A. (1896) - Il Gabinetto di Storia Naturale del R. Istituto Tecnico "Antonio Zanon" in Udine. *Atti del R. Istituto Tecnico Antonio Zanon in Udine, serie II*, 14, 61-148.
- Viglino A. (1897) - Escursioni e studi preliminari sulle Alpi Marittime. *Bollettino del Club Alpino Italiano*, 30 (63), 219-294.
- Viglino A. (1898) - Introduzione allo studio sui ghiacciai delle Alpi Marittime. *Bollettino del Club Alpino Italiano*, 31 (64), 105-138.
- Viglino A. & Capeder G. (1898) - Comunicazione preliminare sul Loess piemontese, *Bollettino della Società Geologica Italiana*, 17, 81-84.
- Viglino A. (1901) - Il Loess del Shan-Si Orientale. *Bollettino della Società Geologica Italiana*, 20, 311-338.

## Figures



**Fig.1.** a) Portrait of Clarence Bicknell in his thirties by Giovanni Degioanini, owner of a photographic studio in Fossano. Bicknell family collection. b) Portrait of Clarence Bicknell as an old man. Bicknell family collection. c) Plate from Bicknell's *Flowering plants and ferns of the Riviera*, with illustrations realized by the author (clockwise from top left: *Coris monspeliensis*, *Primula allionii*, *Primula marginata*). d) Rock engravings of the Merveilles Valley on the glacially polished surface of Permian sedimentary rocks. e) Bicknell on the Permian rocks of the Fontanalba Valley hosting the famous prehistoric rock engravings; the peak on the background to the right of Bicknell is Mont Bego. Bicknell family collection.



**Fig.2.** a) Watercolour in Bicknell's pocket sketchbook, dated 23 July 1897, showing the Rocher des Merveilles (foreground) and the Mont du Grand Capelet (right background) from the Lacs Longs at the outlet of the Merveilles Valley. Bicknell family collection. b) "*Torre dei Mostaccini, Monte Caggio*", 1915, watercolour by Bicknell portraying the Borghetto Valley in the Bordighera inland. Bicknell family collection. c) "*Rocks near St. Ampelio's Church*", 1900, watercolour by Bicknell depicting the rocks of the Sant'Ampeglio promontory in Bordighera. Bicknell family collection.



**Fig.3.** a) *Villa Caterina*, residence of the Pelloux Family in Bordighera, in a postcard sent (not to Bicknell) by Alberto Pelloux on 5 January 1905. The sentence on the postcard, in Pelloux’s handwriting, reads: “*Ricambio mille auguri - Saluti - A.Pelloux*” (“*I reciprocate your good wishes - Greetings - A.Pelloux*”). Luca Barale collection. b) Christmas card sent by Clarence Bicknell to Alberto Pelloux, with a stencil of a bird. Courtesy of Istituto Internazionale di Studi Liguri, Museo Bicknell, Bordighera. c, d) Photograph attached to a letter sent by Bicknell to Pelloux and taken during their excursion of 18 July 1902 in the Fontanalba Valley, showing one of the lakes on the eastern side of the Baisse de Fontanalba with abundant floating ice; the peak in the centre background is Mont Bego. The caption on the back of the photograph (d) reads: “*upper lake near Bassa di Fontanalba – Spedizione del Tenente Pelloux verso il polo artico 18 luglio 1902.*”. Archivio IISL, Bordighera. Fondo Bicknell, I. *Carteggio tra Clarence Bicknell e Alberto Pelloux e altri interlocutori, Lettera s.d. 1902.*



**Fig.4.** a) “Outside Casa Fontanalba, left to right: Marco Novella, Clarence Bicknell, Capitano Alberto Pelloux, Signora Bianca Pelloux, Luigi Pelloux”. Bicknell family collection. b) Excerpt from *Casa Fontanalba Visitors’ Book* with the signatures of Bianca Pelloux, Alberto Pelloux, Luigi Pelloux and Novella Marco, dated 12 August 1913. Bicknell family collection. c) Page of the *Book of Guests in Esperanto* dedicated to Alberto Pelloux (see text for translation of Bicknell’s Esperanto text). Bicknell Family Collection. d) Clarence Bicknell (left) and Alberto Pelloux during an excursion at Monte Bellenda, Ventimiglia. Bicknell family collection. e) Timelapse image superimposing the historical photograph in d) on the present-day panorama shot from the same point (southern side of Monte Bellenda, Ventimiglia; 43°47’28.4”N, 7°32’52.5”E).



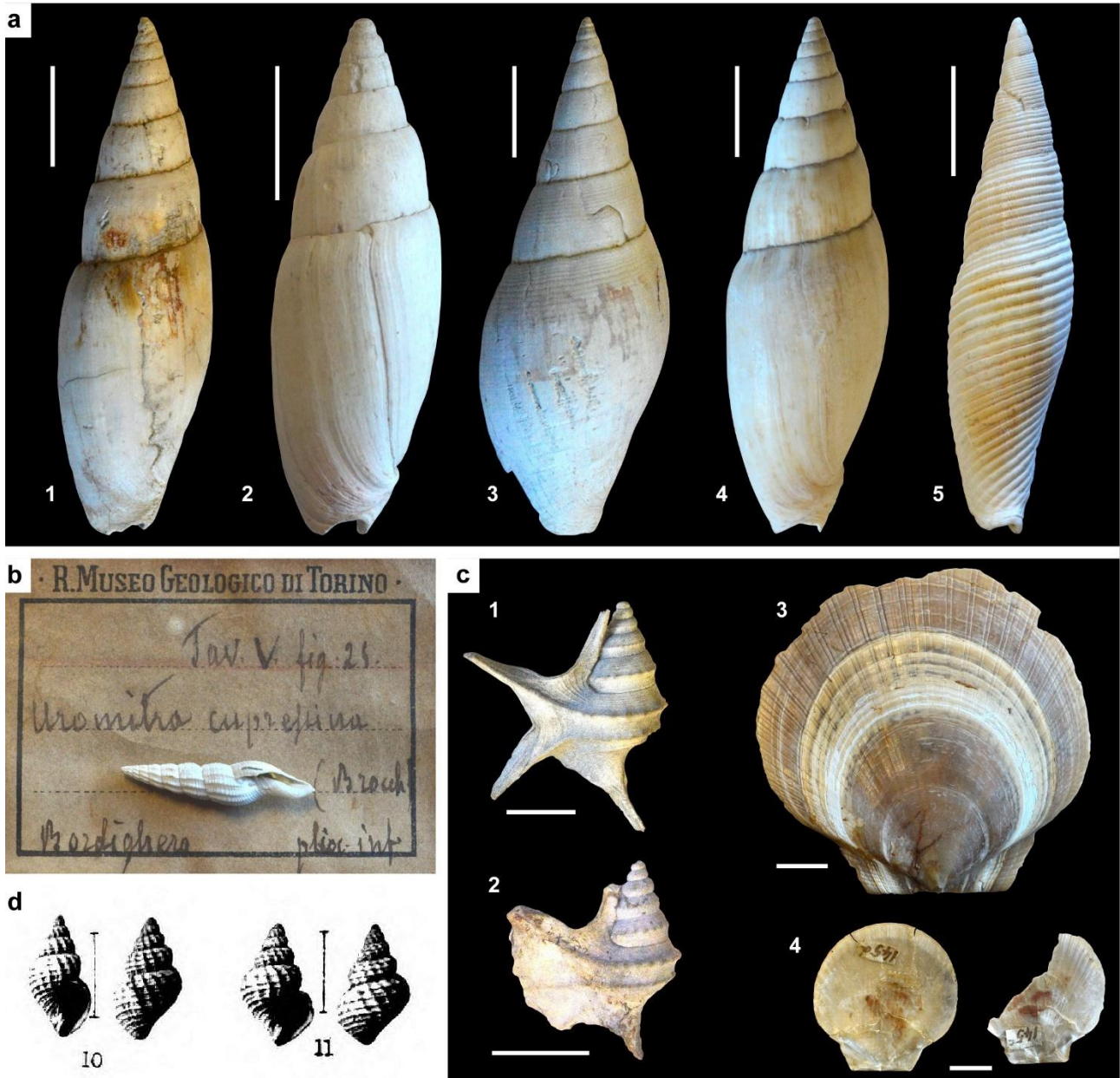
**Fig.5.** a) Page of the *Book of Guests in Esperanto* dedicated to Federico Sacco (see text for translation of Bicknell's Esperanto text). Bicknell Family Collection. b) Page of the *Book of Guests in Esperanto* dedicated to Mario Sacco, son of Federico Sacco. Bicknell Family Collection. c) Excerpt from *Casa Fontanalba Visitors' Book* with the signatures of Giuseppina Sacco Campora, Federico Sacco and Vittorio Sacco, dated 28 June 1918. Bicknell family collection. d) Dedication by Bicknell ("with kind regards from C. Bicknell. 15.12.14.") on the frontispiece of a copy of *A guide to the prehistoric rock engravings in the Italian Maritime Alps* donated to Sacco and presently kept in the Roberto Malaroda Library, Department of Earth Sciences, University of Torino. e) One of the last filled pages of the *Casa Fontanalba Visitors' Book*, bearing the signature of Federico Sacco (2-5 August 1929). At the end of the same page is a pencil annotation, not in Sacco handwriting, reading "Prof. Sacco - Aug 4<sup>th</sup>" [1930]. Bicknell family collection.



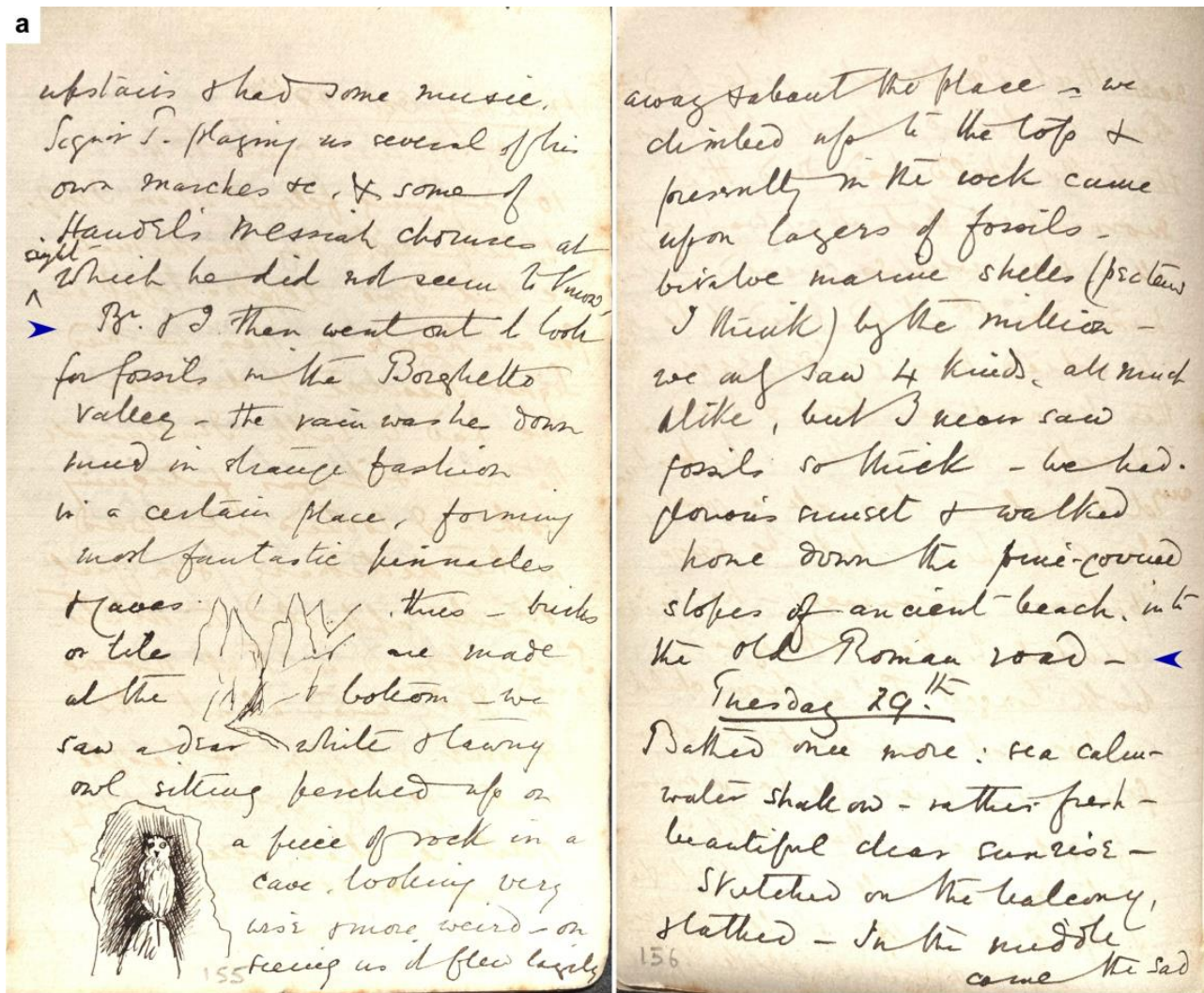
**Fig.6.** a) Portrait of Achille Tellini realized in the photography studio of Arturo Pospisil in Padua in 1905. Public domain, via Wikimedia Commons. b) Excerpt from *Casa Fontanalba Visitors' Book* with Achille Tellini's signature, in Esperanto, dated 31 August 1915. Bicknell family collection. c) Page of the *Book of Guests in Esperanto* dedicated to Achille Tellini (see text for translation of Bicknell's Esperanto text). Bicknell Family Collection. d) Excerpt from Plate 11 in Tellini (1890) showing specimens of nummulitids (*Nummulites Montis-Fracti*) from Menton, collected and donated by Bicknell.



**Fig.7.** a) Page of the *Book of Guests in Esperanto* dedicated to Edward Norris (see text for translation of Bicknell’s Esperanto text). Bicknell Family Collection. b, c) Landscapes reproduced in Roccati (1916) after Bicknell’s photographs (b, Lago Verde and Cime de Chanvrairée, Fontanalba Valley; c, caves in Mesozoic carbonate rocks on the left side of the Casterino Valley). d) “Lago Verde, V. Fontanalba, 11.viii.’97”, watercolour in Bicknell’s pocket sketchbook showing the same view of the photograph in c). Bicknell family collection. e) View of Cime Bicknell and Cime Pollini in the upper Fontanalba Valley, from Cime de Chanvrairée (44°04'50.6"N 7°28'50.2"E). Dashed lines indicate the boundaries of the main geological units (Bas: crystalline basement; Per: Permian succession; LTr: Lower Triassic quartz-arenite; MTr: Middle Triassic carbonates).



**Fig.8.** Pliocene fossils collected by Bicknell in Bordighera; scale bars in a) and c) correspond to 1 cm. a) Specimens of Mitridae from the Pliocene of Bordighera, collected by Bicknell and illustrated in Bellardi (1887). The specimens are kept in the Bellardi and Sacco Collection of the Museo Regionale di Scienze Naturali of Torino (BSC-MRSN) (1: *Mitra atava*, syntype, specimen BS.019.01.017; 2: *Mitra implicata*, syntype, specimen BS.019.01.043; 3: *Mitra altilis*, holotype, specimen BS.019.01.066; 4: *Mitra submarginata*, syntype, specimen BS.019.01.050; 5: *Mitra planicostata*, syntype, specimen BS.019.01.189). b) Specimen of *Uromitra cupressina* (length: 23 mm) collected by Bicknell and illustrated in Bellardi (1887), photographed on its original label (BSC-MRSN, specimen BS.019.02.002). c) Pliocene molluscs from Bordighera, probably collected by Bicknell and illustrated in Sacco (1, 2: Sacco, 1893b; 3, 4: Sacco, 1897). 1: *Chenopus uttingerianus* (BSC-MRSN, specimen BS.041.01.005). 2: *Chenopus uttingerianus* var. *peralata* (BSC-MRSN, specimen BS.041.01.013). 3: left valve of *Flabellipecten alessii* (BSC-MRSN, specimen BS.110.17.008). 4: juvenile left valves of *Flabellipecten alessii* (BSC-MRSN, specimens BS.110.17.009 and BS.110.17.010). d) Excerpt from Plate 40 in Harmer (1914–19), depicting two specimens of the gastropod *Bonellitia serrata*; specimen 10 is from the English Pliocene (Boyton), specimen 11, for comparison, is from the “Italian Pliocene” and was donated to Harmer by Bicknell.



**Fig.9.** a) Excerpt from Bicknell's 1878-1879 diary, Vol. 1, entry for Monday Oct. 28<sup>th</sup>, 1878, describing the Pliocene fossil-bearing outcrops of the Borghetto Valley, with sketches of the erosion forms of the Pliocene deposits, "forming most fantastic pinnacles & caves" and of a "white & tawny owl sitting perched up on a piece of rock in a cave looking very wise & more weird". The blue arrows indicate the beginning and the end of the passage reported in the text as "excerpt 1". Bicknell family collection. b) Panoramic view on the right side of the lower Borghetto Valley in the Bordighera inland. The star marks one of the fossiliferous sites in Pliocene marly claystone described in Bicknell's 1878-1879 diary (see excerpt in a), reported as excerpt 1 in the text) and corresponding to an ancient quarry for the production of bricks and tiles.



**Fig.10.** a) Excerpt from Plate 6 in Sacco (1897), depicting the four syntypes of *Aequipecten bicknelli* from Bordighera (14, 15: “Collezione Bicknell”; 16, 17: “Museo geologico Torino”) and *Aequipecten bicknelli* var. *pseudovaria* from Andora (18, 19: “Museo geologico Torino”). b) Syntype of *Aequipecten bicknelli* (specimen BS.110.03.068 in the Bellardi and Sacco Collection of the Museo Regionale di Scienze Naturali of Torino (BSC-MRSN), kept in a small glass flask, with the original label in Federico Sacco’s handwriting. c) Syntypes of *Aequipecten bicknelli* (1: juvenile right valve, specimen BS.110.03.068 in the BSC-MRSN; 2: left valve, specimen BS.110.03.067 in the BSC-MRSN) and syntypes of *Aequipecten bicknelli* var. *pseudovaria* (3: right valve, specimen BS.110.03.069 in the BSC-MRSN; 4: right valve, specimen BS.110.03.070 in the BSC-MRSN), corresponding, respectively, to 17, 16, 18 and 19 in (a). Scale bars = 1 cm. d) Excerpt from Plate 2 in Hornung (1920), depicting the holotype of *Scalaria* (*Parviscala*) *bicknelli* from Rio Torsero. e) Holotype of *Epitonium bicknelli* (1, 2) and original labels. Hornung Collection, Museo di Storia Naturale Giacomo Doria of Genova. Scale bar = 1 mm.