

# ABSTRACTS

ESTRATTO

da

PHYSIS

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2021/1-2 (LVI)



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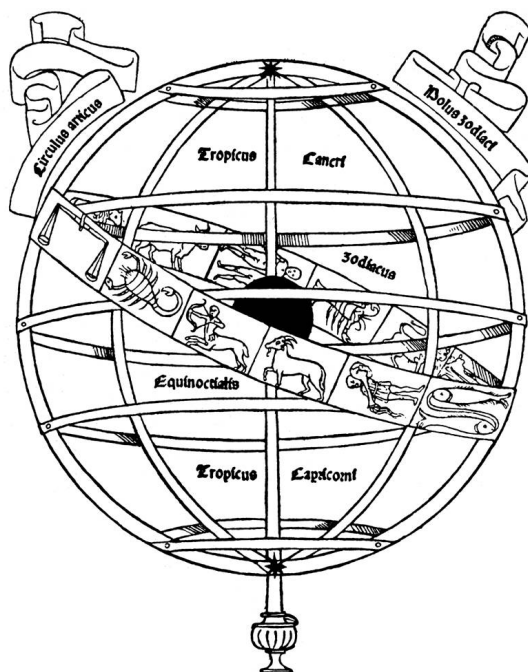
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# PHYSIS

RIVISTA INTERNAZIONALE DI STORIA DELLA SCIENZA



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# PHYSIS

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THE ASTRONOMERS WHO FELL TO EARTH:  
OR, HOW THE COPERNICAN REVOLUTION  
WAS COMPLETED IN THE ALPS

GREGORY A. GOOD  
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ABSTRACT – In the late 18th and early 19th centuries, natural philosophers and astronomers completed the Copernican Revolution by bringing its implications to the study of the third planet, Earth. No longer standing as the universal exception, unique in the center of the Cosmos, Earth had gradually to take its place as a celestial body, subject to gravity and other cosmic forces. Moreover, natural philosophers and astronomers brought to this study questions relevant to but distinct from those asked by natural historians and geologists. From Saussure and Humboldt to the Herschels, Gauss, and Bessel, new instruments and methods were applied to the shape of the Earth, its magnetic and seismic properties, its fluid envelopes, and to the chemical and physical properties of its materials. Much of the work for this new set of scientific investigations occurred in the field. This talk will focus on the Alps as a fieldwork site for this emerging cosmo-physical geoscience, and especially on the work of John Herschel.

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VISUALIZING THE THEORY OF THE ALPS:  
THE FIRST GEOLOGICAL MAP  
OF THE WESTERN LOMBARD PREALPS  
BY CHRISTIAN LEOPOLD VON BUCH (1829)

ANDREA CANDELA  
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ABSTRACT – In the first half of the 19th century, the Wernerian Neptunism began to reveal some flaws. It no longer seemed enough to explain the complexity of European geology. Some decades of detailed fieldwork had shed light on the difficulty of classifying the great variety of lithological formations, and especially of the ones observed by travelling naturalists during the exploration of mountains. It was likely after having examined the Auvergne volcanic area in 1802 that Christian Leopold von Buch, one of the most eminent Werner's students, began to doubt about Werner's geological system. The observation of the Auvergne region was a turning point in von Buch's geological beliefs, and it was essential to establish the following theoretical basis of his 'craters of elevation' hypothesis. The journeys, that he undertook to the Alps and Prealps in the third decade of the 19th century, contributed to strengthening the 'craters of elevation' theory, which was gradually included in a large-scale and geodynamic model of the genesis of mountains and the Earth's crust. The paper aims at analysing the influence that the exploration of the Western Lombard Prealps (Lombardy, northern Italy) exerted over von Buch's geodynamic theory of the mountains.

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THE GEOLOGY OF THE URAL MOUNTAINS  
AS UNDERSTOOD BY RODERICK MURCHISON IN 1845

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ABSTRACT – In 1845, Roderick Murchison, Edouard de Verneuil and Alexander von Keyserling published *The Geology of Russia in Europe and the Ural Mountains*, resulting from two field seasons in Russia (1840 and 1841) and additional fieldwork in Poland and Scandinavia. The first volume contains 7 plates (5 cross-sections and 2 geologic maps), where Plate 7 is the first geologic map of the Ural Mountains using ‘system’ terminology. It incorporates observations by Murchison et al., as well as data from Hermann, Erman, Humboldt, Rose, Helmersen, Hofmann and officers of the Imperial School of Mines. Together with the cross-sections, Plate 7 documents the distribution of igneous intrusions that uplifted and metamorphosed Paleozoic strata. The resulting mountains then eroded and supplied the younger sediments deposited on the flanks of the Urals. Murchison’s interpretation of the Ural Mountains was influenced by the mountain-building theories advocated by Humboldt, von Buch and Elie de Beaumont.

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THE DUN MOUNTAIN “*INOCERAMUS*” OR THE MAITAI PROBLEM.  
A NELSON PERSPECTIVE ON AN EXAMPLE OF THE CHALLENGES  
IN DATING THE OLDER ROCKS OF NEW ZEALAND

MIKE JOHNSTON  
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ABSTRACT – New Zealand’s basement geology is dominated by sparsely fossiliferous rocks commonly referred to as “the greywackes.” Following a visit to Nelson province in 1859 Ferdinand Hochstetter placed some of these rocks in his Maitai Slates (later Maitai Series and now group). With the establishment of the Geological Survey in 1865 the country became progressively geologically better known. However, the stratigraphy became increasingly confused as more rocks were placed in an expanding Maitai Series. In 1861 the discovery of the “Dun Mountain *Inoceramus*,” indicated a Mesozoic age for the Maitai rocks. In 1917 Charles T. Trechmann showed that the Dun Mountain fossil belonged to the atomodesmatinid family and was therefore Permian in age. Controversy over the age of the group (now restricted in content) resurfaced in the late 20th century with the discovery of Early Triassic ammonites stratigraphically between the Permian fossils. The Permian fossils in the upper part of the group are in olistoliths.

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THE DEVELOPMENT OF LITHOSTRATIGRAPHY  
IN THE ALPINE REGION DURING THE EARLY 19TH CENTURY  
THROUGH THE WORK OF GIUSEPPE MARZARI PENCATI  
AND PIETRO MARASCHINI

EZIO VACCARI  
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ABSTRACT – Pietro Maraschini is mainly recalled in the histories of geology for his essay on the formation of rocks in the Vicentine prealps (1824), which enriched the works by Giovanni Arduino on the same mountain region and attracted the visits of some distinguished European geologists including Alexandre Brongniart; Marzari Pencati is known for his studies on the possible ways of intrusion of granite through the strata of limestone in the alpine area of Predazzo (South Tyrol), which prompted several geologists to visit the localities around Predazzo and led to a controversy with Leopold von Buch during the early 1820s. However, both Maraschini and Marzari Pencati also produced an impressive amount of research in the field on several topics. The results of this work remained mainly unpublished, especially in the case of Marzari Pencati, but clearly emerge from the content of their correspondence and collection of manuscripts. The aim of this paper is to provide an introductory and comparative picture of the scientific activities of both these significant Italian geologists, in order to understand their contribution to the lithostratigraphy of the Alpine region within the European context of the first decades of the 19th century, as well as to suggest further studies on published and unpublished primary sources.

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RESEARCH IN THE AUSTRIAN ZILLERTAL VALLEY  
AND RIESERFERNER MOUNTAINS BY FRIEDRICH BECKE (1855-1931)  
AND FERDINAND LÖWL (1856-1908)  
A CASE OF SUCCESSFUL TEAMWORK

MARGRET HAMILTON  
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ABSTRACT – Ferdinand Löwl and Friedrich Becke both were professors at the German University at Czernowitz (today Tscherniwzi, Ukraine) between 1887 and 1890, which belonged to the former Habsburg monarchy. They became friends and when Becke moved to the German University of Prague in 1890, they continued their friendship and started research in the Austrian Alps. Ferdinand Löwl introduced Becke to the alpine regions, first to the Zillertal Valley, where Löwl also became familiar with the people of the Zillertal area. He was a member of the German-Austrian Alpine Club in Prague. Under the guidance of Löwl, Becke began to explore the petrographic situation in the Zillertal Valley. This research led to an excellently guided Excursion at the 9th International Geological Congress in Vienna in 1903. The examination of the rocks of the Rieserferner Mountains in the Southern Alps led to two different publications, one in the well-known geographical magazine *Dr. A. Petermanns Mitteilungen aus Justus Perthes Geographischer Anstalt* and in the important petrographic periodical *Tschermak's Mineralogische und Petrographische Mitteilungen*.

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## GEOLOGICAL EXPLORATION OF THE RUWENZORIS, THE LEGENDARY ‘MOUNTAINS OF THE MOON’

SHARAD MASTER  
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**ABSTRACT** – The Ruwenzori Mountains, in Equatorial Africa, straddling the border between Uganda and D.R. Congo, were equated by H.M. Stanley in 1890 with Claudius Ptolemy’s legendary Mountains of the Moon (2nd century CE). Initially thought to be volcanic, they were shown to be composed of schists and diabase by F. Stuhlmann in 1894. The Ruwenzori Central High Peaks were first mapped geologically by A. Roccati during the 1906 Italian expedition of the Duke of Abruzzi. During the Belgian Ruwenzori Expedition of 1932, P. Michot mapped imbricated thrusts on the Congolese side. In 1951-1952, W.Q. Kennedy led a British geological and glaciological expedition to the Ruwenzoris. Discovery of the Kilembe Cu-Co deposit (Uganda) partly spurred further exploration by teams from Leeds and Belgium. Since 2007 multidisciplinary research teams, from Mainz (Germany), studied the Ruwenzoris and Western Rift. The accelerating recession of Ruwenzori’s glaciers is of continued interest.

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## THE BIRTH OF PETROLEUM GEOSCIENCES IN ITALY

PAOLO MACINI  
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ABSTRACT – This paper investigates the achievements of petroleum geosciences that developed in Italy between the mid-19th and early 20th century, paving the way for the birth of the national oil industry and the establishment of a common cultural and technical *milieu* that attracted to Italy a number of investments and entrepreneurs. The oilfield sector benefited from the contribution not only of academic studies, but also by the input of outstanding geologists and engineers from the Corps of Mines and, last but not least, from the expertise of many field operators. In an attempt to examine the scientific debate of the time, herein are highlighted the crucial issues of interest with regard to petroleum geosciences and the related tectonic studies.

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TWO LETTERS ON MINING SITES IN TUSCANY  
BY GIOVANNI TARGIONI TOZZETTI  
TO THE COUNT OF RICHECOURT

PAOLO SAMMURI  
*Rome*★

ABSTRACT – Giovanni Targioni Tozzetti was a well-known naturalist who lived in Florence and travelled extensively in Tuscany for scientific reasons. In 1743 he wrote two letters to the Count of Richecourt to arouse the Regency's interest in the wealth of Tuscan mines: firstly, a letter titled *Observations on Tuscan mines* followed by a second letter *On the expected benefits of Tuscan mines*. There is no information concerning Richecourt's answer to this correspondence: however, subsequent to these letters, Targioni later published his renowned *Reports on some travels in Tuscany* between 1751 and 1754. In this work, together with an account of his travels, he also reported on Tuscan mines. Probably thanks to the strong stimulus by Targioni, a survey of all Tuscan mining sites, that until then had been unproductive or abandoned, was started. The two letters – today preserved in The State Archives of Florence (SAF) and in the National Central Library of Florence (NCLF) – are herein analyzed from a geological point of view and discussed with regard to the history of mining.

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JOSEPH BURKART'S GEOLOGICAL RESEARCH IN MEXICO  
(1825-1834): A PARADIGMATIC CASE  
OF KNOWLEDGE CO-PRODUCTION

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ERICK VILLANUEVA-VILLASEÑOR  
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ABSTRACT – When European mining companies settled in Mexico (1824), they found local experts who had inherited its long tradition in silver mining, integrated in an abundant bibliography and practical expertise. Thus, they were able to cooperate with the foreign executives and put them in contact with potential Mexican workers from different social strata, who had a wide range of experience in multiple aspects related to mining. This paper analyses the work of Joseph Burkart (1798-1874), a Prussian geologist and mineralogist who worked in Mexico from 1825 to 1834, as manager of British enterprises. During his stay in Mexico he became acquainted with Mexican scholars, who became his collaborators and companions during his expeditions. The data collected during his residence in Mexico, and that sent by his local partners after his return to Bonn, were published in 40 scientific papers, which represent clear-cut examples of knowledge co-production.

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ILLUSTRATION WITHIN  
INFORMAL GEOLOGICAL COMMUNICATION  
DURING THE GOLDEN AGE OF GEOLOGY (1788-1840)  
EXAMPLES FROM THE RESPECTIVE CORRESPONDENCE  
AND ARCHIVES OF HENRY DE LA BECHE AND WILLIAM BUCKLAND

RENEE M. CLARY  
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ABSTRACT – During the Golden Age of Geology (1788-1840), geologists conveyed information informally within letters and field notebooks, sometimes including illustrations in the narratives. These sketches encapsulate geological observations to serve as references and reminders, and supply data for the author's and their colleagues' future interpretation. Illustrations impact how a reader processes a topic; they also record a *selective* example and the geologist's interpretation of it. The illustrations in Henry De la Beche's (1796-1855) and his colleagues' letters, notably William Buckland's (1784-1856), and De la Beche's field notebooks, form the basis of this case study that probes the contemporary level of scientific understanding and illustration trends. While this was an important communication venue in the age of focus, letter-writing implementation in college geology classrooms revealed that modern students lack skills to communicate geological information with self-produced illustrations.

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COMMUNICATING GEOLOGY BETWEEN BUREAUCRACY, PUBLIC,  
SOCIETY AND LAYMAN: PRIVATE CONVERSATION  
AND PRODUCTIVITY IN THE METROPOLIS VIENNA

MARIANNE KLEMUN  
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ABSTRACT – Earth sciences were particularly successful both locally and internationally in nineteenth-century Vienna and the Habsburg Empire in general, which can be attributed to new institutions: the association *Friends of the Natural Sciences* (since 1845) and the *Imperial Geological Survey* that was founded in Vienna in 1849. Their esteemed reputation was based on the extraordinarily high quality of their output, resulting from the geological examination of the terrain of the entire monarchy. However, historical scholarship has so far ignored that the extremely effective communication structure also played a significant role in this success story. There was indeed a group of dominant researchers who cooperated and coordinated the field of earth science, making geology visible among science in new ways. This paper focuses on a new perspective on communication on several levels, in particular highlighting the personal contact through channels of different institutions, political elites, administrative networks, society and culture in the metropolis Vienna.

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“CENTRAL NODES” AND “NEUTRAL GROUNDS”:  
BOUNDARY-WORK BETWEEN SCHOLARSHIP,  
SCIENTIFIC AMATEURISM AND THE PUBLIC IN VIENNA (1860-1890)

JOHANNES MATTES  
*Austrian Academy of Sciences*★

ABSTRACT. ‘Citizen Science,’ the public participation in scholarly research, is not just a recent phenomenon. Nowadays, conceptions of ‘citizen science’ are based on social boundary-work between science and the public, which, during the 19th century, led to new cultures of community, cooperation and practices in dealing with knowledge. These processes are linked to the development of the civil society, open urban spaces, scholarly associations and knowledge exchange. The differentiation between professionals and scientific amateurs in Central Europe is largely derived from scholarship on conditions in Germany. In the Habsburg Empire, however, this demarcation did not occur as early. The close ties between research and public administration before 1848, the legal regulations of associations and state censorship resulted in unique paths in science popularization. Using the examples of three selected (popular) learned societies in Vienna, this essay examines the processes, in which demarcations between scientific and other knowledge-based activities were created, attacked, advocated or reinforced. Particular attention is paid to the impact of earth sciences on the emergence of scholarly amateurism.

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PALEONTOLOGIST MARIA PAVLOVA'S COMMUNICATION  
WITH FOREIGN SCIENTISTS  
IN THE LATE 19TH-EARLY 20TH CENTURY

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GALINA LYUBINA

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ABSTRACT – Maria V. Pavlova (1854-1938) was one of the first Russian women paleontologists. In 1884, she graduated from the Sorbonne in Paris specializing in paleozoology. She worked for many years at Moscow University with her husband geologist Aleksey P. Pavlov. Studying the remains of fossil vertebrates, she visited museums in London, Paris, Munich, St. Petersburg, Vienna, and other places that housed paleontological collections of interest to her studies. Maria presented her paleontological work to foreign scientists and corresponded with prominent geologists and paleontologists in Europe and America. Many letters from Albert Gaudry, Ludwig Rüttimeyer, Eduard Suess, Arthur Woodward, Othenio Abel, Karl Redlich, Antje Schreuder, Henry Fairfield Osborn, Johannes Walther and others are stored in the Archive of the Russian Academy of Science (ARAS). In 1925, she became a corresponding member of the Academy of Sciences of the USSR and in 1930, she became an Honorary Member. Pavlova was also a foreign correspondent or member of many foreign Geological and Zoological Societies.

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## OVERRATING THE EXACTITUDE: THE ROLE OF GEODESY IN ALFRED WEGENER'S ARGUMENTS FOR CONTINENTAL DRIFT

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ABSTRACT – Alfred Wegener argued that the best way to prove his conviction that continental drift was a reality was to measure displacements directly. Taking a series of historic longitude determinations, he concluded that Greenland was moving away from Norway at a rate that agreed with his assumption of the timing of separation. The confirmation that this offered was eventually found to be illusory however, and Wegener appears to have been tempted to gloss over what he knew were inherent flaws in the geodetic data on the basis of an unfortunate coincidental agreement between predicted and measured rates of displacement, both of which were found to be erroneous after Wegener's death. Geodesy also offered Wegener a short cut to a confirmation of continental drift at a time when his other commitments precluded him from more time consuming investigations. Wegener's use of geodetic data may ultimately have been misguided, though it did not unduly harm his overall case for continental drift.

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GEOSCIENTISTS AND BUDDHIST THOUGHT:  
THE POPULARIZATION OF SCIENCE  
AND 'COSMIC CONSCIOUSNESS' IN 1920s JAPAN\*

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ABSTRACT – This article examines the circumstances and the context of the popularization of geoscientific knowledge with reference to a Japanese religious background. It is generally agreed that there was little conflict between Buddhist doctrines and Western science when the latter was accepted among Japanese scholars in the nineteenth century. Yet, fifty years after the comprehensive changes to Japanese society brought about by the restoration of imperial rule under the Emperor Meiji, in 1868, the Japanese people, as late as the 1920s, were faced with difficulties of mental or spiritual 'readjustments.' This was also the case among geoscientists. Especially so, when they tried to popularize Western scientific concepts, and to reconcile them with the religious background of Buddhism. The problems they encountered in these attempts and how they dealt with them, will be discussed. The author will concentrate on two cases, those of the cosmo-geophysicist Shinjō Shinzō (1873-1938) and the geologist-poet Miyazawa Kenji (1896-1933), focusing on how they utilized Buddhist terminology in writing their works. Shinjō, after studying at the University of Göttingen, in Germany (1905-1907), institutionalized cosmophysics at Kyoto Imperial University in Japan, and gave popular lectures in the 1910s-1920s. Miyazawa, trained as agricultural engineer, became a follower of the *Nichiren-shū* sect, and wrote poems and fables. The analyses of their works show that they shared geo-cosmic evolutionary thoughts and held a kind of 'cosmic consciousness' in common but followed different pursuits. Shinjō proceeded to study the history of ancient Chinese astronomy and became the director of an institute in Shanghai while Miyazawa became a local practitioner and religious activist.

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\* In the text of this article, Japanese names are described family name first and given name last.

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LIMITS OF COMMUNICATION:  
GEOLOGISTS' LETTERS AND THE NAZI REGIME

MARTINA KÖLBL-EBERT  
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ABSTRACT – In a totalitarian regime, there are limits to communication when letters are subject to censorship; when carelessness may endanger sender as well as recipient. It shows in ritualized greeting formulas, in linguistic conventions, in lies being told and in the use of code. The historian's remedy is the collection of numerous, independent sources, including non-verbal communication such as images or the evidence of the paper itself.

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## ROCKS IN ARAB-ISLAMIC SCIENTIFIC HERITAGE BETWEEN THE 8TH AND 13TH CENTURIES

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**ABSTRACT** – Jabir ibn Hayyan (8th century) is considered one of the first to divide rocks according to their origins and he clearly distinguished between three categories of rocks. Al-Jahidh (9th century) mentioned volcanoes and fire rocks, pondering some interpretations of the diversity of characteristics of rocks which were based on the ratio of the terrestrial, water or air component, but did not take into consideration the fire component. The brothers of al-Safa (9th century - 10th century), also distinguished smooth solid magmatic rocks that contained few plants, from soft superimposed sedimentary rocks (layer upon layer), in which many caves and a lot of plants, grasses and trees could be observed. Ibn Sina (11th century) also distinguished between sedimentary rocks (consisting mainly of a terrestrial substance) and the igneous rocks (consisting predominantly of water). It seems that Al-Al-Dimashqui (8th century) was well aware that the formation of some rocks was due to their exposure to very high temperatures (such as white marble), where the extensive heat changed their shape and the original stone appearance so that they took on a completely new aspect. Al-Jahidh stated: "And tell me about the jewels of the Earth [...] are they something definitely created or earth that has been turned into them (transformed)?" Perhaps this is the first reference to metamorphic rocks. It is a statement that the rocks containing the gems, are not the 'land' created by God, and then remained as it was first created; but they are rocks that could be changed and transformed. Muslim naturalists were fully aware of the many origins and categories of rocks. It may be possible to consider them as the founders in general of petrology and in particular of the science of sedimentary rocks. Especially with regard to the works of Al-Bairouni (10th century-11th century), Al-Karkhi (11th century), the brothers of Al-Safa and Ibn Sina, which present a precise scientific language, describing the processes of weathering, transport, sedimentation and their consequences.

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*FORMA VESUVII – 2*  
VOLCANIC MORPHOLOGY  
AT THE TIME OF THE 79 AD PLINIAN ERUPTION

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*IGG – CNR Pisa* ★  
SIMONE ARRIGHI  
*DSTP-Pisa* ★★

ABSTRACT. This work is aimed at reconstructing the morphology of the volcanic edifice of Vesuvius before the most famous eruption that occurred in 79 AD, destroyed the cities of Pompeii, Herculaneum, and Stabiae, and was described by Pliny the Younger. This result has been achieved by using both volcanological data and historical documents. The previous history of the volcano and the distribution of the deposits of the 79 AD eruption has been used as a guide for the reconstruction of the pre-eruptive morphology. This is consistent with the few indications given by the ancient writings and the frescoes found during archaeological excavations in Pompeii and Herculaneum.

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FOREIGN COMMUNITIES, DEVELOPMENT OF METALLURGY  
AND MINING ACTIVITIES IN SOUTHERN ITALY  
AT THE BEGINNING OF THE BOURBON DYNASTY  
(1734-1759)

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ABSTRACT – In the South of Italy, at the beginning of the Bourbon dynasty, mining and metalworking projects were intensified with the aim of promoting the development of the southern economy and manufacturing industry. To this end, the new sovereign, Charles of Bourbon, drew up a complex and ambitious project to train, with the help of workers coming from German countries, new experts in ore processing. The essay dwells on the attempts to create a modern and autochthonous mining-metallurgical culture, which, while allowing the development of a technical-scientific environment on site, would, on the one hand, provide a solution to the inadequateness and shortage of local technicians and, on the other hand, support the sustainable growth of the mineral and metallurgical sectors without having to rely on the expertise of qualified professionals from abroad.

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MINERALOGICAL TRAVELS AND MINING KNOWLEDGE  
IN THE 18TH CENTURY: PRELIMINARY CONSIDERATIONS  
ON THE CASE OF MARCO CARBURI

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ABSTRACT – During the 18th century, the practice of mineralogical travels became widespread throughout Europe. Between 1760 and 1764, Marco Carburi, professor of chemistry at the University of Padua, was commissioned by the Mining Board of the Republic of Venice to visit excavation sites and metallurgical plants in Hungary, Germany, Denmark and Sweden. The aim of his travels was to collect knowledge and acquire experience in this field, as well as to make the acquaintance of important representatives of the scientific community of the time, and with whom he later corresponded, such as Wallerius and Cronstedt. In Sweden Carburi also encountered the great naturalist Linnaeus, who became one of his correspondents and the latter requested his opinion on the mineralogical system he had devised.

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## THE IMPORTANCE OF A.E. FERSMAN'S RESEARCH ON THE ISLAND OF ELBA (1908)

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ABSTRACT – Alexander Fersman traveled to the Island of Elba (Italy) in the spring of 1908. He explored the island in search of a range of minerals and ores and especially pegmatite veins. It was his first independent scientific expedition and research project. He had completed his university education and worked under the tutelage of Vladimir Vernadsky, did an internship with Heinrich Rosenbusch, Victor Mordechai Goldschmidt, and Alfred Lacroix. The Island of Elba is well known for its abundance of interesting and rare minerals and Fersman dreamed about going to visit it. He studied museum samples and publications about Elba. His visit served him as a model and a reference for his further research of pegmatites. It gave him practical understanding and set a goal for his studies of mineralogical processes and geochemistry. Fersman published three papers about Elba's minerals in Russian and used his own data in other publications. His Elba collection is still important for mineralogists and historians of science and is exhibited in the Fersman Mineralogical Museum of the Russian Academy of Sciences in Moscow.

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DOLORES RUBIO ÁVILA.  
THE FIRST FEMALE ENGINEERING SCHOLAR  
AND ACADEMIC IN MEXICO, 1910

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ABSTRACT – In 1910, the National University of Mexico was founded; this educational project gathered together the main national schools of higher education, such as the National Engineering School. The National University inherited the legacy of the Royal School of Mines, which opened its doors in 1792 aiming to train young students in mineral exploration and exploitation based on a scientific approach. In 1867, this school gave birth to a civil engineering program and later, courses in mechanical and industrial engineering and metallurgy were added. Nevertheless, during the 19th Century, all registered enrollments were exclusively male; it would take until 1910 for when the first female student, Dolores Rubio, was enrolled. In this paper, I will study Dolores Rubio's entry into the metallurgy program in the National Engineering School, and, as a parallel subject, I will also analyze her professional performance as Preparator of the Cabinet of Mineralogy, Geology and Paleontology in this institution. Based on this research and its source documents, some ideas regarding the role of women in society, science and engineering at the beginning of the 20th Century in Mexico will also be presented.

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## TOWARDS DEFINING STROMBOLIAN ACTIVITY DURING THE 20TH CENTURY

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ABSTRACT – Strombolian activity is the typical eruptive phenomenology of the Stromboli volcano, on the homonymous island in the Aeolian Islands archipelago (Sicily, Italy). Defined as moderate explosive activity (but also capable of violent events), it was included within a classification of eruptive activity by Mercalli at the beginning of the 20th century. Over the course of the century, the definition would be broadened by scientists such as Lacroix, Ponte, Rittmann, Gèze and many others, until arriving at the current terminology, the result of research and constant monitoring by technologically advanced institutes, that keep a close watch on the volcano.

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# THE 1:1M GEOLOGICAL MAP OF ITALY: A MILESTONE IN GEOLOGICAL KNOWLEDGE

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ABSTRACT – Since 1873, the Geological Survey of Italy has conducted field research aimed at the realization of the official detailed scale geological map of the country. However, among these maps, the Geological Survey cartographic series also includes the Geological Map of Italy at 1:1,000,000 scale. This map, in addition to its intrinsic scientific significance, also has historical and cultural value; the long time span between the first and the last edition allows us to retrace the evolution of scientific knowledge within Italian geological sciences over 100 years.

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EXHIBITS OBSERVED AT THE VIENNA WORLD'S FAIR, IN 1873,  
AND THE INTRODUCTION OF WESTERN GEOLOGICAL THOUGHT  
AND PRACTICE TO JAPAN

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ABSTRACT – A chance discovery of fusulinid fossils in a stone exhibit and the observation of decorative rocks samples in a Japanese garden, at an exposition in Vienna, in 1873, served as an unlikely catalyst for the introduction of western geological knowledge to Japan. The description and publication of these findings by the German geologist and palaeontologist Karl Wilhelm von Gümbel, alerted Japanese officials to the potential benefits to their country in applying western teaching and practices in geology in Japan. The appointment of the young geologist Edmund Naumann by the Japanese government, led to considerable advances in the teaching of geology and to the production of geological maps.

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