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LETTERS IN THE EARTH SCIENCES: THEIR HISTORIC VALUE AND PRESENT-DAY SCIENTIFIC RELEVANCE

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INTRODUCTION

Scientific letters have always played a significant role in understanding the history of science and scientific instrumentation. They also play an important role in those areas of the earth sciences in which organised observation networks are spread out across territories, such as in seismology, meteorology, geomagnetism and astronomy. It may come as rather a surprise to discover that collections of historic scientific letters can actually unveil information endowed with present-day scientific relevance. The novelty and relevance of the information contained in some of the historical letters for seismological studies is one of the aspects that most of all motivates an investment into this kind of research, conducted more by seismologists than by historians of science. The tests performed up until now within the framework of the TROMOS project (Istituto Nazionale di Geofisica e Vulcanologia – Storia Geofisica Ambiente. INGV-SGA) have led us to identify the following kinds of information: descriptions of the effects of seismic events; scientific comments on theories, publications, etc.; graphs; reproductions of seismograms; news of lending information; information and drawings of instruments, their location and orientation within the observatories.

The first three information categories do not require any particular comments, while the others are very important for seismological research and are worth analysing further.

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Among the hundreds of seismological observatories in the world that have recorded earthquakes since the early 1890s,[1] it is unfortunate that not all of them have kept their recording archives intact. In many cases such archives were partly or totally destroyed for a wide range of reasons: human (state of abandonment, deliberate destruction or wars) and natural (fires, earthquakes, floods, etc.). At times the recordings of the most important earthquakes were lost, with serious damage done to research. However, the reproductions of their seismograms and/or related information that can be gleaned from several letters which, when suitably re-evaluated on the grounds of modern methods of analysis, can still provide vital information and retrieve what had previously been lost.

Within the framework of a broad international collaboration in the International Association of Seismology and Physics of the Earth's Interior (IASPEI) Sub-Committee *Historical Instruments and Documents in Seismology* and the European Seismological Commission (ESC) Working Group *History of Seismometry* projects,[2] fulfilled on the grounds of the TROMOS project experience, the idea of developing a specific research strand analysing scientific correspondence in the earth sciences, hinging upon a close-knit collaboration between institutions, was born. Although most of the studies hitherto performed refer to the seismological field, and at most to the meteorological field, it should nevertheless be noted that the disciplinary difference is a rather recent one, and that in Italy meteorological and seismic observations have often been performed in long-established astronomical observatories. Hence the materials, the observations and the history of distinct disciplines mingle together. The astronomical observatories of Brera at Milan, Turin, Piacenza, the Collegio Romano in Rome, Capodimonte in Naples and Palermo, to mention just a few, are some examples of how historical Italian astronomical observatories represented a natural home for meteorological observation first, later followed by seismological observation.[3]

A large number of identified historical correspondences of interest for meteorology and astronomy lie idle, uncatalogued, and even at risk of dispersion. The problems posed by cataloguing and above all managing

[1] GRAZIANO FERRARI, *The new IASPEI Sub-Committee Historical instruments and related documents in seismology: goals, objectives and first results*, «Sismological Research Letters», 71(5), 2000, pp. 553-561 (special issue: Proceedings of the XXII IUGG General Assembly, Birmingham, 19-30 July 1999).

[2] FERRARI, *The new IASPEI*, cit.

[3] FERRARI, *Census, filing and elaboration of scientific letters in the earth sciences*, «Nuncius», XVII (1), 2002, pp. 307-320.

the files with a view to making them accessible for research purposes has often been a disincentive to preservation efforts.

Within the scope of the TROMOS project, we are digitally scanning the files of scientific correspondence between some of the leading Italian seismological observatories. The cataloguing and digital scanning is carried out in collaboration with the holders of the documentation, whether they are public or private institutions. These initiatives are mainly performed in their interests.

The letters of the files of Timoteo Bertelli (1826-1905), Pietro Tacchini (1838-1905) and part of those of Giulio Grablovitz (1846-1928) have already been submitted to electronic scanning, held respectively at the Centro Studi Storici Barnabiti of Rome (transferred there from its original site of production and preservation, the «alla Querce» College of Florence), the Ufficio Centrale di Ecologia Agraria in Rome and at the home of Grablovitz's descendants (temporarily kept at SGA). It is no coincidence that the first systematic digital scan was performed on the Tacchini file: he was an astronomer, 'meteorologist' and 'seismologist', at least defined institutionally.

The digital archive hitherto created has brought together over 7,000 letters, totalling over 11,000 pictures, received by Tacchini, Bertelli and Grablovitz from over 800 correspondents, all surveyed in the TROMOS database and documented by all available biographical information.

Modern computer technologies have allowed us to store and distribute, via DVD-ROM and the Internet, diverse information formats and thus enable us to realise what only a few years ago was unthinkable: a single letters corpus for the scholars of Earth Sciences.

The project, enlarged to embrace a broader community of researchers, aims to promote and foster the identification, cataloguing and electronic scanning of letters, thus making available files of interest for the study of the history of earth sciences and astronomy.

Parallel to this project we also aim to enhance the electronic retrieval of everything published so far: letters catalogues, registers, unabridged letter transcriptions; this phase should also be supported by a digital scanning of the letters themselves.

The materials are catalogued, scanned and made public online respecting the rights laid down by law and by specific agreements stipulated with the public or private bodies preserving the files under study.

In order to discuss the methodological aspects of the study of the scientific correspondence and its scientific relevance, a seminar was organised on 10th May 2002, promoted by the author in collaboration with

the Istituto Nazionale di Geofisica e Vulcanologia (INGV) and the Ufficio Centrale di Ecologia Agraria (UCEA), at the congress hall of the UCEA, historic headquarters of meteorology and seismology in Italy. At the seminar, in addition to the scholars most committed to studies of this kind over the past few years, the descendants of the most illustrious Italian scholars of the earth sciences were also invited: Mario Baratta (1868-1935), Pietro Caloi (1907-1978), Michele Stefano de Rossi (1834-1898), Giulio Grablovitz (1846-1928) and Quintino Sella (1827-1884), as well as prestigious representatives of the public, private and ecclesiastical Italian archives, relevant to this sector.

The seminar

The seminar was held under the splendid Renaissance ceilings of the UCEA, refurbished to host congresses and exhibitions.

In order to represent the various situations existing in this particular study sector and the multidisciplinary and interdisciplinary characteristics of the various approaches, the day of study developed along five strands: Scientific Letters: study traditions and prospects; Fragments of the European context; Case studies in Italy; Places of Observation; Places of Preservation.

Domenico Vento (Director of the UCEA, Rome) opened the session with a welcoming message that traced the history and transformations of the Office he is directing. Vento briefly discussed the great historic and scientific value of the documentary and instrumental assets of the UCEA, generally acknowledged for some time: He also recalled the long and well-established tradition, within the TROMOS project, between the UCEA on the one hand and INGV and SGA on the other, and he expressed his hope that the renewed cultural understanding between these bodies could achieve new and important objectives.

Scientific Letters: study traditions and prospects

This section was dedicated to relating research experiences to their established tradition, and two talks on astronomy and seismology were given. The international character that this kind of research can have, given the universal nature of the research itself and the relationship between the scholars, also emerged.

Pasquale Tucci (Institute of General Applied Physics, University of Milan), with his talk on *The correspondence between Otto Struve and Giovanni Virginio Schiaparelli (1864-1904)*, two eminent astronomers who lived between the 19th and 20th centuries, presented by means of the study of an important scientific collection, a clear-cut example of the potential that this kind of documentary evidence has for the history of science, embedding it in the cultural and political context of the day. In reconstructing, through some 280 letters preserved in Milan and Pulkovo (Russia), the major stages in the scientific and public lives of the two scholars, Tucci also paused to reflect on the specific value of the testimonies provided by this kind of documentation. For example, its crucial role in the reconstruction of the history of international scientific institutions such as the International Astronomical Union, established and developed thanks to those scholars whose collaboration went far beyond the official availability granted by the various states.

Graziano Ferrari (SGA Storia Geofisica Ambiente, Bologna) with his talk on *Correspondence in Seismology, historical value and present-day scientific relevance* outlined the role and the importance of letters between scholars of seismology, developing and exemplifying some of the aspects alluded to in the introductory part of this text. He also mentioned the cataloguing project, the electronic reproduction and the dissemination of the scientific correspondence in the earth sciences, started by the TROMOS project, inviting those in attendance to join in as well.

Fragments of the European context

A couple of trials of the recovery and analysis of correspondence performed in the European field help us to contextualise the Italian experience in this sector. One, belonging to the British tradition, documents the status and the study method of the New Dictionary of National Biography (DNB) and the materials available to researchers. The second case deals with a research project carried out in Spain, similar to the one performed in Italy within the TROMOS project.

Anita McConnell (Research editor, New DNB Oxford University Press), with her talk on *The 'New Dictionary of National Biography': A New Look at British Earth Scientists* presented the contents of the DNB, with particular attention to British earth scientists, as well as the places, materials and instruments of their research. The New Dictionary of

National Biography: (http://www.oup.co.uk/newdnb) contains some 60,000 names of British people active from c. 60 BC to 2000 AD in Scotland, Ireland, North America and other colonies, and of foreign people who were active in Britain. It includes more than 100 people who were active in the earth sciences. In preparing their articles, searches were made for their correspondence and papers. The survival and whereabouts depends largely on the date, affiliation, and family interests of the scientists concerned. McConnell also gave an overview of the main institutions holding documents of interest to the DNB, such as university and scientific societies' archives, the Public Records Office in London and the John Milne Library.

Josep Batlló (Observatori de l'Ebre, Seismic Section, Roquetes, Spain) with his contribution on *Scientists and scientific associations in Catalonia (Spain) in the early 20th century: manuscript vs. published research* brought us the benefit of his research experience within the seismological and meteorological field, relating to published and unpublished documentation on scholars, observatories and scientific associations in Catalonia. He also highlighted the present-day relevance of various kinds of documentation, and in particular letters, with regard to research in the meteorological and seismological fields, with some examples for Catalonia of the reconstruction of the macroseismic maps of historical earthquakes and climatological maps.

Case studies in Italy

One of the main figures in the history of the earth sciences at the end of the 18th century is Pietro Tacchini, a leading personality in astronomy, who from 1879 had the scientific, political and organisational skills to set up and develop the national meteorological and geodynamic services within the scope of the Central Meteorology Office (and from 1887 also Geodynamics). Three talks outlined the complex biographical profile of this scientist as seen from different disciplinary perspectives.

Letizia Buffoni and Edoardo Proverbio (Astronomical Observatory of Brera, Milan) with *The contribution of Angelo Secchi and Pietro Tacchini to the birth of earth and solar meteorology: the role of correspondence*, developed some aspects of the scientific and human relations existing between Pietro Tacchini and Angelo Secchi, two of the greatest 18th century Italian astronomers, through the study of the letters sent by

Tacchini to Secchi preserved at the Archives of the Pontifical Gregorian University, Rome.

Ileana Chinnici (Astronomical Observatory, Palermo) in his talk on *Pietro Tacchini «astronomer» in the scientific correspondence preserved at the UCEA* outlined Tacchini's scientific biography with special regard for the contribution of this great scientist in reorganising the network of astronomical observatories, documented by the letters of the Tacchini epistolary archive preserved in the Library of the UCEA.

Franca Mangianti (Central Office of Agrarian Ecology, Rome) *Pietro Tacchini «meteorologist» in the epistolary documentation of the UCEA (1879-1899)* went over the experience of Tacchini as a meteorologist and as first director of the UCEA, documenting it with letters from the Tacchini epistolary archive of the UCEA (entirely digitally scanned by the TROMOS project) and that of the Archive of the Pontifical Gregorian University.

Francesco Obrizzo (Istituto Nazionale di Geofisica e Vulcanologia – Osservatorio Vesuviano, Naples) and Edvige Schettino (Department of Physics, University of Naples) presented a contribution on *The machines of the Bourbons in Naples between Collection and Museum: verbal sources and others (1840-1850)* in which they recalled how the Royal Cabinet, made up of an initial nucleus of 200 scientific instruments, where magnetic, meteorological and time measurements were also made, acted as a teaching laboratory for the heir to the throne Francis II of Bourbon. The instrumental resources recovered in the ten-year period 1985-95 are the subject of study, supported by the documentary and epistolary evidence.

Places of observation

The changing strategies for monitoring the observation networks, both seismological and meteorological, many of which are often centralised and heavily automated, have radically modified the functions of several surviving ancient observatories, transforming them in some cases into places for the preservation of the historical materials of their history of observation. In other cases these scientific institutes have been able to adapt to the new requirements of modern research and represent the places where modern monitoring systems cohabit with the preservation and the valorisation of the material traces of the long historical tradition of observation. In the hope of providing a broad picture of the sites with a

long scientific tradition in the seismological and meteorological fields, the representatives of the various observatories that are still active were invited. Amongst them were the «Vincenzo Nigri» Observatory of Foggia, still kept working by the descendants of the founder, and the Ximenian Observatory of Florence of the Scolopi fathers.

GRAZIANO FERRARI (SGA Storia Geofisica Ambiente, Bologna) and MATTEO CERINI (Director of the Observatory «Alberoni», Piacenza) presented a contribution on *The seismological correspondence of the «Alberoni» observatory of Piacenza*, first of all recalling that the observatory of Piacenza is one of the rare cases of a long scientific tradition, still active, that has its roots in the 1870s, and where the modern instruments are side by side with the ancient ones and the related historical documentation. From the Observatory's archive, which M. Cerini is patiently reconstructing, the more recent history of the Observatory and its instruments is emerging: from the events that brought them to Piacenza in the 1920s and their descriptions. All these elements are of great scientific value today if we consider the fact that the Observatory has intact over 15,000 original seismograms of enormous scientific value.

PLACES OF PRESERVATION

The Archive and the Library of the Barnabite study centre, the Central State Archive, the Library of the Neapolitan Society for Local History and the Archive of the Pontifical Gregorian University are very important examples of the contribution that can come from these 'historical containers' both because of the importance of the historical documentary resources contained therein, and the availability to collaborate demonstrated by the bodies which took part in the seminar and the expertise of their representatives.

FILIPPO LOVISON (Barnabite Historical Studies Centre, Rome) in his *The earth sciences in the epistolary archives of the Barnabite scientists* briefly but incisively recalled the contribution of several 19th and 20th century Barnabite scientists to progress in several sectors of the earth sciences such as: Timoteo Bertelli, Francesco Denza (1834-1894), Camillo Melzi d'Eril (1851-1929), to mention only some of the most important. In recalling the long collaboration of the Barnabites with the research performed within the TROMOS project, Lovison stressed how important it is for the historical sites preserving the historical documents not to be considered merely as 'document containers', but as centres for the study and the

valorisation of the historical documentation they are preserving. It is important for the archive to benefit, as in the case of the TROMOS project, from scientific collaborations that can help to draw from the documentation the historical and currently relevant scientific contents. In confirming the Centre's availability and its willingness to collaborate with scholars and with the project on the scientific correspondence as described by G. Ferrari, Lovison underlined the need to reflect on some aspects of the dissemination of the digital copies of the letters, especially via the internet.

NELLA ERAMO (Central State Archive, Rome) with her talk on *The archive of the General Directorate of Agriculture in the Central State Archive*, outlined a brief historical and archival profile of the archive of the General Directorate of Agriculture, with special regard to repercussions on the history of the earth sciences. These materials often document the reasons, conditioning and motivations behind the choices made and the paths taken by scientists and public administrators in the development of meteorological and seismological observational networks. Eramo also recalled the important documents in the history of geology, citing some documents dating back to the early 1870s in which the urgent need for a geological map of the Kingdom of Italy was manifest.

PAOLA MILONE (Neapolitan Society for the Local History, Naples - SNSPN). With her presentation on *The Seismic Archive of the Neapolitan Society for the Local History*, Milone first of all recalled the present-day knowledge of the origins of this important Archive, established on the nucleus of the library and archive belonging to the French naturalist Alexis Perrey, acquired by the Club Alpine of Naples (CAI), and the reasons that brought this wealth of information to Naples in 1878, later given by the CAI to the SNSPN in 1893 or 1894. The Society is currently cataloguing all the library, documentary and iconographic material available in the archive, in which the substantial epistolary collection of A. Perrey himself stands out. It spans the period 1842 to 1877 with some gaps, having nonetheless an indisputable historical and scientific value for seismology.

LYDIA SALVIUCCI INSOLERA (Director of the Archive of the Pontifical Gregorian University, Rome) with her talk on *The scientific archives of the Pontifical Gregorian University: research methods, coordination and future potential* outlined the principal contents of the Archive with particular regard to the most important Jesuit scholars, particularly in physics and astronomy. She confirmed the openness, great attention and interest of the Gregorian University for collaboration with the scientific world and

historians of science. She put forward some proposals, amongst which that of setting up a communications network among the scholars who may be a point of reference for the Archive's staff, and selecting together the Archive's materials relating to Jesuit scholars of special interest for the earth sciences.

The scholars who took part in the seminar left hoping for further collaboration within the scope of the project, subsequently named *Letters in Earth Sciences*, for the recovery, reproduction and evaluation of scientific correspondence in the earth sciences.

The seminar has also been followed up on a European scale during the 28th ESC General Assembly in Genoa, where the *Letters in Earth Sciences* project was presented, eliciting positive feedback from a number of seismologists operating in historical sites of European seismology that preserve important epistolary documentation.

Contacts are being fostered to formalise the collaboration between the INGV and bodies and scholars interested in participating in the project. A web site is under construction: for the moment a demo version is available (at the address http://80.117.141.2/letters), which will allow us to disseminate the historical epistolary materials, reproductions, descriptions and more generally the products of the collaborations developed. The project is open to all the researchers and institutions that may be interested, and they are invited to get in touch with the author.

Considering the attention and the interest aroused by this first seminar, a second day of study is scheduled for September 2003, with date and location still to be decided.