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REPORT ABOUT THE 28TH INTERNATIONAL CONGRESS OF PAPYROLOGY (BARCELONA, 2016)

Herculanean Papyri And Non-Invasive Unrolling Techniques

ABSTRACT: The article provides a report on the 28th International Congress of Papyrology which has been hold in Barcelona in 2016. The focus lies on the contributions about Herculanean papyri. Particularly intriguing were two papers about recent developments in virtually unrolling of unopened papyrus rolls, a technique which, if fully developed, would mark a revolution in the field of Herculanean papyrology.

KEYWORDS: Papyrology; Herculanean Papyri; Virtual Unrolling; X-Ray Phase-Contrast Tomography

In early August 2016 papyrologists from all over the world gathered in Barcelona for the 28th International Congress of Papyrology (1st-6th August 2016). This congress, taking place every three years in another city and lasting usually about one week, can be regarded as the most important and renowned conferences in the field of papyrology. It was for the first time hosted in Spain. Organised under the patronage and in cooperation with the International Association of Papyrologists (AIP) the congress could gratefully make use of the modern facilities of the Universitat Pompeu Fabra (Ciutadella Campus) in the centre of Barcelona. New developments and progress in papyrology were presented and discussed. The contributions ranged from Documentary Papyri to Literary Papyri, from Para-Literary Papyri to archaeological and conservatory aspects of papyrology, from the history of collections to ethical issues related to the acquisition and trade of papyri. Among the scholars giving papers in Barcelona were also researchers

of the Italian Consiglio Nazionale delle Ricerche (CNR) whose contribution about a new technique for the deciphering and digital unrolling of papyrus scrolls based on X-ray phase-contrast tomography attracted even the attention of a TV team.

Some introductory remarks about the organisation and structure of the Congress are in order. The conference was organised in parallel sessions (usually five at the same time) devoted to different subfields of papyrology what allowed scholars to focus on their interests without missing a thematically similar paper. The (traditional) division in parallel sessions is by no means optional, since without an overlap of sessions the conference with its more than 250 single contributions, general papers and podium discussions would have lasted about a month. Each paper was restricted to 20 minutes followed by 10 minutes of discussion. The Organizing Committee led by Alberto Nodar and Sofia Torallas deserves acknowledgment for a sound preparation and organisation of the Congress. The opening plenary lecture was given by Andrea Jördens whose argument that non-English native speakers should continue writing articles and papers in their own language (German, French, Italian) might be worth pointing out. On the last day of the conference there was a round table debating the question 'Setting limits to our discipline?'.

The subject of the majority of papers, overwhelmingly in English, were documentary papyri, whereas a substantial amount of contributions was dealing with para-literary papyri (e.g. ancient school exercises) and related questions. Considering the conservation situation, it is almost superfluous to state that most papers discussed Greek texts. However, the number of papers thematising Arabic, Coptic and Latin papyri was rather remarkable. The comparatively numerous papers on Latin papyri were not least due to the so called Platinum project, headed by Maria Chiara Scappaticcio. It aims at a comprehensive edition and cataloguing of all papyri written in Latin. Besides papyrological papers in a rather strict sense, i.e. the edition, revision and interpretation of (new) papyri, there were many interdisciplinary papers, refreshingly widening the borders of papyrology and especially taking into account the archaeological contexts in which papyri were found. Although papyrology has ever since pursued an interdisciplinary approach, the Congress demonstrated impressively, how close and fruitful the cooperation between different fields of Ancient studies and, increasingly relevant, between modern science and papyrology has become within the last years.

The branch of papyrology, which has the closest relationship towards Classical philology and Ancient philosophy, is the so called Literary papyrology. It embraces all literary texts (Latin and Greek) written on papyri or on (in Egypt found) parchment. An average of one out of five parallel sessions covered literary texts (app. 50 papers). Apart from the already mentioned Latin papyri (app. 10 papers) and many papers discussing papyri from Oxyrhynchus, a respectable number of papers on Herculanean papyri was read (app. 20 papers).

The sessions on Herculanean papyri started on Wednesday, 3rd August with an update concerning the Greek books found in the Villa dei papiri, provided by Giovanni Indelli and Francesca Longo Auricchio. Vincenzo Damiani presented an *editio princeps* of a column of *PHerc.* 1024, an unknown Epicurean text which had practically not been legible without the multispectral images. Next, Kilian Fleischer (myself, CNR-ILIESI) has talked about his forthcoming new edition of Philodemus' *History of the Academy* (*PHerc.* 1021) and discussed a new reading from which we learn under which circumstances the Academic scholarch Philo of Larissa died. Mariacristina Fimiani's paper was dealing with some inedited fragments of Philodemus' *De Rhetorica* (4th book) whereas Christian Vassallo, who is currently preparing a comprehensive edition of the *Presocratics in Herculanean Papyri*, discussed *PHerc.* 1788. Daniel Delattre and Annick Monet presented their progress on Philodemus' *De calumnia* (*PHerc*. Paris. 2); Gaia Barbieri talked about her preliminary results on *PHerc*. 1289. Furthermore, Gianluca Del Mastro illuminated some inedited and rediscovered smaller fragments of the Herculanean collection.

On Thursday, 4th August the papers of Angelica De Gianni and Stefano Napolitano dealt with ancient drawings, a subject also chosen by Holger Essler who tried to figure out how far these drawings allow for palaeographical conclusions about the original form of letters. Federica Nicolardi talked about Philodemus' *De Rhetorica* (1st book). She was followed by Guliana Leone and Sergio Carrelli, giving a paper about a new edition of an unknown book of Epicurus' famous *De natura.* Xavier Riu proposed some new readings for Philodemus' *De libertate dicendi* (*PHerc*. 1471), and Antonio Parisi discussed the quoting technique in Demetrius Laco.

Undoubtedly, the highlight of the Herculanean section, maybe of the whole congress, were two contributions about X-ray phase-contrast tomography applied to unopend papyrus rolls from Herculaneum, which attracted not only many auditors, but also provoked coverage from Media.

Two teams are competing with each other in developing a new technique by which it shall be possible to digitally unroll and read unopened scrolls. If this non-invasive technique was successfully developed and applied, it would mark a milestone in Herculaneum papyrology and deserved to be called a revolution. A plenty of hitherto unknown text, preserving valuable texts of Epicurean philosophers and other authors, might emerge and give us new insights into the history of philosophy and the overall content of the library of the Villa dei papiri. This non-invasive techniques may provide us with much less damaged texts in comparison with the rolls unwinded by means of conventional techniques ('Macchina di Piaggio' or 'Oslo-method').

Interestingly, the researchers of both teams are basically affiliated with the Italian CNR. One team was represented by Vito Mocella, physicist of the CNR-Institute for Microelectronics and Microsystems, who collaborates, among others, with the papyrologist Daniel Delattre (CNRS-IRHT/Centro Internazionale per lo Studio dei Papiri Ercolanesi); the other team was jointly represented by the physicists Inna Bukreeva, Alessia Cedola (CNR-Institute of Nanotechnology) and the papyrologist Graziano Ranocchia (CNR-Istituto per il Lessico Intellettuale Europeo e Storia delle Idee).

The history of the competition in reading and virtually unrolling the Herculanean papyri shall be touched upon shortly. The American engineer Brent Seales (University of Kentucky) worked for a certain time on digital unrolling techniques, not exclusively targeting Herculanean papyri. He also cooperated with scientists of the Mocella-team, but this cooperation was at some point interrupted and the Mocella-team continued on its own. At an event organized by the Herculeanum Society (Oxford, January 2016), Seales presented intriguing results concerning the digital unrolling of a carbonized Hebrew parchment scroll from Ein Gedi, which have been published in *Science Advances*. He announced to perpetuate with his efforts to virtually unroll Herculanean papyri and informed the audience about his future plans. One year earlier (January 2015), the team led by Mocella had caused a stir with an article published in *Nature Communications*, claiming that it had read letters of an unopened papyrus roll from the Institute de France (*PHerc*. Paris. 4) by applying X-ray phase-contrast tomography. The results raised hope within the papyrology and classics community that, in a not too far future, it might be possible to virtually unroll complete papyrus rolls from Herculaneum and rediscover new works, although it should be stated that the quality of the images left some

colleagues sceptical. Parallel to the Mocella team, the other team led by Cedola and Ranocchia applied to two unopened papyrus rolls kept by the Neapolitan National Library (*PHerc.* 375 and *PHerc.* 495) an advanced version of the same technique and performed for the first time a kind of virtual unrolling. The results were published in *Scientific Reports* (June 2016). This team claimed to have read larger portions of Greek text including a sign (*coronis*). The experiments performed by both teams were conducted at the European Synchrotron Radiation Facility (ESRF) in Grenoble.

Mocella basically referred to the results published in *Nature Communications*, but also made mention of subsequent efforts and adumbrated future steps. The team led by Ranocchia and Cedola, on its turn, explained the strategy and methods it was applying in reaching the aim it shares with the other team.

The discussion following both sessions was fair and balanced, although the TV (CBS, *Sixty Minutes*) as well as the audience could easily spot the piquancy of some questions raised. Both teams avoided answering too clearly the question when they would make the meta-data public.

To sum up, it is only fair to state that both teams have made some substantial progress and might have even read some text. What unites all the papyrologists attending the congress in Barcelona is the sincere hope that one team, whichever it will be, announces a breakthrough and, ideally, presents clearly readable lines or columns of Greek text. In this very moment, it is difficult to assess, how far the teams are away from this breakthrough, which would not only (Herculanean) papyrologists, but classicist and educated men from all over the world make enthusiastically cheering. Are we talking about months, years, decades? What is the decisive momentum for the virtually unrolling? Are the applied physical technique, the algorithms or some other elements crucial? How can papyrologists support the physicists? What is the best way to come to satisfying results as soon as possible? Should both teams join forces or are the challenge and the competition more fruitful? Will other scientists or teams enter this competition?

These and other questions to debate, was a plenty of time at the 28th International Congress of Papyrology in Barcelona, during official discussion and during coffee breaks, lunches or dinners. The discipline of papyrology might profit from the public awareness going along with this competitive and exciting strive for being the first to develop a technique

which would literally allow for a new 'insight' into Ancient Literature which has been lost for 2000 years. It is many papyrologists' hope, that a breakthrough at reading and virtually unrolling papyri might even inspire new excavations of the Villa dei papiri in Herculaneum.

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