Defining “museology” (also known as “heritology”) is as easy as describing any academic field – the minute you say something about it, someone sets out to prove you wrong. These fields are therefore most often defined by objects of scrutiny rather than methods of research. As the interests of museums vary from robotics and mathematics to music and sofas, the field of museology also covers all corners of human behaviour and doings, and does not need over-zealous surveillance of its boundaries.

Besides improving academic knowledge about human activities in and around museums, museology has a duty to improve museum professionalism. Being a meta-field – one uniting a large variety of more or less down-to-earth or up-to-the-heavens interests – museology offers a unique place to share opinions and knowledge of all sorts. We would argue that there is no reason to separate and grade museum professions or research done in the universities, museums or wherever under different fields, and fence them apart. That will only make everybody’s work more difficult.

The doctoral thesis of Ulla Knuutinen, entitled *Kulttuurihistoriallisten materiaalien menneisyys ja tulevaisuus – Konservoinnin materiaalitutkimuksen heritologiset funktiot* (The past and future of cultural historic materials – the heritological functions of materials research of conservation), 2009, gives us an excellent example on fruitfully stretching borders. Research projects that seem to belong to a completely different universe can produce results that can be used in more familiar fields of study (in
this case, for example, archaeology and art history – as shown below) as well as in improving the results and working conditions of museum professionals.

Ulla Knuutinen is a chemist teaching conservators in Metropolia, (previously known as the EVTEK University of Applied Sciences), the only school for conservators in Finland. She has occupied her teaching position for years but has also done laboratory research and worked on the Pompeii archaeological site, all of which benefit her thesis. This thesis, binding together seven articles, is based on research published earlier in other contexts. Now the articles are linked together under an idea of how and why one should apply “hard sciences” in the study of museum objects and conservation processes. Knuutinen ponders the means of conservation and how to test and improve them. She also shows how material objects can “talk” their age as well as their future care. Knuutinen names her field *konser
voiminn materiaalitutkimus* (materials research in conservation).

The first three articles in Knuutinen’s dissertation deal with the analysis of heritologically important inorganic pigments, mainly by using the spectrometries of different regions of electromagnetic radiation. Among these are various versions of X-ray fluorescence analysis: isotope induced X-ray fluorescence (IXRF), tube induced X-ray fluorescence (standard XRF) and energy dispersive X-ray spectrometry by using a scanning electron microscope (SEM-EDS). The reflection spectrometry of visible light (VIS), as well as Fourier transform infrared spectrometry (FTIR), have also been applied successfully. Knuutinen has mainly used non-destructive or non-invasive methods without special sampling. In addition, we can mention the cross-sectional studies of paint layers by using both optical microscopy and X-ray fluorescence analysis by SEM-EDS. Perhaps the most impressive new results of pigment studies have been achieved in analysing the paints used on walls and wall paintings in the house of Marcus Lucretius in Pompeii.

The three following papers in the dissertation concern physical and chemical analyses of composition, aging and damaging of some organic binding and composite materials used in various museum objects. In the last article of the thesis, the usability of ion chromatography (IC) for monitoring the washing of paper cellulose materials under conservation has been successfully tested. Knuutinen herself writes more about these subjects elsewhere in this publication.

Articles discussing pigments, especially those of wall paintings in the house of Marcus Lucretius in Pompeii, bring out at least two results that should interest humanists working in museums and universities. The Pompeii research itself concerns the changes in cinnabar caused by light, and describes results using methods and language suitable for chemistry. Although this research project may seem impenetrable for most humanists, the re-use of the outcome is indeed the opposite.

The first thing to pinpoint here is that natural sciences can provide the kinds of exact knowledge that other fields are rarely in position to offer. For example, in case of the house of Marcus Lucretius, we now know for sure that cinnabar was used, even though subsequent exposure to light and heat has made the walls lose the colour. The knowledge that an expensive pigment was used allows other researchers on the project make more accurate assumptions about the wealth of the house owner – as just one example.
The other observation made while scrutinizing pigments is especially important to art historians and artists but must be remembered by everyone. Knuutinen criticises a common habit of describing colours using pigment names as deceptive, and shows why. She demonstrates her point by a chemical analysis of commercial cadmium colours sold as pure, and used regularly in conservation. Her research reveals that some organic substances are used in most products, making future reactions of colours impossible to predict. The result inarguably demonstrates how important it is to know for sure what materials you are working with, but Knuutinen also has a wider concern here.

Colours can be combinations and mixtures of all sorts, and can change due to the environment, for example such as light and nearby materials. This means the same pigment can have many different appearances, while compounds that are different can appear the same. Knuutinen warns that using pigment names instead of colours can easily lead to a mistreatment of objects. Fortunately, there is at least a partial solution already available to help in describing painted surfaces as well as for the follow-up of their future visible changes when chemical analysis is not available. Knuutinen introduces the Natural Color System® (NCS), which includes 1950 comparison colours. The limited amount of standardized colours can certainly not solve the problem of describing a painting but is definitely more accurate than terms on a par with “red”, “light brown” or a “guessed ultramarine” that are still in regular use.

When discussing professionalism in conservation and restoration, Knuutinen expresses a serious concern that reconstructions are based on personal visions and beliefs instead of knowledge and studied facts. This situation is historically familiar and laughed at but unfortunately still not put behind us. Even though earlier mistakes stare us in face, we still easily make judgements about repairs or rebuilding work, based on vague memories or publications instead of, on the basis of study of what changes have taken place in the specific objects or buildings, not knowing whether our reference material is accurate. Even art historians hardly ever pay attention to the most obvious: if printed illustrations have correct colours and propositions, which is actually relatively rare.

Last but not least, one very real aid for museum work is provided in the form of a series of questions. These help illuminate how dependable the facts related to any single object are believed to be, and what is the basis for that knowledge. Answering these questions helps conservators in particular consider whether they have sufficient equipment and skills to take care of their keepsakes, or whether further research must be purchased from other professionals.

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