

## The Documentation of Geological and Archaeological Features using the Lacquer-Film Method.

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### 1. Introduction

This article brings to the general public a description of the production and presentation of lacquer-films.

#### 1.1 A History of the Origins of Lacquer-Films

The documentation of the archaeological and geological sciences today includes not only curated or collected old sherds, bones, fossils, minerals and rocks or related photographs and drawings, but also actual archaeological sondages or geological profiles, usually open only for a short period. These, with all their textural and structural markers, are unique features, which would be better reserved for later (more detailed) study in the laboratory. For this reason, Hamburg professor of Geology and Palaeontology Prof. Dr. Ehrhard Voigt developed in 1933 a method which was able to take from the least hard minerals a section transferable from nature to the indoors. In the land of its origin, this original preparation became known as „Der Lackfilm,, (in English-language literature „the lacquer-film,,). From the terminological point of view, it is unfortunate that the term does not correspond to the reality of geological (petrological, sedimentological, pedological, archaeological) features, a problem particularly acute in the Czech language where it comes partly from the translation of the German specifications.

#### 1.2 The Presentation of Lacquer-Films

Lacquer-films were first exhibited in the former Czechoslovakia from the 1st to 30th June, 1988. The Geological-Palaeontological Institute, the Hamburg University Museum and the Department of Petrology of the Faculty of Natural Sciences of Charles University together exhibited 37 of the best films owned by Hamburg University in the Cross Hall of the Karolinum in Prague. The films put in place sunken microdepressions and micro-debris, ice wedges, texture slippages, gravitational and cryoturbational deformations, secondary seepage of inorganic soil colours, chaotic peat sediment layers and the like. The exhibition was called "Geology in Pictures: Nature and Art", and was seen by around 2000 visitors. As a result of the great inter-

est in the lacquer-film method generated by the exhibition, from June 27th-30th 1989 the Geological-Palaeontological Institute, the University of Hamburg and the Faculty of Natural Sciences of Charles University jointly ran the first field course in lifting lacquer-films in the former Czechoslovakia. The course was preceded by a petrological seminar entitled "A Discussion on the Texture and Structure of Sedimentary Rocks", and the specialist course then took the form of three working visits to selected locations. The course was attended by 25 professionals from institutes of higher education, geological and archaeological institutes and museums.

After these two major events, which did a great deal to broaden interest in this method of documentation, there came a five year pause in the presentation and manufacture of lacquer-films. The reasons for this are that the lifting and subsequent processing of lacquer-films (the latter in particular) are neither so easy nor so unproblematic as they appear at first sight. After problems with their technical character in particular, interest in lacquer-films declined.

Not until 1993 was the work of the late 1980's followed up by the local firm Dolmat, which provides geological and ecological consultancy, and consultancy in the extraction and regeneration of natural resources. It was in the framework of such work that the company first became interested in specialist documentary methods. The result of several years of research undertaken on sedimentary rocks and loose material, and experiments with dyes, adhesives and resins, was the successful production of the first sedimentological lacquer-film.

The company has expanded its methods to the documentation not only of geological and sedimentological features, but also to the direct study of palaeontology and especially archaeology. At the end of 1994, the company lifted films as part of the excavation of a mediaeval (14th Century) hearth in Pšstrossova ul.; the result was a unique archaeological film of a mediaeval stratigraphic sequence measuring 1225 x 940mm. Later, the firm concentrated mainly on lifting films of moldavite-bearing sediments, most commonly with moldavites *in situ*. These can be seen today in, for example, the Týn nad Vltavou and České Budějovice Museums, and have been prepared for exhibition in the National Museum in



Fig. 1 Brown-coal bearing sediment lacquer-film from the Jan Šverma coal mines, Czech Republic. Actual size 640 x 370 mm. Photo by Petr Korbel. Dolmar depository.



Fig. 2 Moldavite-bearing sediment lacquer-film from Vrábče u Českých Budějovic. Actual size 1100 x 900 mm. Photo by Petr Korbel. Dolmat depository.

Prague, the Kadaň Museum, the Moravian Provincial Museum, and others. The firm returned to archaeological sites in 1997 when staff took part in the rescue excavation (by the PÚPP - Prague Institute for Monument Care) of a mediaeval cemetery in Vladislavova ul., employing the method to lift a film of a mediaeval (12th Century) grave pit. The film lifted from mediaeval layers measured 1255 x 995 mm.

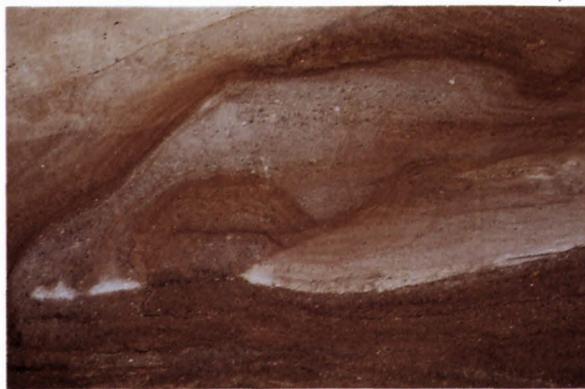
Dolmat's presentation activities with lacquer-films culminated in an exhibition entitled "Geology in Pictures - Lacquer-Films" at the National Museum in Prague from August 12th to September 8th 1997, published in *Archeologické rozhledy* ("Archaeological Perspectives") 4/97. This singular event, the first exhibition of its kind in the Czech Republic, displayed a total of 20 lacquer-films that were a cross-section of the company's documentary work to date. With the exception of some particularly interesting lacquer-films of moldavite-bearing sediments with moldavites *in situ*, these were all attractive sedimentological and palaeontological lacquer-films from the

Czech brown-coal basin and both the aforementioned archaeological lacquer-films from sites in Prague. The exhibition lasted almost a month, and was seen by 1500 domestic and foreign visitors.

Other exhibitions undertaken by the firm include an exposition of lacquer-films at the mineral and fossil exchange in the Prague Eden on November 14th and 15th 1997, and an exhibition of lacquer-films in Klatov nad Ohří from April 1st to June 30th 1998. The company organised an independent exhibition at the Moravian Provincial Museum in the same year. In the years that followed the company participated in numerous other events and fairs including its lacquer-film exhibition in late 1999 in the historical spa town of Karlovy Vary. Dolmat took an active part in several international conferences in 2000 including 2000 PAGES International Conference on Past Global Changes and Praga 2000 Natura Megapolis. Dolmat lacquer-films have been a topic of national newspaper articles and several radio and TV programs in recent years.



Actual size 900 x 500 mm.



Actual size 850 x 500 mm.



Actual size 800 x 550 mm.



Actual size 800 x 550 mm.



Actual size 700 x 550 mm.



Actual size 700 x 550 mm.

Fig. 3 Lacquer-films of Pliocene gravels belonging to the Vildštejn formation from the Dřenice gravel pit. Photo by Petr Korbel. Depository of Tekaz, s.r.o., Czech Republic.

## 2. Characteristics of pictured materials

The production method makes possible the acquisition of lacquer-films only from the least hard rocks and minerals. Therefore, the process can be elaborated not only for the homogenous sediment types of aleurites and pelites (dust, clay, loess, soil, peat) but also for het-

erogenous minerals such as psephites or psammites (various conglomerates, sands, gravels, or disintegrated matter). In the same way, evidence of human activity in artificial features (fills, hearths, graves, wastes, discarded materials, kilns etc.) can be lifted in cases where they are found in loose materials and/or are actual formations.

The main requirement for the successful lifting of a lacquer-film is the low moisture content of the material, dependant on the content of clay particles and permeability (i.e. porosity). The temperature of the surrounding environment should not be less than 12 °C, and the relative humidity no more than c. 80 %. The ideal conditions for work are thus warm, dry weather; these short-term unfavourable impacts can however be eliminated by more rigorous working procedures.

### 3. The Methodology of Producing Lacquer-Films.

The methodology of documenting archaeological sections with the aid of lacquer-film makes possible the conservation of important profiles capturing the main stratigraphic relations of anthropogenic layers. The lacquer-film method preserves any and all natural materials exactly as they are observed in the field, i.e. saving all the main components and an admixtures of all of the material structures making up the layers and features. A section conserved with the aid of lacquer-film can be examined in a dry or in a wet state, so that even after several decades (with the help of advanced techniques) we can assess the stratigraphic relationships of individual elements. The methodology is particularly useful for archaeological rescue excavations, for the entirely unique way in which it supplements field drawn and photographed documentation, these remaining the only practicable means of documenting endangered sites.

#### 3.1 Fieldwork

Fieldwork consists of smoothing chosen sections of bare earth with suitable tools (mattock, blade with small garden hoe, "scraper" etc.) to a plane close to the vertical (c. 80 °C). Afterwards, the profile is sprayed with a penetrative lacquer, which impregnates and hardens without corrupting textural, mineral or colour characteristics of the profile. After the prepared area dries, the undiluted lacquer and thin fabric are stronger. If after repeated dryings the fabric is carefully removed, the lacquer retains a thin layer of the prepared situation, which holds the natural aspect of the sediments and all of their attributes. The outcome is thus a sort of "carpet" made up of one or two

layers of fabric, to which are attached a strong sediment layer several millimetres to centimetres thick. The preparation thus obtained can be removed to the workshop for final processing.

#### 3.2 Workshop Processing

The prepared sheet of several dm<sup>2</sup> to m<sup>2</sup> is removed to a workshop for its finishing touches and conservation. The lifted profile is fastened to a wooden board, dried, conditioned and impregnated. After the final steps of the conservation process and complete drying, the sheet is formed, edged and has a wooden frame fitted, with reinforced metal corner pieces and fitted picture hooks for hanging. The complete film is then ready for distribution.

#### 4. The Distribution of Lacquer-Films

In order to meet storage and mobility needs, every picture is packed in a recyclable cardboard box, in which it can be safely transported. Every film is accompanied by handling elements (hooked nails, hooks), a professional specification and pertinent photodocumentation.

#### 5. Conclusions

Thanks to our experience and a thorough elaboration of the method, it is possible to lift films of a wide range of sediments, even warm and dry weather not being an essential condition. It is, however, worth reflecting that when the sediment is damp, more compact, less porous and thus less permeable, the amount of work required in the field and in laboratory processing increases. The resulting lacquer-films have no exacting storage requirements, are relatively resistant to mechanical wear, are colour-fast and do not cause health problems. They can be vacuum cleaned, dusted or wiped over with a damp cloth.

In conclusion it can be said that every lacquer-film is an original, which can faithfully represent and at the same time preserve for a long period any natural situation, and along with its obvious professional qualities it is distinctly decorative.