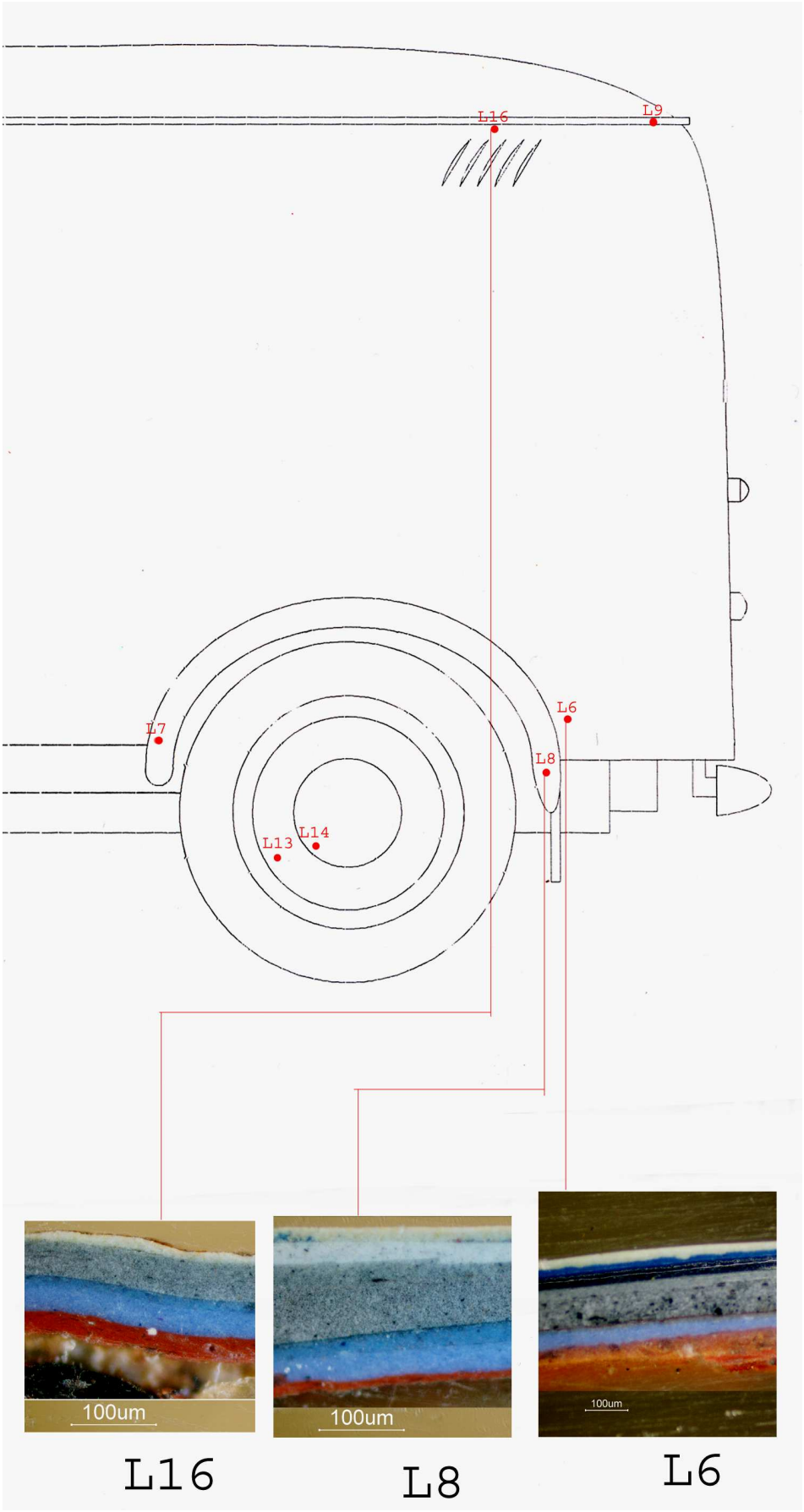

Figure 32.1: *Mapping of layers of lacquer; van from 1950 (HTW, Hilsky)*

32. Large Devices of Industrial Culture: the Preservation of their Historical Evidence

Ruth Keller-Kempas (Berlin, Germany)

Figure 32.2: *Lac flaking off and corrosion are the main problems of instruments in observatory (HTW, Keller-Kempas)*

Abstract

Development of material science and engineering technology is present in devices of the last 150 years. How can the historical evidence of their construction and use, the transfer of technological stages of development be preserved as a special quality in cultural tradition?

The conservation of technical artefacts as a cultural heritage of western civilisation has developed scientific methods of conservation so as to respect their authenticity as materialised references of the past. During the last fifteen years these methods have been evaluated in the unique training program for this specialisation of conservation discipline at the HTW Berlin, University for Applied Sciences. They are enough standardised now to be applied without hesitation on objects being kept indoor in a museum or private collection. It is much more difficult to keep devices outside or – as is the case in Observatory – at climates changing between inside and outside situations.

The paper will show a few examples of how to develop concepts for conservation and how it is technically possible to preserve the very important original surfaces of the objects, their authentic materiality. As soon as the objects are kept as part of cultural history or history of science they change their function and can not be kept in the same manner as before. They give evidence of their materiality. The archaeometry of modern times is a new and expanding branch of historic research. Moreover the surface of a historic device is the point of contact between passed times and the presence – for the general public as much as for the scientists. It will be demonstrated how large the loss of historic information and thus of cultural value of objects can be by renovation instead of considerate conservation. Some examples of careful conservation work carried out on big objects other than an observatory are presented.

The paper will then summarise the possibilities and difficulties of doing such work on large devices still in use. The scientific research in this specialist field of conservation has only just begun und will be continued in large scientific projects in the future:
"The relation to the past is always an integral dimension of the form of being of the present, and restoration, dealing materially with the object, always exteriorizes this relationship in a manifest an indisputable manner, even in its least conscious aspects."[1]

32.1 Observatories

They are large and fascinate by their literally "extraterrestrial" orientation towards space. Built as instruments for the exploration of the sky, they are often of national importance. When they were succeeded by newer installations, the historical observatories discussed here gradually lost their scientific importance and at the same time gained in cultural value. Visible from a large distance, they now point towards a period of sky exploration that determined our understanding of the world. The ancient striving of mankind to find out the secrets of the night sky was given new possibilities in the 19th century.

Rapid developments in physics, engineering and material technology, especially in the technology of the production of glass, opened up the possibility of manufacturing very large and bright mirrors, that could be adjusted precisely to the needed requirements, despite their enormous weight. This makes the remaining telescopes from the late 19th and early 20th century that can still be found in observatories unique and irreplaceable worldwide material testimonies to this period of feverish research in astronomy and the manufacture of

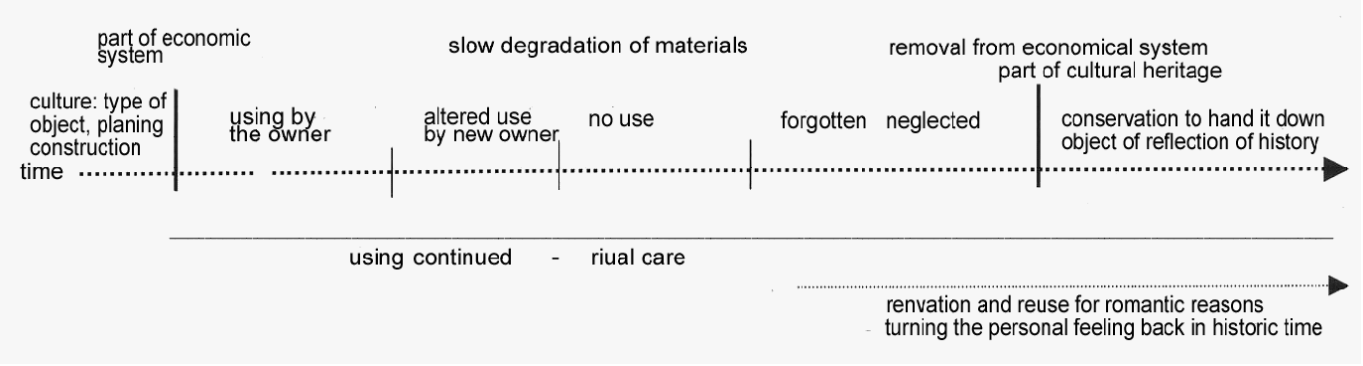

Figure 32.3: *Time scale: from construction to use and status of an object as cultural heritage (HTW, Keller-Kempas)*

instruments closely related to it. The question that needs to be answered here is how they can be preserved according to international requirements without losing their attractive use.

32.2 Preservation of Material Heritage of Industrial Culture

The museum-standard conservation of a large astronomical apparatus that meets international requirements for the preservation of cultural heritage is not known.

Nonetheless it is methodically possible to fall back on conservation techniques for other objects of material heritage. A training and research department of the *University of Applied Sciences* (HTW) in Berlin, specialized in this class of objects, has developed this field of speciality during the past 15 years. Their work is based on the high source value that objects of the industrial age have for the history of science and industrial archaeology, as well as the economic, scientific and technological context of society. Large or small, it is always individual objects that become representative for many others and need to be passed on to future generations in the most authentic state possible.

The methods employed by this field of speciality are based on international ethical guidelines for the preservation of cultural heritage, as for example laid down in the ICOM *Code of Ethics for Museums* of 2006.

The **§2.23 Preventive Conservation**, the paragraph concerning measures related to the environment and not the object itself, is of importance for observatories in so far as the change between exterior and interior climate is an important problem in the conservation of scientific instruments as cultural heritage, that can only be resolved by continuous care. The Code puts the highest priority on prevention and calls it an *"important element of museum policy"*. Furthermore: *"It is* **an essential responsibility** *of members of the museum profession to* **create and maintain a protective environment** *..."*.[2] Even if the historical observatories are not necessarily preserved in the form of museums, these requirements can be applied to them as they can be to many other technical objects.

The **§2.24 Collection Conservation and Restoration** summarizes the work to be carried out on the object: *"The museum should carefully* **monitor the condition** *of collections to determine when an object or specimen may require conservation-restoration work and the services of a* **qualified conservator-restorer. The principal goal should be the stabilisation of the object or specimen.** *All conservation procedures should be* **documented** *and* **as reversible as possible**, *and all alterations should be clearly* **distinguishable from the original** *object or specimen."*[3]

Table 32.1: *Documentation*

Bezeichnung Bild	deutsch	englisch	Photo / Author
fig. 32.3	Zeitleiste: von Herstellung über Nutzung bis zum Status eines Objekts als Kulturgut	Time-scale: from production to use and status as an object of cultural heritage	Keller-Kempas

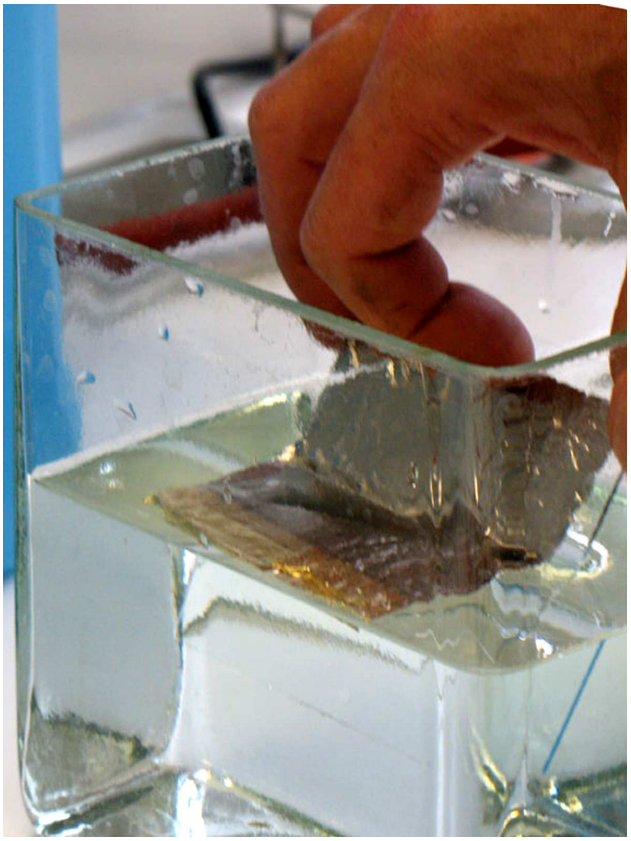

Figure 32.4: *Missing areas of chrome on the back of a car mirror; Metal leaf in a galvanic bath: chrome is being plated; As above, after filling missing area with the plated metal and gilding oil; N. B. for New Built on the head of a reconstructed screw to replace a missing one (HTW, Grundmann, Matin Pour, Grundmann, Gehrmann)*

Figure 32.5: *Last layer of van's lacquer, before cleaning; Last layer of van's lacquer after cleaning, filling in and retouching (HTW Berlin)*

32.3 Documentation and Concept

As for any conservation project the conservator's work begins with a detailed documentation and examination of form, function, material and manner of production of the object. The materials of each production group, their construction and the marks on the surface that production, use and ageing have left, are recorded purely as phenomena, in an almost criminological sense. This apearance is generally known as "Patina". Written and oral history and scientific analysis supplement the documentation.

The findings are recorded in a time-line (fig. 32.3, p. 286). The attempt is then made to find a workable preservation concept, taking into account the guidelines of the international codices and the requirements of the object's socio-cultural environment (owner, users, public interest).

It is important that the time layers seen in fig. 32.3 all contribute to the present state of the object and to its quality as a material witness of history. The focus on a single historical period would mean an inacceptable loss of historical truth and source quality. Only the entirety, or the condensation of the different non-verbal statements of the object can justify us to speak of the preservation of its "authenticity" or "aura".

32.4 Practical Conservation and Restoration

The prime task is conservation, meaning the preservation of existing material. Conservation science is occupied with research on how to slow down in the best possible manner, if not stop, degradation processes of the most diverse materials in their beginnings and in more advanced states. Accretions that may speed up decay, such as dusts that can bind humidity and aerial pollutants, usually have to be removed.

Corrosion products may need to be treated with neutralizing substances and binders, in order to preserve the historic material. Sometimes an additonal reversible coating can aid preservation. Parts at risk are stabilized mechanically, additions that have a stabilizing function remain visible. All treatments of the object are documented, additions are marked, as is explained later on.

The restoration intervenes in the object with cleaning, in-filling, additions and also retouching, following the requirements of the restoration concept. Exact documen-

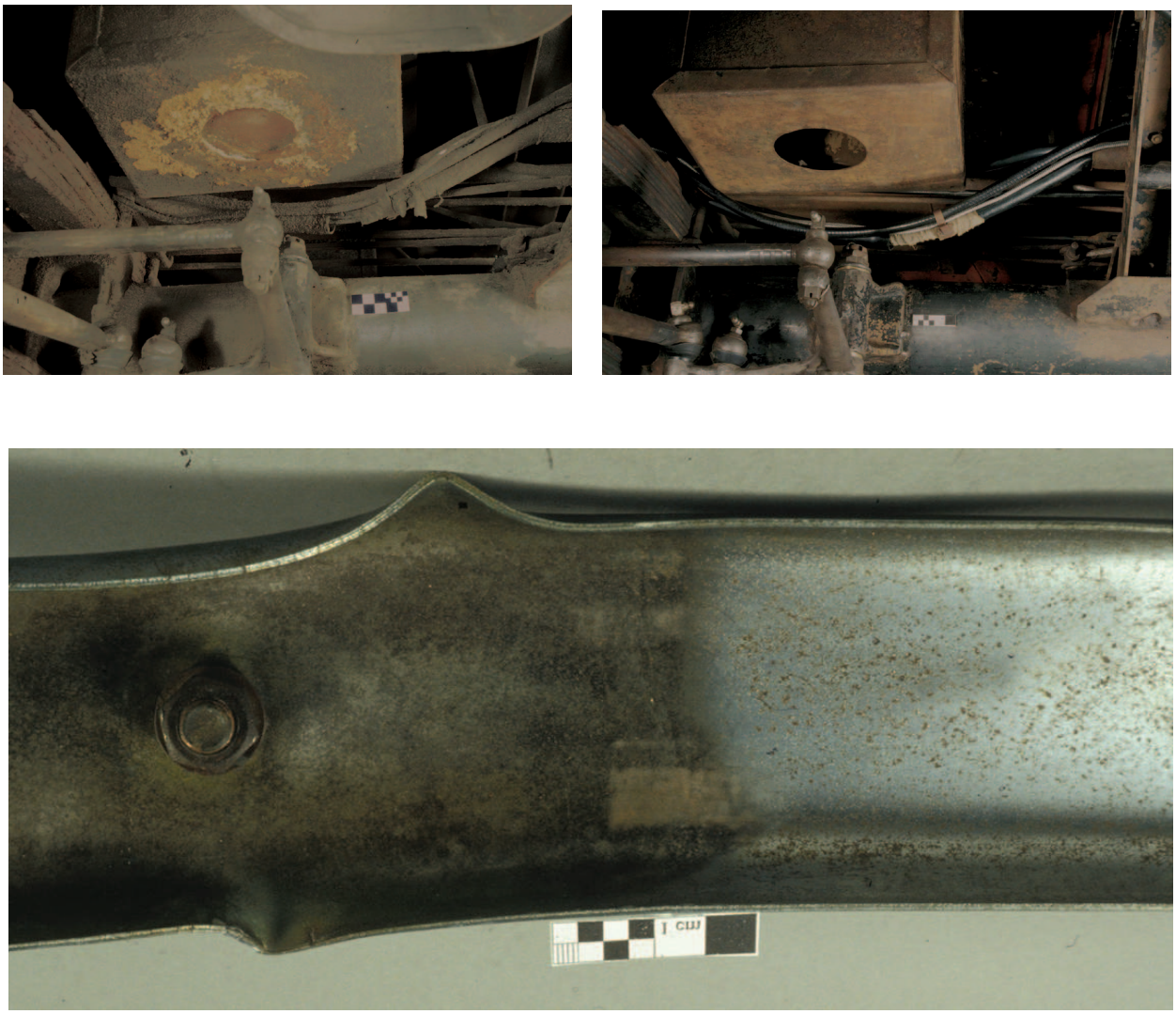

Figure 32.6: *Dirt and corrosion underneath a van, 1950; Underneath the historic van after cleaning and conservation; Chrome plated steel covered by corrosion products; before (left) and after (right) the local cleaning by scalpel (HTW Berlin; HTW, Grundmann)*

tation is important as well as the marking of additions to the object according to the following system developed by Dietmar Linke at the HTW Berlin in the 1990's:

The year the addition was made and one of the following combinations of letters denote the type and date of the addition.

N. B. New **B**uilt for an addition that exactly reproduces the historical model (fig. 32.7 left, p. 290).

F. R. Free **R**econstruction for an addition that is indispensible from a conservator's point of view but has no exact model.

C. S. Conservation **S**tability for further stabilizing measures that are attached to the object (fig. 32.7 right, p. 290 und fig. 32.6, p. 289).

A few examples of documentation, conservation and restoration of missing areas in metal, metallic coating and lacquer surfaces will supplement the short theoretical descriptions, in the hope that the methods for the conservation and restoration of technical objects can also benefit the historic scientific instruments in observatories.

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1. Paul Philippot in: Jukka Jokilehto: A History of Architectural Conservation. Oxford 1999, VII.
2. aus: `http://www.icom-deutschland.de/, schwerpunkte-ethische-richtlinien-fuer-museen.php` (30.6.09).
3. aus: `http://www.icom-deutschland.de/, schwerpunkte-ethische-richtlinien-fuer-museen.php` (30.6.09).

Figure 32.7: *Detail of large device with corroded metal, dirt and degraded rubber, material before conservation; Detail as in the left figure, after cleaning, consolidation and conservation of the materials (HTW, Halm)*

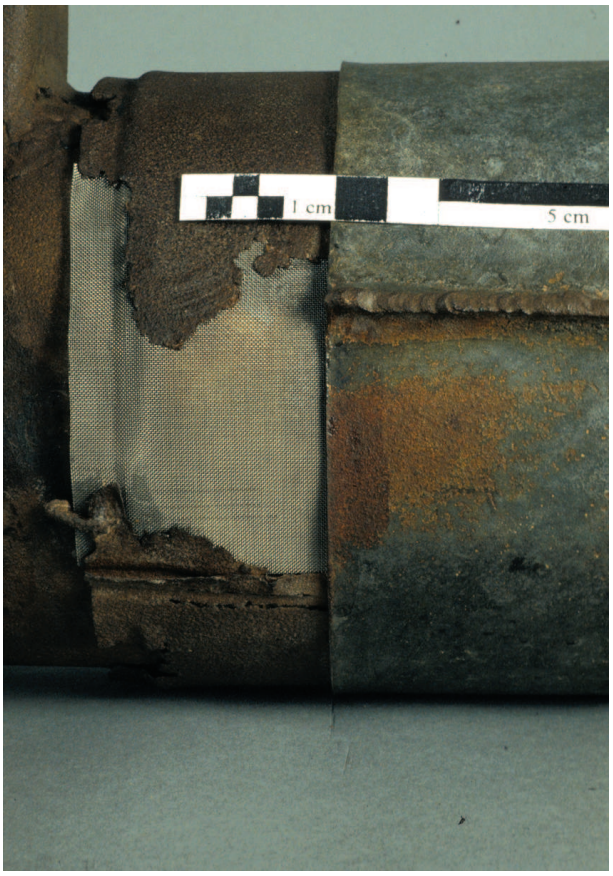

Figure 32.8: *Corroded sound absorber; C. S. Conservation Stability by a matal wove as duplicating material (HTW, Voigtländer, Brandt)*