

The Cultural Heritage for Transportation and Industry in the 21.th Century New Conditions for the Work of Preservation

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Summary:

As museums witness with satisfaction a growing understanding and support for preserving the history before 1950, this paper directs its attention to quite another attitude towards the heritage in the 21.th century. This new attitude forces us to develop a new strategy: We have to preserve history almost synchronously with the present time. If not, there will be no historic evidence of this period of time.

The society has changed and is still changing. It is today international, complicated, and specialized, which gives museums new working conditions. History is brought nearer to the present, due to machines and buildings lasting few years only and digital technology results in us no longer waiting to collect the paper-archives when a company moves. Today we have to collect the information while it is still in use. The extent of knowledge around the complicated and huge production machinery has to be collected while the engineers and technicians are still at the company.

Curators and historians within cultural heritage have to change their methods. Fewer artefacts may be collected or preserved physically and therefore they must instead make continuous investigations about contemporary life by means of fieldwork as a method. The work will be more like a contemporary research as an active and planned task and it has to be made by specialists.

The transportation systems operate internationally. Working with the cultural heritage therefore has to be performed in international cooperation too. Transportation is a very difficult subject to get a hold on because transportation is movement rather than a physical and static artefact. In the history transportation is invisible.

Epilogue

In the summer of 2003 in a forest near the Swedish town Norberg a small group of people participated in an experiment that interested them much. They wanted to make iron. To do so they had built a copy of a melting furnace, exactly as they believed it had been done around year 1100. The copy was made from an archaeological place called Lapphyttan and they called the new furnace the New Lapphyttan.

They were anxious when the furnace should be opened. They have done everything as they thought people in the Middle Ages would have done it. The furnace had been fired up two weeks earlier to dry it. During the last days the fire had been burning with the furnace filled with charcoal, ore and some lime and quartz for making a fine slag. Carefully they had regularly used the bellows to attain the right temperature of 1.200 degrees centigrade for melting the iron. But did they succeed? Had the ore melted right?

Many eyes followed the working people when the furnace was opened. Out of the smoke came glowing things; but was it pig iron?

The glowing pieces were examined and fortunately there was pig iron among them. A closer analysis showed that they had won 120 kg iron out of the possible 200 kg. The burning had only partly been a success. Still they didn't master the old technique perfectly.

It was the fifth time they had made an experiment like this. The first attempt in 1994 was totally unsuccessful as the furnace had been build wrong. Since then they had tried to improve the furnace and to learn how to use it.

This technique has been known all over the world. It has been known not only in the Middle Ages but since then and in some areas of the world close up to the present time. But the know-how has disappeared. In other words some of the most basic knowledge of our civilisation disappeared.

It is suggestive that we don't know how to master the working methods to day. We have all the knowledge from the archaeologists from their excavations all over the globe. At the same time we have know-how from all the scientific theories behind iron making and results from all the universities and technical high schools around the world, and we have a lot of engineers from the modern steel business helping with their practical expertise. And still is it difficult to reconstruct the lost knowledge.

The lost memories are of a particular kind of knowledge, the tacit knowledge. Nobody took care to preserve it when the old technology was replaced by new technology.

This story gives us two important lessons:

Firstly is it important to *secure the tacit knowledge*. Without this can we risk having a missing link in the understanding of technology.

The second lesson is on the psychological level. When you shift from one technology to a new one, the deserted technology is uninteresting and contemptuously.

The knowledge process and industrial heritage

Industrial heritage is about preserving evidence, and this evidence can be of many forms.

In theory it is knowledge and let us see what the contemporary research about knowledge processes can tell us.

The knowledge process can be visually imaged like a triangle with five layers. At the bottom we have the *noise*, a lot of disorganized things. It is useless for us because we can't see any patterns in the chaos.

The next layer is the *data* – the aggregated noise. Now there is a kind of system in the things; we recognize an order in words, numbers, artifacts and so on. Still it is rather unuseful, however, it can be useful because it can be the bricks for a more useful building.

When the data are systematically processed they become useful *information*. Now we know, for instance, that a tool has been used for a certain task or that there had to be a special mix of ore and charcoal to make pig iron.

In the next layer the information has been interpreted and we now have the *explicit knowledge*. It is the understanding of complicated matters – how iron works are functioning or how chemical formulas are made. We are conscious about this explicit knowledge and we can explain it to others.

In our last step we have the *tacit knowledge*. It is the secret behind lots of tasks. How to make iron, how to be a fine poet and so on. We can't tell other people how to do it, but they could learn from you if they are working with you for a shorter or longer period. This explains why the craftsmen had to have apprentices to learn a craft by working with it for a period of 3-5 years. Often you can't write these things down – it is difficult to explain for instance when a piece of iron is going from one specific kind of red colour to another when the temperature shifts.

In the last level you have to think about what is happening and get the meaning.

The preserving of crafts and early industry

With this theory about knowledge at the back of our minds we can use it to analyse the situation around preserving the heritage. Before we consider the present situation this chapter will show how the history from crafts and early industry are kept.

To have a quick overview the area of preservation is divided into four different areas only.

The first of these areas is the large artefacts – the *buildings and constructions*. Luckily we have preserved a lot of these in situ. Even large ones have been preserved - for instance Duisburg-Nord landscape park with 200 hectares filled with blast furnaces, chimneys and steel structures.

The same fine picture is shown when we look at *machines and tools*. A lot of fine museums are keeping large collections worldwide.

In many ways the positive situation also exists around the knowledge about the crafts and early industry. I will divide knowledge in two distinct parts according to the theory mentioned: first the *data and information*, which can be kept written down and in other ways be transferred from one generation to another. Again there are a lot of historical archives taking care of the historical evidence. In some countries there are even historical archives for business only like in Denmark with “Erhvervsarkivet” (The Danish National Business Archive) from 1948.

The last area is the *tacit knowledge*. Here the picture is a little more mixed. Knowledge is not kept about all trades, but in some respects many crafts and parts of industrial business are kept living. We have a lot of functioning steam railways around the world – hereby there are thousands of working railway people. The baton can hereby be passed on to the next generations.

All things considered the history of the crafts and industries before say 1900 are well kept for the future.

The preserving of contemporary buildings and constructions

After this positive picture let's look at the situation for the contemporary industry and transportation after say year 2000. Can we have the same preservation of buildings and vehicles that we have for the former period? Can the buildings or boats be preserved as monuments and in this way be added as a new chapter to the big history book in the landscape, where we have those large monuments reminding us of the realities of the past?

Preserving buildings is incidentally one of the best ways of telling the history, where the things are 100% real (almost), impressive in size and telling the story through architecture. Schoolchildren can learn about the history by looking at this history book and tourists can learn about foreign cultures.

Unfortunately this situation will change, I am afraid. There are several reasons for this.

Firstly the contemporary buildings, constructions and boats are very large. I have been working on preserving the history from a steel works in Denmark, but even though it is a relatively small steel works of its kind, its 143.000 square metres under roof are impossible to preserve. Only small fragments can be preserved – and can it tell the story at all? What about a tanker?

Even smaller buildings can be difficult to preserve. There is another rather serious reason for this: the buildings are situated in special areas and have an anonymous architecture.

About the location: In a way we can say that there are three distinct areas to place the industry. The first location can be near natural resources such as a river providing power for the machinery or it can be at natural resources like mines. This was typical for the industry until the beginning of the 19th century. These buildings can often be seen in natural and beautiful surroundings well situated for tourism.

This way of locating industry was totally changed when artificial power came into the picture. The steam engines made it possible to have the industry located in towns near the workers and services. Many of these industries are now closed down but remain as fine monuments in the town centres.

Again the picture changed in the 1950ies. This time the reason behind was logistical of nature. Important road transportation with juggernauts meant that the industry should be placed near a motorway and in parks reserved for industry only, far away from schoolchildren and tourists. Besides this, the internal transportation with forklift trucks forced the development of a brand new kind of building: the one story building where the trucks could transport the semi-products from machine to machine. Gigantic buildings were built with their traditional car park ahead of the buildings.

The architecture is a chapter of its own. The time was for cheap concrete or steel plate buildings and because all constructions should be kept in house in order to keep the dust and the noise away from the surroundings, all industries looks alike today. The result was huge industrial parks with anonymous often white blocks of buildings.

Why preserve an anonymous building no one can see? That's why it will be difficult to raise a campaign for preserving these contemporary facilities.

The Essence of Transportation

Transportation is movement in time and space; it is invisible. Only vehicles such as aircrafts, trains or ships can be seen when they move from one place to another. When transportation is done there is nothing more to see.

Time is important and often critical. A person must go to work through transportation. If they do not get there in time, the journey is in vain.

Transportation loads change; they may be different people or goods. Sometimes it is the same people and same products, but often it is different every time. This volatility makes it more difficult to maintain knowledge on transportation than on production in a factory. A product is usually a physical object, which in one form or another can be saved. The product of transportation is only physical when it is done, otherwise it is gone.

There are obviously a lot of objects around transportation, which can show the different aspects of transportation. There are often large infrastructure systems, with different parts that can help in understanding transportation. Docks, cranes, roads, airports, gas stations, and railway stations are some parts of the infrastructure.

Transportation is done with tools in which we completely or partially can save some of the aircraft, vehicles, and ships that have been used. There is also used packaging, containers, and other equipment close to transportation funds. In the transportation area there has been an increase in complexity, as in the rest of society. There are an increasing number of complex relationships between transportation and society's other activities.

These complex relationships are also included in the concept of logistics, which exists in a context of production, transportation, and marketing. In the opposite direction of transportation is a flow of money and increasing amounts of information to ensure economically efficient and accurate transportation.

Save artifacts

	Production	Transportation
Commodities	Yes	
Production unit	Yes	Yes

Production/transportation
Product Yes

The preservation of vehicles and machinery

We know that tools and other artefacts are very important to preserve. They are ‘the real thing’ in the kind of sense that they have been a genuine part of the history for a longer or shorter period. Often they can tell their own function to the spectator. We can see how the steam engine has moved its parts and so on.

This situation has changed to the worse. Again there are several reasons for this.

Often the machinery or a motor can no more tell the story because it is housed in boxes to contain the noise or dust like the abovementioned new way of building houses for the industries. They are all looking like refrigerators nowadays. Why should curators collect this for an exhibition?

If a curator would like to have equipment for the purpose of research it is difficult and often impossible to secure a total collection of tools. Industry is today in special units where the machinery is built-in often as an integrated unit. An oil refinery is an example of such a specialised unit; one little pump or tube wouldn’t tell the whole story.

In any circumstance we will only have a fraction of all the equipment made. In the specialised world there are many different production units, all with their own special equipment. Also the generations of tools are shifting quicker and quicker. In our days a total factory often has its machinery totally renewed with new generations of machinery within 20 years. The competition within some branches is even tougher with tools having to be renewed within 6-8 years, as it is common in the plastics industry and 3-4 years in the computer business – or even shorter. Ships have a life on 20 years and trucks 6 years.

Nothing can be reused anymore. Earlier we would be lucky to find old tools after a long since dead craftsman in the basement or in the attic; today everything is thrown away.

With these shorter generations we can say that history is approaching the present with all the new problems this gives. We have to make agreements with the owners while the machinery is still in use. In some cases we have to make agreements *before* the equipment is in use. This is for instance done by the Danish museum “Tøjhusmuseet”. They wanted to keep an aeroplane and made an agreement before the plane was taken in active service. It was a fighter

plane – and to secure it for the museum they made an agreement about another plane too if the first was shot down.

It is obvious that it is difficult for curators to make these agreements – it is difficult to collect artefacts without the historical distance to the thing, when it is easier to see what is interesting after 50 years or so. Besides it is difficult to make the agreements about machinery in working environments.

Preserving the information and data

The information and data have become more important at a time that is so complex. But again there are problems. The workers at the historical archives are faced with new problems:

A paradoxical situation since we never have had so much information and data in the society, but never have the information disappeared so quickly again. Thanks to the new digital medias the information is disappearing some time strictly speaking with the speed of the lightning.

The digital information disappears due to several reasons. Firstly the digital medias are *demolished physically*, secondly *the 'key' to the information disappears*; there is a short cycle of *technological obsolescence* when information become inaccessible with the introduction of a new type of computer, a new operating system or a new software program. Besides, most information is *stored in complicated systems* where it is difficult to retrieve the desired information afterwards.

For all these reasons information has to be collected shortly after it has been made. In many cases the collection has to be planned *before* the information is created.

And when you have got the data the problems are not over yet. It is not possible to put the stuff on the shelf and sit back and be contented. No. There will be an ever-ongoing process saving the data from one media to a better, perhaps even new, one. Translate the data from one program to the present one and so on. It will be a relay race where no future generation should forget to re-light the baton – or the data and information will be destroyed forever.

Some public archives have started on the tedious work with information at public institutions. As far I know no public archives have done it systematically for the trades and industries. In the business world all the big companies are doing the transfer at least with a part of their information. Old 'useless' information is not transferred and when a company close for one reason or another all the other information is wasted too.

With these new working conditions in mind you have to think that there are many more possibilities with these digital data. It can be moved quickly around the globe, it can be copied, the storage is cheap and it can be researched to name a few of the many new situations.

Saving the tacit knowledge from the present

Here we are in really big troubles, I can tell you, when we want to preserve the knowledge from the present. It will never be possible to have a factory making components to the automotive business or a shipyard like working the earlier mentioned workshops from blacksmiths. That time has passed.

The knowledge had to be preserved in other ways. In the following I will show how the modern trade is composed and discuss some solutions.

A single man could have the total knowledge of the blacksmiths business. In a modern specialised factory or transport ationsystem the competences are spread among the employees. No single person has the total insight. There are lots of specialists, each with their particular knowledge. In a company with lets say 400 employees the majority are doing almost the same job, OK. But the remaining people are doing around 100 different tasks. Instead of preserving the knowledge of one single person like the blacksmith; the task now is to preserve the knowledge of 100 people!

There are other challenges. The business world is much more specialised, and if we want to have the same share of knowledge about the society in the years after year 2000, we have to preserve knowledge from many more different trades.

The abovementioned fast changes in technology naturally have consequences at the plant level too. While the blacksmith could live all his life with the same know-how, people of today have to learn new things everyday. It is not only at the ground level the educational efforts are made but also for the grown ups.

Previously I have explained the situation around a plant. In reality the plant does not exist in that kind of sense any more. The typical situation is that that the business is formed by a lot of units forming an international company. The knowledge is therefore spread all over the world.

A new paradigm for the cultural heritage: the present day documentation

With all the mentioned new situations it would be a sad story if the historical world would continue to work like in the past. But I predict that there will be a kind of new paradigm, a kind of revolution, in the work in the time coming.

In this paradigm there will be new methods of working and one of the most important issues will be the present day documentation. We have heard about similar things before. For instance the Swedish project SAMDOK has for almost 35 years made propaganda for it. The target for the future has primarily to be more directed towards the present and not towards the time for 'the memory of man' that often has been done. The consciousness about the complicated and specialised tasks in the modern business world must be increased.

One of the important tools for the present heritage work will be the fieldwork. The investigator has to be at the place where the things are happening. It is the old fashion social anthropologist working under new conditions and using new tools and theories.

The most important tools will be the (tape) recorder, camera and the video recorder. With these tools the contemporary time can be preserved at least as memories secured on these relative cheap medias.

In this way buildings and constructions can be preserved in their totality. There can be pictures of even huge facilities. With the help of architectural and engineering drawings there can be supplemental information about the physical structures. Interviews with the constructors and the users can give an extended picture of the use and the thoughts behind the plants.

In the same way with the help of the visual medias tools and machinery can be documented and again the interviews (and observations through the fieldwork) can secure information about the work, with the experiences of designers, engineers, mechanics, workers and managers.

There is a practical matter that automatically will reduce the possibilities of saving newer machinery: the museum stores are already filled up with stuff from previous periods. Documentation will be the only way of keeping knowledge.

The study of work is a large discipline in itself. Let us leave it at that, pointing out that we have all the possibilities to learn and capture knowledge about the work in all aspects and not least in all the relations of the local, regional and international dimensions. We have never before had the possibility to have a general view but with these new working methods it is within range – at least if there is enough time for the work.

There are some severe drawbacks with this contemporary investigation. It is a rather new way of handling history with its great possibilities but also with its negative sides.

The most important of these negative sides will be, at least for a while, that there will be less money for this kind of historical work than for the traditional way of handling history. There will be no nostalgia for the present and we shall not underestimate this psychological feeling behind the political and economical support of history.

The investigators have a tedious task to fix an order of priority in their work. Particularly if there is a short time interval between the time for the creation and the present it will be difficult to put the tasks into order of priority. Photographs that are uninteresting today may later show interesting details about the habits of dressing and hair cuts for instance.

Working with the present always gives the investigators problems with their 'cultural views'. It is a well-known problem for the social anthropologists and it will be enlarged manifold when we are working with cultures closer to our own daily life and not with a strange and foreign culture.

The long row of problems has not ended yet. There will be difficulties to get in touch with the wanted objects. The areas around buildings and facilities are very private, and so is the information about the production processes, the economy, the tax matters, the industrial relations and so on. It will be a special task to convince busy business people that their enterprise has to be investigated.

And a final fact: The work has to be carried out by specialists. Where historical work could earlier be made not only by educated historians but also by interested amateurs, it will be a special task to navigate in a complex business world. The investigator had to know about economy, engineering, human relations, electricity, chemistry, marketing, pollution and so on. On the other side this background will give results in a quite another class of quality.

A 'standard' documentation

To exemplify the new way of working I will give an outline of how it can be done. All investigations have to be tailored to the specific situation, but in many ways the following example can be a model for a start of a rather not in-depth investigation.

Let us say the job is concerning a typical plant with buildings on 20.000 square metres under roof and with 250 employees working at this place.

With an enterprise of this size it will take around 3 to 5 months of observations to collect the ethnographical data. All the working places have to be observed for a specific period of time and the investigators have to follow the life in the production, the warehouse, the sales department, the board of directors and so on.

This picture had to be supplemented by interviews with key persons. In this sense a key person is a person with a unique knowledge and in all there can be around 100 persons at a plant of these size. Most of them have to be interviewed several times to get a thorough picture of both the present situation and the past developments on all levels.

The documentary material will be around 2.000 pictures and 10 hours of video. The pictures will show (most of) the physical surroundings, all the tools in cabinets and drawers, the meeting places, the toilets, the car park and so on, while the video will show the work, everything that is moved in space and time, the persons activities with meetings and other social activities.

For future exhibitions there can be collected around 200 artefacts. It will mainly be smaller pieces with fine narrative characteristics.

The whole process will be carried out much like in an ordinary research process. All relevant literature to build on the existing knowledge and to supplement it has to be read. The results have to be discussed regularly with peers.

In this process of acknowledgement the archive at the enterprise is important. Or let us say archives because information is secured at many places at a plant.

The archive had to be used in the present investigation and it partly had to be saved for future supplemental research. In all there will be around 30-metre paper archive and 40 gigabytes on digital medias.

All this work will take 2 manpower years inclusive of registration of the photos, writing reports and so on. It is much time – and it is expensive. Of course the work could have been done on a less ambitious level but the results then will never approach the quality of knowledge like that around primitive iron making mentioned in the first chapter of this article.

The future is international

The work with historical matters has to be international in its scope. Many of the activities in modern business are international in their scope and international cooperation will be necessary to capture this around the world where the information and knowledge is located.

An infrastructure for this international cooperation had to be developed. The tiny platforms like that in T2M had to be extended both organisationally and with practical matters like databases covering knowledge about the topics.

With the new working conditions and their rather high expenditure as we heard about in the previous chapter the number of investigations will be limited. Only the largest countries will have resources to cover all the most important industries and even that is a matter of speculation.

Also with an aim to work internationally there will be some implications. One of the more severe is that the history no more will be national. Without nationalistic arguments it will be more difficult to argue for money – that is a worldwide situation.

With less money we therefore have to work more effectively. But I think we will. The quality of the results will be much higher when we are working in a more research-like matter, and with international cooperation we can better help each other.