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NORDISK no 3|2008
TIDSKRIFT
UTGES AV FÖRENINGEN NORDISKA PAPPERSHISTORIKER

Utvecklingen av pappersprodukter

På IPH:s konferens i våras höll Per Jerkeman ett föredrag med titeln "The Evolution of Paper Products". I föredraget beskriver han hur industrialismen växte fram i Europa på 1800-talet och hur den och andra trender skapade en ökad efterfrågan på papper och hur pappersmaskinen och cellulosa från skogsråvara möjliggjorde en bred användning av olika pappersprodukter. Många av dagens pappersprodukter utvecklades under 1800-talet och i föredraget beskrivs också en av de svenska förgrundsmännen – Johan Edvard Lundström – en framgångsrik entreprenör, men ett tragiskt livsöde.

SIDAN 2

Tidningspapper är den mest spridda pappersproduktionen i världen med en konsumtion av – i runda tal – 40 miljoner ton per år.

Norske Skogs pappersbruk i Skogn, Norges största tillverkare av tidningspapper etablerat 1962, är ett representativt exempel på förnyelsen av den norska skogsindustrin under 1900-talet.

I en utförlig artikel skildrar Sven Olav Hansen, författare och historiker, vad han betecknar som den problematiska förnyelsen av norsk skogsindustri med utgång från slutet av 1800-talet och början av 1900-talet.Artikeln härrör från ett föredrag han hållit inför NPH. Så här lyder hans summering:

Treforedlingen har endret karakter både i takt og utakt med de kraftigste pulsslagene i industrisamfunnets utvikling. I virksomhet i etterkrigstiden vokste, spesielt på 1960-tallet, stanget norsk treforedling mot et nasjonalt råvaretak. Nordenfjelske Treforedling i 1962, Borregaards satsninger på finkjemi og Saugbrugsforeningens magasinpapirprogram er unntakene. Men markedssituasjonen er vanskelig. Det er ikke noe nytt. Og kravene til avkastning for eierne er større enn noen gang. Det er én utfordring for selskapene. Én annen utfordring er om moderne informasjonsteknologi vil utkonkurrere papiravisene i en nærmere eller en fjernere fremtid. Uansett er gran en fornybar ressurs, og treforedlingen

perioden opp mot første verdenskrig var den en sentral dynamo i utviklingen av velstandssamfunnet. Deretter stagnerte den, og mens annen industri og nærings-

En påkrevet strukturrasjonalisering og modernisering kom ikke i stand før og etter 1970-tallskrisen. Det var et par-tre unntak på 1960-tallet. Etableringen av

har i noen grad også vist at den er i stand til å fornye seg. Spørsmålet er om den vil være det også i årene som kommer.

SIDAN 7

FÖRENINGENS HEMSIDA: www.nph.nu

Nordiska Pappershistoriker (NPH)

Föreningen Nordiska Pappershistoriker (NPH) är en ideell förening med uppgift att främja intresset för pappershistoria i Norden. Föreningen uppmuntrar och stimulerar forskning om och dokumentation av lump och dess beredning, tillverkningsprocesser, redskap som valskistor, kypar, formar och guskredskap. Andra intresseområden är historia om bruksmiljöer och mäniskorna vid pappersbruken, papperets användning och distribution. Vattenmärkning och datering med hjälp av pappersegenskaper är liksom papperskonservering och konstnärligt bruk av papper andra exempel på föreningens intresseområden.

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Den vardagliga papperspåsens rötter går tillbaka till 1850-talet då en skollärare fick patent på en maskin för påstillverkning.

The Evolution of Paper Products

Last year there was an exhibition at the National Museum in Stockholm called Förfärligt härligt or Dreadful Delight. It showed products from the 19th century, arts and crafts, paintings and sculpture, china-ware and furniture. The objects were often overburdened with ornaments, many were kitschy and vulgar – that was the style, or the lack of style in the 19th century. You can say it showed – in our eyes – a dreadful taste.

AV Per Jerkeman

That is one way of looking at this fascinating period, anything goes, nothing was discriminated, everything was allowed. There was room for inventors and entrepreneurs. That was the delight of the 19th century.

This was also the era of industrialism. With industrialism the modern society was created; railways transported goods and people; steam powered ships and vehicles; electricity powered en-

Increasing demands for paper

All these trends also meant increasing demands for paper. For information, publication and packaging. And they also created demands for new types of paper.

The technical prerequisites to fulfil these market demands were of course the paper machine and the cellulose fibre from the forests - the two major technical developments in the paper area during the 19th century.

These developments meant new quality paper has never been produced as in the middle of the 19th century. There was a shortage of rags, and rag was needed to reinforce the paper when ground wood pulp was used. Paper from this period has caused a lot of problems for libraries and archives because of its deterioration with age.

That was the other side of the coin, the results of a technology in its infancy. But at the same time as archives and libraries are still suffering from these problems, we are also taking benefits

gines; Alfred Nobel invented dynamite, Alexander Graham Bell the telephone, Thomas Alva Edison the light bulb, Henry Bessemer the converter for steel production and Carl Daniel Ekman the sulphite process.

With industrialism followed socialism. A new working class had been formed. Karl Marx and Friedrich Engels wrote Manifest der Kommunistischen Partei and trade unions were organized in many countries.

But there was also a breeding ground for nationalism during this century. Men like Napoleon Bonaparte, Franz Josef and Otto von Bismarck made great efforts to change the map of Europe. Many former colonies declared their independence and new states were formed. Local wars and civil wars, revolutions and risings were more or less the natural condition. Authors wrote nationalistic poems and composers transformed them to national anthems.

In many countries, people were now given the right to education and the ability to read was spreading.

tools for product development and during the second half of the century there was nothing less than a revolution on the paper market.

The productivity of the paper machine and the possibility to deliver paper in endless rolls, together with the new raw materials, meant drastically reduced prices and were a prerequisite for producing paper for large volume products like newspapers and corrugated containers.

The price for one centner of handmade paper in 1806 was 16 shillings and for patent paper – as the machine-produced paper was then called – was 3 ½ shilling – an 80 percent price reduction.

But the introduction of the new mechanical and chemical pulps also meant quality problems: inferior strength, low whiteness and ageing.

Low price and quality

So, the starting point for the development of new products was a low price and a low quality. In fact, so much low from the inventions during the 19th century; in fact most of the paper products we are using daily today have their origin in that period.

Let me take some examples, and start with newspaper.

The key factors for the development of the modern newspaper were the paper machine and the web rotary printing press. The web rotary printing press was patented in 1863 by William Bullock.

Bullock had been working both as an inventor and a newspaper publisher in Philadelphia and this invention meant that large rolls of paper could continuously be fed into the press, the paper was printed on both sides, folded and cut. The first model could print 12 000 sheets an hour, but Bullock improved the construction until it could print 30 000 sheets an hour. That should be compared with the previous standard: Friedrich Königs Schnellpresse with a capacity of 900 sheets an hour.

At the end of the century with still lower paper prices and more efficient

Den svenske uppfinnaren Johan Edvard Lundström, grundaren av Munksjö Pappersbruk.

one of the sheets in the book. The previous sheets were protected by a waterproof paper, the letter written with the right kind of ink was put under the wet sheet, you closed the book and put it under pressure for a minute, and so you got a copy. The copy book was very popular and it could also be used as proof in a court of law.

In the copy book you got one copy – if you needed more than one copy you had to use some other invention, for instance the hectograph or gelatine duplicator. The prerequisite for these duplicating methods was the new synthetic aniline dyestuffs.

Another method was to stencil. You made an original where the written text could be penetrated by ink. Thomas Alva Edison used an electric pen for this purpose. The pen worked like the needle in a sewing machine and the letters were made up of a lot of holes. The original was then put in a duplication tray. Edison sold a number of his

printing presses there were no technical limitations for the production of newspaper. Now Alfred Harmsworth – later Lord Northcliffe – founded The Daily Mail in London which started with a circulation of 400 000 and became the first newspaper reaching a circulation of one million copies. It has been said about Lord Northcliffe that the greatest finding of his life was that he understood the importance of sensations.

Fighting to survive

Today, most newspaper editors seem to have learnt their lesson from Lord Northcliffe. But not all of them live up to the motto of C.P. Scott who became editor of The Manchester Guardian in 1872: "Comments are free, but facts are sacred."

The development of the modern newspaper in the 19th century – the free press with a mass circulation – has been a key factor for the development of democracy and human rights in many countries round the world.

Today, newspapers are fighting to survive in the battle with other media in a world drowned by information. In our generation we have difficulty in imagining a day without a newspaper, but the younger generations seem to have other habits and addictions. However, as long as we teach our children to read - and I think that is the most critical factor – as long as we teach our children to read, there will be a market also for free and independent newspapers. At least, that as my idle wish.

Newspaper is the most widely spread paper product in the world – the world consumption of newsprint is around 40 million tons a year.

Office papers in size A4 and Xerox-copiers are inventions of the 20th century, but the need for copies existed of course in the offices long before. The 19th century presented many innovations.

The president used a multiple pen to copy

Thomas Jefferson, the third president of USA, used a multiple pen. One pen was connected to a second pen, so that when you wrote with one pen the second pen wrote the same thing on another paper. Thomas Jefferson wrote in a letter: "I think this is the finest invention of the present age."

James Watt – the inventor of the steam engine – was also active in this field. The most important of his copy patents is the copy hook, which became standard in many offices for copying outgoing correspondence during the second half of the 19th century. The sheets in the copy book were made of very thin paper, often from Japan. To make a copy, you started by wetting apparatuses but it soon received competition from other stencil methods of which all are now forgotten.

So much abour printing and writing in the 19th century.

Today, about half of the world's consumption of paper is for packaging purposes. In the early days, hand-made paper was an expensive product in short supply and packaging was just a secondary application. Paper were even stolen from archives and sold to shops for wrapping.

In the 19th century, the paper bag, the paper sack, the paper box and the corrugated container were invented and they all became commercial successes. And it is no exaggeration to say that these products look pretty much the same today almost 150 years later.

The precursors of the paper bag were the envelope and the cornet, and at first the shopkeepers folded and glued their own bags. In 1844, a young Englishman – Elisha Smith Robinson – started to sell handmade bags. Together with his brother Alfred he established E. S. & A. Robinson Ltd, a company which today is still producing paper bags.

Two success stories based on simple paper bags

In the 1850s, Francis Wolle, a schoolteacher in Pennsylvania, was granted a patent for a paper bag machine and in the 1860s he and some colleagues started Union Paper Bag Machine Company.

▷ ×

It was very successful; joined with the paper producer Camp Manufacturing Corporation and formed Union Camp, which just ten years ago was bought by International Paper and is now part of the world's largest forest products industry corporation. Two success stories based on simple paper bags.

The difference between a bag and a sack is mainly the size, and paper sacks were developed in parallel with paper bags until Aldemar Bates invented the valve sack, but that was in 1908.

A Swedish invention

to the stores in New York, but became one of the great pioneers in packaging technology. He developed machines and products and he also realized the importance of the appearance of the box and engaged a number of artists to design his products. Outside his factory he had a large banner saying: THE FATHER OF THE FOLDING BOX.

Corrugated board or Wellpappe or Carton ondulé or böljepapp is an ingenius product. It is, of course the sandwich-construction which gives the high stiffness.

In 1970, professor Börje Steenberg and

you use corrugated board. This material gives more stiffness per dollar than steel, aluminium or plastic. This is the main reason why corrugated board still has a promising future.

Corrugated board was also born in the 19th century. The first patent for corrugating paper was granted in 1856 to two Englishmen, Edward Healey and Edward Allen, but they did not use the corrugated paper for packing, but as a sweatband in men's hats. It was an American Albert Jones who realized its potential as a packaging material.

A Swedish invention became important

A Swedish invention, the kraft paper, became an important factor in the development of paper as a packaging material. Kraft is the Swedish word for strength and the paper was developed by Alvar Müntzing, who also coined the term kraft paper.

By the way, Alvar Müntzing was also one of the founders of SPCI, the association which is celebrating its 100 anniversary this year. At this time, he was mill manager at Munksjö Paper Mill. The first kraft paper was based on rag and soda pulp. It was dark brown, but the strength properties were not too good. The success came when the young engineer David Fielding got the idea of using an unsuccessful batch with just half-cooked pulp and treated the pulp in a kollergang – the refiner of these days – and made paper from it. Later, when the real kraft process or the sulphate process was introduced, that pulp became the basis of kraft paper.

The origin of the paper box was in Boston 1836. Aaron Dennison was a jeweller and clock dealer and was looking for an elegant way of wrapping his exclusive products.

His father Andrew was a retired colonel but also a shoemaker, and Aaron got the idea that his fathers tools – the knife and the awl – could also be used for making boxes instead of repairing shoes. Aaron and his two sisters folded boxes from the sheets his father had cut and scored. So, Aaron Dennison left the clocks and jewels and became the first paper box maker.

The father of the folding box

Even if Aaron was the first to score paper board, it was Robert Gair who invented a machine which could cut and score board in a continuous process. He started his career by selling paper bags

co-workers in Stockholm published an article in Svensk Papperstidning which has been widely quoted. They showed that you get stiffness most cheaply if

Improvement in paper for Packaging

His patent was called "Improvement in Paper for Packaging". He used a single

Anvisning till

taktäckning med tjärpapp

(eller så kallad Stenpapp)

i långa banor,

sådan den tillverkas vid

MUNKSJÖ PAPPERSBRUK

i Jönköping.

Tredje uppfagan.

(Utgifven den 1 November 1862.)

"Tak af tjärpapp i långa banor öfverträffas af inga andra tak med hänseende till billigt pris, varaktighet, lätthet och beqvämlighet i användning och underhåll."

Büsscher & Hoffman, Arkitekter i Berlin.

"Ej nog att tjärpapp icke är eldfarlig: den bör äfven vid eldsvådor vara ett skyddsmedel mot eldens utbredning."

Borgmästareembetet i Eisenach.

Märk Priskuranten å omslagets följande sider!

Tidig marknadsföring av tjärpapp från Munksjö.

sheet of corrugated paper as wrapping to protect glass bottles. So, it was not yet what we call corrugated board.

The idea to glueing flat board on both sides of the corrugated paper, creating

called Munksjö Paper Mill. Yes, the same mill in which Alvar Münzing became mill manager 20 years later and invented kraft paper. Lundström´s business idea was to utilize straw as raw

An innovater also in marketing

He was a witty copy-writer, people enjoyed reading what he had written. He compared his brochures with John the Baptist – they should go out into the

the stiff sandwich-construction came from the American Oliver Long in the beginning of the 1870s and the first factory for corrugated board production started in 1875.

Robert Gair – the father of the folding box – bought Oliver Longs´ patent and also started production of corrugated containers. He was the first to produce these containers from rolls of paper, and with that we have reached the end of the 19th century.

But let me end this little presentation of paper product development in the 19th century by talking about the Swedish innovator Johan Edvard Lundström.

A Swedish innovator

He was a remarkable man. He was born in 1815 in Jönköping, a small town in Southern Sweden. His father was a book printer and publisher and he also hired a small paper mill. Johan Edvard – everybody called him Janne – studied at the university in Uppsala, mainly chemistry, but left the university without graduating.

He worked for a couple of years as a teacher, became like his father a printer, publisher and newspaper editor and in 1845 together with his brother Carl he started the production of matches. He used his knowledge in chemistry and experimented with different formulations for the match head.

Based on a patent from professor Gustaf Erik Pasch he developed a formulation where the phosphorus was put on the striking surface on the box and not in the match head, and so he had invented the safety match – a match which is ignited only when it is struck on the striking surface.

These matches achieved success at the world exhibition in Paris 1855, and Lundström was called the father of the safety match, but at the same time he lost his interest in the business. He was an innovator and entrepreneur – not an administrator. Production of matches was a pretty simple operation and he was looking for something more technically demanding and that was paper making.

He succeeded in finding a financier and built a paper mill in Jönköping material, but the success came when he started to produce roofing paper and a paper to provide protection against draught.

Industrialism needed people to work in the new factories; people moved into the cities and they needed shelter; many lived in overcrowded conditions and their places were cold, moist and draughty. Jönköping was no exception and Lundström, who was a warm-hearted person, was well aware of this social problem.

"Förhydningspapp" sheating paper

People tried to stop the draughts with felts and old newspapers, but he had a better idea. He started to impregnate paper or rather board based on straw and rag with tar. This rugged material was sold in small rolls, it was easy to apply on walls and floors and it gave a good protection against draught. He called the product "förhydningspapp" or literally sheathing paper and launched it at an exhibition in Karlstad 1862 and went home with more orders than he could deliver.

It took a little longer time to convince people of the advantages of his roofing paper, also that delivered in rolls. People were familiar with the old type of roofing paper made from sheets of handmade paper, dipped in hot wood tar and nailed on the roof. This product was inflammable and had a bad reputation after a big fire caused by careless handling of the tar.

Instead Lundström used coal tar, which was a by-product from the gasworks which at this time were built in Germany and which was not at all inflammable. Roofing paper impregnated with coal tar was already on the market in Germany and the Prussion government had confirmed that a paper-covered roof was as good as a tiled roof with regard to fire security.

Lundström refined both the product and the process and the sheathing paper and the roofing paper were the primary products for the Munksjö mill for many decades. One of the reasons for the success was his talent in marketing. He printed brochures with detailed descriptions showing how to use the products.

Baptist – they should go out into the world and pave the way! He taught craftsmen how to fix the products and he built a net of retailers. It is only recently that the paper industry in general has learnt to use marketing on the same level as Lundström did! He was an innovator also in this area.

Father of the safety match, founder of a successful paper mill – John Edvard Lundström is a respected name in the industrial history of Sweden, but he had a troubled soul and his life had a tragic end. He remained a bachelor, but fathered an illegitimate daughter with his maid when he was 27. He cared greatly for his daughter, and she became his faithful supporter until he died.

He left the paper mill after a conflict with the financier, tried to repeat his success at an other paper mill, but failed. He died in 1888 at the age of 73, after a long illness. He was bankrupt and he spent his last years in his daughter´s home. When he was laying on his death-bed, the day before he died, the authorities made a search-raid in the house, because of his son-in-law´s unpaid debts. A painful end for a great man.

Not forgotten

But the people in Jönköping had not forgotten him. At the funeral, his coffin was followed by several hundred people and his gravestone has the inscription: Thousands are blessing his memory.

And the end of the century showed business as usual: war between Japan and China, between Greece and Turkey, between USA and Spain, civil war in South Africa and risings in Cuba, in the Philippines, in China and Korea. At the same time, Kipling wrote The Jungle Book and and Tchaikovsky Symfony Pathétique; Picasso painted in blue; the Wright brothers were making their first attempts to fly and the first Olympic Games of the modern era took place in Athens. The 19th century – dreadful delight!

Saugbrugs 1938: "Vi ser cellulosefabrikken fra 1906 midt på bildet og papirfabrikken fra Første verdenskrig til høyre. I bakgrunnen skimtes konturene av Fredriksten festning."

Den problematiske fornyelsen av norsk treforedlingsindustri

AV Svein Olav Hansen, historiker og forfatter

Treforedling var en motor i Norges modernisering i de siste tiårene av 1800-tallet og de to første tiårene på 1900-tallet. Ja, skogens betydning – totalt sett med sagbruk og andre anvendelsesområder for trevirket – kan knapt overdrives når vi skal beskrive moderniseringen av Finland, Sverige og Norge. Når det gjelder Norge, ga næringen i år 1900 utkomme til om lag en fjerdedel av befolkningen. Ved utbruddet av første verdenskrig sto treforedling (masse og

være konkurransedyktige på pris. Det var nemlig slik at selskaper i Sverige, Finland, Canada og USA under og etter første verdenskrig oppførte "anlegg av en størrelse man tidligere ikke hadde kunnet tenke sig". På den annen side: Varsler om en snarlig undergang for de mange små masseprodusentene og de verken teknisk eller forretningsmessig ikke-integrerte norske bedriftene slo ikke til. Industrien levde i all hovedsak videre med den strukturen som ble skapt i de siste tiårene av 1800-tallet og de to første på 1900-tallet til opp mot

bare cellulose. Resten, det vil si omkring 30 bedrifter var teknisk integrerte enheter med masse- og papir- (eller papp-/kartongproduksjon). Bare cirka 10 av de integrerte selskapene hadde en produksjon av noen størrelse (Borregaard, Union Bruk, Saugbugsforeningen, Hunnsfos, Bøhnsdalen, Vestfos, Greaker, Embretsfos, Follum og Ranheim).

Når det gjelder cellulose laget Borregaard nesten like mye alene som de andre ni til sammen. I papirproduksjon var Union størst. Viktigste norske pa-

papir) alene for om lag 80 prosent av eksportverdien fra norsk skogindustri og den utgjorde cirka en fjerdedel av verdien av all norsk vareeksport.

Men bransjen var allerede omkring 1920 på en måte en moden næring. Mange stilte spørsmål om hvor lenge de mange, små norske anleggene ville

1970-og 1980-årene.

40 tresliperier

Hva slags selskaper hadde vi? Av de cirka 100 treforedlingsbedriftene, som fantes i Norge i 1920, var vel 40 rene tresliperier, cirka 20 var rendyrkete papirfabrikker og knapt et titalls laget

pirsort var avispapir, som var teknisk sett relativt uinteressant å lage, dessuten gulnet papiret og avispapir var forholdsvis dårlig betalt. Av norskprodusert cellulose og tremasse gikk hele 40-50 prosent ubearbeidet ut av landet. Derfor var det en uttalt målsetting fra flere hold fra mellomkrigstiden at man