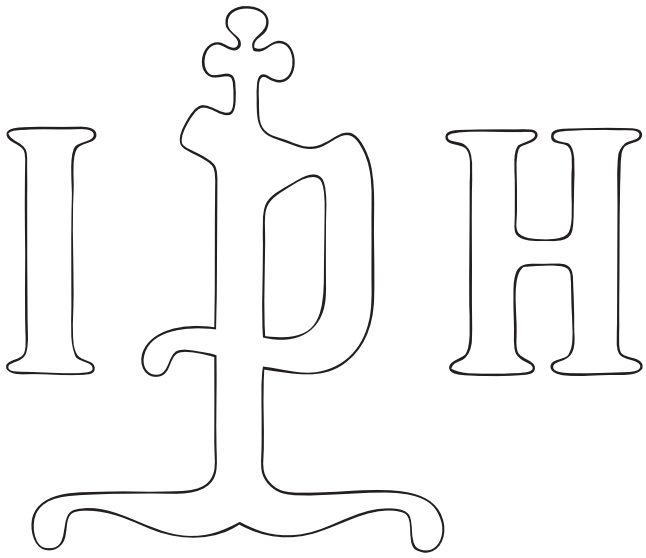
Volume 16, Year 2012, Issue 2



PAPER HISTORY

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International Association of Paper Historians
Internationale Arbeitsgemeinschaft der Papierhistoriker
Association Internationale des Historiens du Papier

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President's biennial report

Dear members and friends of paper history

2010 we celebrated the IPH 50 years jubilee at the 30th International Congress of Paper Historians, so brilliantly organized by AFHEPP, the new Association Française pour l'Histoire et l'Etude du Papier et des Papeteries. We spent wonderful days together listening to interesting lectures, visiting paper mills and enjoying brilliant receptions and late dinners; the organizers even managed to solve all transport problems in connection with the railway strike at the end of the congress. Thanks to the hard work after the congress in the hands of Jean Louis Estève as main editor of all contributions the IPH Congress Book 2010 became in itself the most beautiful celebration of the 50 years jubilee.

At the end of 2010 Chinese TV contacted IPH for advice to choose the ideal place for documentation of European paper history. The TV Paper & Civilization team planned to shoot four of the five sections of paper history in January in Asia and the last one in April in Europe. The Chinese producers settled on Fabriano among the various places suggested by IPH, and the spring 2011 presentation on Chinese National TV Channel of all sections was very positively accepted. A year later the new centre CISSCA in Fabriano for the study of Italian paper history and technology was a reality.

No clear agreement had yet been obtained at the G.A. 2010 concerning proposals for the IPH Congress 2012 and 2014. The Council's proposal for the 2012 congress in the Upper Rhine Region was presented by Dr. Peter Tschudin. Without a national association hosting the congress it was complicated, but with a general agreement at the G.A the Council made further investigations of this plan; finally it was decided at the Council meeting 11/3 2011 to concentrate the planning of the 2012 IPH Congress in the Upper Rhine Region. Built on close cooperation in congress coordination between IPH and delegates from AFHEPP, DAP and SPH a new way of organizing the International IPH Congress started. A provisional program and first announcement was published in IPH Paper History Vol. 15, Year 2011, Issue 1, Call for papers was sent out in Issue 2, available as well on our web site www.paperhistory.org. The spring Issue of Vol. 16, 2012 brought information about registration, congress fee, general program and practical information. The 31. IPH Congress opened 17/9 2012, thanks to a close internet contact between congress coordinators and the executive Council, a Council meeting 25/2 2012, meetings 2011 and 2012 in Basle, valuable contributions from speakers and the most important attendance of participants.

Because of new EU bank regulations, an official documentation was needed to prove IPH being an international association with domicile in Switzerland. An official registration of IPH under Swiss Law by a public notary in Basel was decided by the Council. Thus much effort was concentrated on a new version of the 1994 Statutes to meet the Swiss standards of the Basel Registry of Commerce. To ensure the Basel domicile, a request was sent to the Basel Paper Mill, Museum of Paper, Writing and Printing for changing the address of the IPH domicile to the address of the Basel Paper Mill. This request has been approved by the Council of the Paper Mill Foundation in 2012. The new Statutes presented at this G.A. are the result of Dr. Peter Tschudin's careful adaptation of the 1994 Statutes to Swiss Law in cooperation with Dr. Hans Münch as juridical advisor in Basel. As all associations in Switzerland shall pay taxes, after approval of the New Statutes IPH will apply, as a non-profit international organization, for tax exemption.

To minimize the costs of the stock of IPH publications in Lenninghaus an agreement has been made with a former Belgian paper manufactory in Malmedy. The old building is converted into a museum with an area transformed to storage of archival material. Until ready, the stock of publications will remain stored in the Lenninghaus firm in Hemer.

For collection of archival material from IPH congresses Martin Cuppen, Alphonse Radermecker, Bruno Kehl and Heinz Godesar initiated preliminary negotiations 2011 with CODA Archive in Apeldoorn. Here documents of the 19th IPH Congress 1990 in Belgium are already stored together with other IPH archives of importance and from 2012 also documents from the 29th IPH Congress 2008 in Sweden.

The new IPH membership list from January 2011 includes members from 30 nations. Since then 16 new people and institutions have joined IPH, but

we have lost two of our oldest German members in 2012 –Professor Dr. Guido Dessauer and Dr. Klaus Roemer. They will remain blessed in our memory. 5 memberships have been cancelled and among them Hans-Peter Jaraczewski's of health reasons. We will miss him after many years of active membership of IPH. Today we are 104 individual members and 100 institutional members.

Dr. Peter Tschudin and Dr. Frieder Schmidt have prepared a third edition (IPH Standard 2.1 2011) with images and texts in 6 languages as substitute for the not longer available IPH publication of International Standard for the Registration of Papers with or without Watermarks Version 2.0 (1997). The new version is intended as a possible adaptation and future download offer on the IPH homepage to the needs of the newly created European on-line Watermark Database, where the Stefan Feyerabend Collection of machinemade watermarks is now going on-line, included in the Bernstein project.

Zweijahresbericht der Präsidentin

Liebe Mitglieder und Freunde der Papiergeschichte,

2010 feierten wir das fünfzigjährige Jubiläum der IPH beim 30. Internationalen Kongress der Papierhistoriker, der hervorragend organisiert wurde von AFHEPP, der neuen Association Française pour l'Histoire et l'Etude du Papier et des Papeteries. Zusammen verbrachten wir wunderbare Tage mit interessanten Vorträgen, Besuchen von Papiermühlen und exzellenten Empfängen und Abendessen. Den Organisatoren gelang es sogar, alle Transportprobleme, die durch den Eisenbahnstreik gegen Ende des Kongresses entstanden, zu lösen. Dank der harten Arbeit Jean Louis Estève, dem Hauptlektor der Beiträge, im Anschluss an den Kongress wurde das IPH-Kongressbuch 2010 selbst zur gelungenen Festschrift für das fünfzigjährige Jubiläum.

Ende 2010 kontaktierte das chinesische Fernsehen die IPH, um sich bei der Wahl eines idealen Schauplatzes für eine Dokumentation der europäischen Papiergeschichte beraten zu lassen. Das Team TV Paper & Civilization plante vier der fünf Teile über die Papiergeschichte im Januar in Asien zu drehen und den letzten in Europa. Unter den von der IPH vorgeschlagenen Orten entschieden sich die chinesischen Produzenten für Fabriano, und die Ausstrahlung aller Teile im chinesischen Nationalfernsehen im Frühjahr 2011 wurde sehr gut aufgenommen. Ein Jahr später war CISSCA, das neue Zentrum für die Erforschung der italienischen Papiergeschichte und -technologie in Fabriano, Wirklichkeit geworden.

Auf der Generalversammlung 2010 kam es zu keinen klaren Vereinbarungen über die IPH-Kongresse 2012 und 2014. Der Vorschlag des Vorstandes für den Kongress 2012 in der Oberrheinregion wurde von Dr. Peter Tschudin vorgetragen. Ohne eine nationale Vereinigung als Gastgeber für den Kongress war die Organisation schwierig, aber mit der Zustimmung der Generalversammlung prüfte der Vorstand diesen Vorschlag genauer. Bei einem Vorstandstreffen am 11. März 2011 wurde entschieden, den Kongress 2012 in der Oberrheinregion zu planen. Aufbauend auf einer engen Zusammenarbeit zwischen der IPH und Vertretern von AFHEPP, DAP und SPH wurde ein neuer Weg bei der Organisation des Internationen IPH-Kongresses eingeschlagen. Eine Ankündigung und ein erster Programmentwurf wurden in der Zeitschrift Paper History 15, Jahrgang 2011, Heft 1 veröffentlicht, der Call for Papers wurde in Heft 2 abgedruckt und war auch auf der Website www.paperhistory.org einzusehen. Die Frühlingsausgabe von Band 16, 2012 enthielt Informationen über die Anmeldung, die Kongressgebühr, das Programm sowie praktische Hinweise. Dank einem engen Kontakt zwischen den Kongresskoordinatoren und dem geschäftsführenden Vorstand, einem Vorstandstreffen am 25.2.2012, Treffen 2011 und 2012 in Basel, wertvollen Beiträgen von Vortragenden und vor allem der Anwesenheit der Teilnehmer öffnete der 31. IPH-Kongress 17/9-2012.

Aufgrund neuer Vorschriften zur Regelung des Bankverkehrs in der EU ist ein amtlicher Nachweis dafür erforderlich, dass die IPH eine internationale Vereinigung mit Sitz in der Schweiz ist. Der Vorstand entschied sich für eine offizielle Registrierung der IPH unter schweizerischem Recht durch einen öffentlichen Notar in Basel. Deshalb wurde viel Aufwand in eine Neufassung der Statuten von 1994 gesteckt, um die gesetzlichen Vorschriften des Basler Handelsregisters erfüllen zu können. Um einen nicht an eine Person gebundenen Sitz in Basel nachweisen zu können, wurde eine Anfrage an die Basler Papiermühle,

Schweizerisches Museum für Papier, Schrift und Druck, gestellt, ob der Sitz der IPH dorthin wechseln könne. Diese Anfrage wurde 2012 vom Vorstand der Stiftung Basler Papiermühle positiv beantwortet. Die neuen Statuten, die bei der diesjährigen Generalversammlung präsentiert wurden, sind das Ergebnis von Dr. Peter Tschudins sorgfältiger Anpassung der Statuten von 1994 an die schweizerische Gesetzgebung in Zusammenarbeit mit Dr. Hans Münch als juristischem Berater in Basel. Da alle Vereinigungen in der Schweiz steuerpflichtig sind, wird die IPH als internationale Non-profit Organisation, nach der Annahme der neuen Statuten die gesetzlich mögliche Steuerbefreiung beantragen.

Um die Kosten für die Lagerung der IPH-Publikationen bei der Firma Lenninghaus in Hemer zu minimieren, ist eine Vereinbarung mit einer früheren belgischen Papierfabrik in Malmedy getroffen worden. Das alte Gebäude wird in ein Museum umgewandelt mit einem Bereich für die Unterbringung von Archivmaterial. Bis dies abgeschlossen ist, bleiben die IPH-Publikationen im Firma Lenninghaus in Hemer.

Um das Archivmaterial der IPH-Kongresse zu sammeln, begannen Martin Cuppen, Alphonse Radermecker, Bruno Kehl und Heinz Godesar 2011 erste Verhandlungen mit dem CODA-Archiv in Apeldoorn. Hier werden bereits die Unterlagen des 19. IPH-Kongresses 1990 in Belgien zusammen mit anderen wichtigen IPH-Unterlagen aufbewahrt, und seit 2012 auch Dokumente des 29. IPH-Kongresses 2008 in Schweden.

Die neue IPH-Mitgliederliste von Januar 2011 verzeichnet Mitglieder aus dreißig Ländern. Seitdem sind 16 Personen und Institutionen der IPH beigetreten. 2012 haben wir zwei unserer ältesten deutschen Mitglieder verloren – Prof. Dr. Guido Dessauer und Dr. Klaus Römer. Wir werden ihnen ein ehrendes Gedenken bewahren. 5 Mitglieder haben gekündigt, unter ihnen Hans-Peter Jaraczewski aus Gesundheitsgründen. Er wird uns fehlen nach vielen Jahren der aktiven Mitgliedschaft. Heute haben wir 104 individuelle und 100 institutionelle Mitglieder.

Als Ersatz für die nicht mehr lieferbare IPH-Veröffentlichung des Internationalen Standards für die Dokumentation von Papieren mit oder ohne Wasserzeichen, Version 2.0 (1997) haben Dr. Peter Tschudin und Dr. Frieder Schmidt eine dritte Ausgabe (IPH-Standard 2.1, 2011) mit Bildern und Texten in sechs Sprachen vorbereitet. Die neue Fassung stellt eine Überarbeitung dar und soll in Zukunft als download-Angebot auf der IPH-website zur Verfügung stehen, um dem Bedarf der kürzlich geschaffenen europäischen online-Datenbank für Wasserzeichen nachzukommen, in die die Maschinenwasserzeichen-Sammlung von Stefan Feyerabend nun online eingeht, als Teil des ”Bernsteinprojektes”.

Rapport bisannuel de la Présidente

Chers membres et amis de l’histoire du papier,

En 2010 nous avons célébré le jubilée des 50 ans de l’IPH au 30ème Congrès international des Historiens du Papier, si brillamment organisé par l’AFHEPP, la nouvelle Association Française pour l’Histoire et l’Etude du Papier et des Papeteries. Nous avons passé ensemble de merveilleuses journées à écouter d’intéressantes conférences, à visiter des moulins à papier et à savourer d’excellents dîners et de belles soirées de réception; les organisateurs ont même réussi à résoudre tous les problèmes de transport suite à la grève des trains à la fin du congrès. Grâce à un travail remarquable mené sur l’ensemble des contributions par Jean-Louis Estève en tant que responsable éditorial, le Livre des Congrès de 2010 est devenu en soi la plus belle célébration du jubilée.

A la fin de 2010, la TV chinoise a contacté l’IPH pour des conseils concernant le lieu idéal pour documenter l’histoire du papier en Europe. L’équipe de TV “Papier et civilisation” projetait de tourner quatre ou cinq épisodes documentaires sur l’histoire du papier en Asie, et le dernier épisode en Europe. La TV chinoise s’est installée à Fabriano, entre autres lieux suggérés par l’IPH, et la série d’émissions présentée au printemps 2011 sur la chaîne nationale chinoise a été fort bien reçue. Un an plus tard naissait à Fabriano le nouveau centre CISSCA pour l’étude de l’histoire et de la technologie du papier en Italie.

Concernant les propositions pour les Congrès IPH de 2012 et 2014, l’assemblée générale de 2010 n’a pu se conclure sur un accord précis. La proposition du Conseil pour tenir le congrès de 2012 dans la région du Rhin supérieur avait été présentée par Dr. Peter Tschudin. En l’absence d’une association nationale, l’organisation risquait d’être délicate, mais avec

l'accord unanime de l'assemblée générale, le Conseil poursuivit ses recherches en ce sens; pour finir, lors de la réunion du Conseil du 11 mars 2011, il fut décidé de retenir cette option pour le Congrès IPH de 2012. Ainsi s'est mis en place une façon nouvelle d'organiser le congrès international de l'IPH, fondée sur une étroite collaboration et coordination entre l'IPH et les représentants de l'AFHEPP, du DAP et de la SPH. Un pré-programme et une première annonce furent publiés dans le vol 15, n°1, 2011 de *IPH Paper History*. L'appel à contributions fut diffusé sur le n°2, disponible également sur notre site Web www.paperhistory.org. Le numéro de printemps du vol. 16, 2012, fournissait les informations nécessaires pour l'inscription, les tarifs, le programme général et les données pratiques. C'est grâce à d'étroits contacts via internet entre les coordinateurs du congrès et le Conseil exécutif, grâce à une réunion du Conseil le 25 février 2012, à deux réunions en 2011 et 2012 à Bâle, grâce à l'apport des intervenants pour les contributions, et surtout grâce à la présence des participants, que le 31. IPH Congrès etait débuté 17/9-2012.

En raison de nouveaux règlements bancaires européens, il nous fallait fournir des documents officiels prouvant que l'IPH est une association internationale domiciliée en Suisse. Le Conseil décida de faire enregistrer l'IPH, sous la loi suisse, par un notaire de Bâle. Aussi avons-nous dû consacrer nos efforts à l'élaboration d'une nouvelle version des statuts datant de 1994, afin de satisfaire aux exigences des standards suisses du Registre du commerce de Bâle. Nous avons sollicité le Moulin à Papier de Bâle, Musée du Papier, de l'Ecriture et de l'Imprimerie afin de changer l'adresse de domiciliation de l'IPH pour l'inscrire à l'adresse du Musée. Cette demande a été approuvée par le Conseil de la Fondation du Moulin à Papier en 2012. Les nouveaux statuts présentés à la présente AG résultent d'une adaptation attentive des statuts de 1994 à la loi suisse, menée par Dr. P. Tschudin en collaboration avec le Dr. Hans Münch, conseiller juridique à Bâle. Comme toutes les associations en Suisse payent des impôts, à la suite de l'approbation des nouveaux statuts par l'AG, l'IPH déposera une demande d'exemption d'impôts, en tant qu'organisation internationale ne générant pas de profit.

Afin de réduire les coûts du stockage des publications de l'IPH à Lenninghaus, nous avons négocié un accord avec un ancien fabricant de papier belge à Malmédy. Le bâtiment ancien est transformé en musée, et dispose d'une zone dévolue au stockage des archives. En attendant que cet espace soit prêt à l'utilisation, le stock de publications de l'IPH sera hébergé à Lenninghaus, Hemer.

Martin Cuppen, Alphonse Radermecker, Bruno Kehl et Heinz Godesar ont commencé des négociations préliminaires avec les Archives CODA à Apeldoorn, en vue de la collecte d'archives des congrès de l'IPH. Des documents du 19e congrès de l'IPH tenu en1990 en Belgique sont déjà archivés dans ce lieu, ainsi que des archives importantes de l'IPH, et depuis 2012 des documents concernant le 29e congrès de l'IPH en Suède y ont été déposés.

La nouvelle liste des membres datant de janvier 2011 inclut des membres de 30 pays. Depuis lors, 16 nouveaux membres et institutions ont rejoint l'IPH, mais nous avons perdu deux de nos membres allemands parmi les plus anciens – Professeur Dr. Guido Dessauer et Dr. Klaus Roemer. Ils resteront honorés dans notre mémoire. 5 membres ont mis fin à leur participation, parmi lesquels Hans-Peter Jaraczewski, pour raisons de santé. Il nous manquera, après de nombreuses années de participation active à l'IPH. Aujourd'hui nous rassemblons 104 membres individuels, et 100 membres institutionnels.

Pour remplacer la publication épuisée du Standard International pour l'enregistrement des papiers avec ou sans filigranes (version 2.0, 1997), Dr. Peter Tschudin et Dr. Frieder Schmidt ont préparé une troisième édition (IPH Standard 2.1, 2011) avec des images et des textes en six langues. La nouvelle version est conçue comme possible adaptation aux besoins des Bases de données européennes de filigranes on line, et pourra à l'avenir être téléchargée à partir du site de l'IPH, tandis que la collection de filigranes mécaniques de Stefan Feyerabend est désormais disponible en ligne, incluse dans le projet Bernstein.

International Association of Paper Historians
Internationale Arbeitsgemeinschaft der Papierhistoriker

Association internationale des historiens du papier
Headquarters - Sozialsitz - Siège social
Wasserstelzerweg 95, CH-4125 RIEHEN

Financial Statements Year 2010

Income	EURO	CHF
Membership fees	€ 9.339,21	CHF 11.677,75
Sales of books	1.511,83 €	CHF 1.890,39
Bank Interests	92,11 €	CHF 115,17
	10.943,15 €	CHF 13.683,31

Expenses		
Bank charges	€ 238,74	298,52
Computers	€ 510,85	638,77
Web-Site	€ 220,00	275,09
Council Meeting expenses	€ 0,00	0,00
Congress Angoulême	€ 964,00	1.192,88
Paper History (Vol 13/2009)	€ 1.487,96	1.860,55
Lenninghaus Warehouse	€ 514,15	642,89
Taxation CH	€ 0,00	0,00
Administration expenses	€ 2.476,50	3.096,62
	6.402,20 €	8.005,31

Surplus 2010	4.540,95 €	**5.678,00**

Total Assets as of December 31st, 2010		
Bank C.B.C # 732-0046959-62, Eupen (B)	17.195,53 €	21.501,29
Bank C.B.C # 728-00431486-67, Eupen (B)	0,00 €	0,00
Postbank Frankfurt (D) # 0.012.616.604	16.692,58 €	20.872,40
Postfinance-Basel (CH) # 40.31640-0	5.059,48 €	6.326,40
Post Basel (CH) # 17-355906	8.220,85 €	10.279,40
	47.168,43 €	**58.979,49**

1 Euro = 1,25040 CHF
1CHF = 0,79974 Euro

Auditor's report : 17/11/2011
Aucune remarque

Treasurer : Alphonse Radermecker
17/11/2011

Aucune remarque

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Internationale Arbeitsgemeinschaft der Papierhistoriker

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Financial Statements Year 2011

Income	EURO	CHF
Membership fees	€ 2.632,00	CHF 3.205,25
Sales of books	987,60 €	CHF 1.202,70
Bank Interests	113,10 €	CHF 137,73
		CHF 0,00
	3.732,70 €	**CHF 4.545,68**

Expenses		
Bank charges	€ 116,55	CHF 141,93
Computers	€ 511,68	CHF 623,12
Web-Site	€ 240,00	CHF 292,27
Council Meeting expenses	€ 541,66	CHF 659,60
Congress Basel	€ 2.530,98	CHF 3.081,76
Paper History	€ 862,45	CHF 1.050,29
Lenninghaus Warehouse	€ 518,42	CHF 631,42
Taxation CH	€ 75,54	CHF 91,99
Administration expenses	€ 2.284,62	CHF 2.782,21
		CHF 0,00
	7.681,56 €	**CHF 9.354,60**

bilan 2011	**-3.948,86 €**	**-4.808,92**

Total Assets as of December 31st, 2011

Bank C.B.C # 732-0046959-62, Eupen (B)	11.398,52 €	13.881,12
Bank C.B.C # 728-00431486-57, Eupen (B)	0,00 €	0,00
Postbank Frankfurt (D) # 0.012.616.604	18.453,23 €	22.472,34
Postfinance-Basel (CH) # 40.31640-0	5.183,31 €	6.312,18
Post Basel (CH) # 17-355906	8.519,21 €	10.374,60
		0,00
	43.554,27 €	**53.040,39**

1 Euro = 1,2178 CHF
1CHF = 0,82116 Euro

Auditor's report :
10/08/2012
signe R. Colin, H Godesar

aucune remarque

Treasurer : Alphonse Radermecker

10/08/2012.

International Association of Paper Historians

Internationale Arbeitsgemeinsinchaft der Papierhistoriker

Association Internationale des historiens du papier

	Budget 2012 (in Euro)	Budget 2012 (FCH)
Income		
Membership fees	**7.000,00**	**8.524,60**
Registration Congress Basel	**11.126,00**	**13.549,24**
Sales of books	**1.000,00**	**1.217,80**
subside	**832,63**	**1.013,98**
Bank Interests	**100,00**	**121,78**
Total	**20.058,63**	**24.427,40**
		0,00
Expenses:		**0,00**
Bank charges	**200,00**	**243,56**
Computer service	**500,00**	**608,90**
Web-Side (Tele2)	**240,00**	**292,27**
Congress Basel	**13.300,00**	**16.196,74**
Paper History (2012-1)	**566,00**	**689,27**
Paper History (2012-2)	**566,00**	**689,27**
Lenninghaus	**1.000,00**	**1.217,80**
Storage and Transportation	**1.000,00**	**1.217,80**
Postage	**1.800,00**	**2.192,04**
Printed matters (invoice)	**0,00**	**0,00**
Administration expenses	**880,00**	**1.071,66**
Total	**20.052,00**	**24.419,33**
Difference:	**6,63**	8,07

200 IPH members x35 euros

1 Euro = 1,2178 CHF valeur au 31/12/2011

1CHF = 0,82116 Euro

International Association of Paper Historians

Internationale Arbeitsgemeinsinchaft der Papierhistoriker

Association Internationale des historiens du papier

	Budget 2013 (in Euro)	Budget 2013 (FCH)
Income		
Membership fees	**2.500,00**	**3.044,50**
		0,00
Sales of books	**2.500,00**	**3.044,50**
subside		**0,00**
Bank Interests	**100,00**	**121,78**
Total	**5.100,00**	**6.210,78**
		0,00
Expenses:		**0,00**
Bank charges	**200,00**	**243,56**
Computer service	**0,00**	**0,00**
Web-Side (Tele2)	**240,00**	**292,27**
Congress book Basel	**3.500,00**	**4.262,30**
Paper History (2013-1)	**600,00**	**730,68**
Paper History (2013-2)	**600,00**	**730,68**
Intermills Malmedy	**500,00**	**608,90**
Storage and Transportation	**300,00**	**365,34**
Postage	**1.500,00**	**1.826,70**
Printed matters (invoice)	**0,00**	**0,00**
Administration expenses	**700,00**	**852,46**
Total	**8.140,00**	**9.912,89**
Difference:	**3040** (negatif)	3.702,11

1 Euro = 1,2178 CHF valeur au 31/12/2011
1CHF = 0,82116 Euro

Paper Industry and Consumption in the last Twenty Years

Sabine Schachtner,
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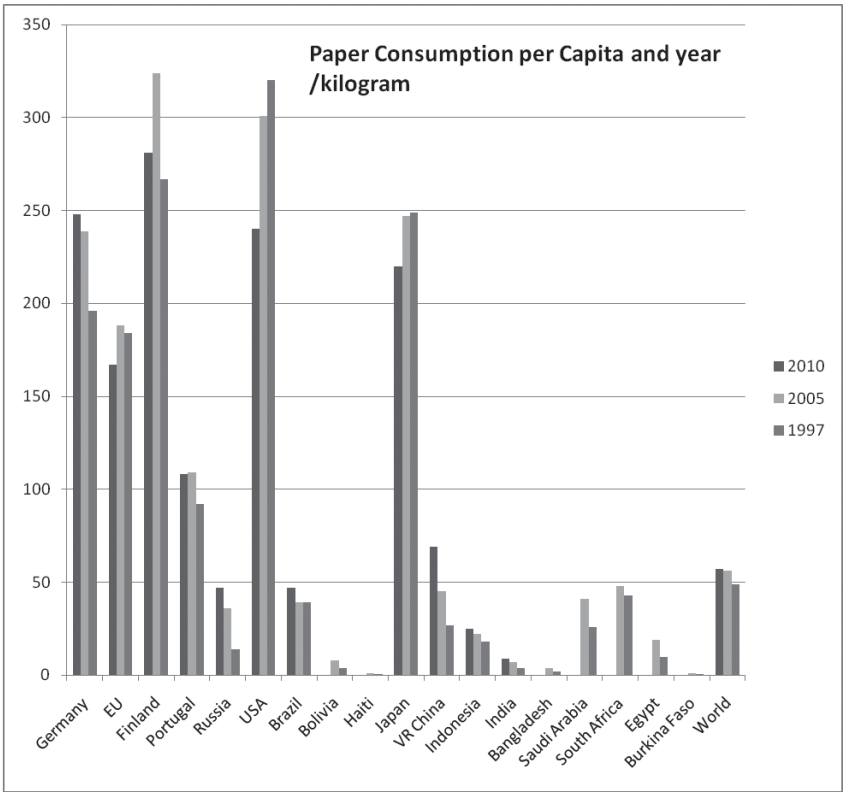
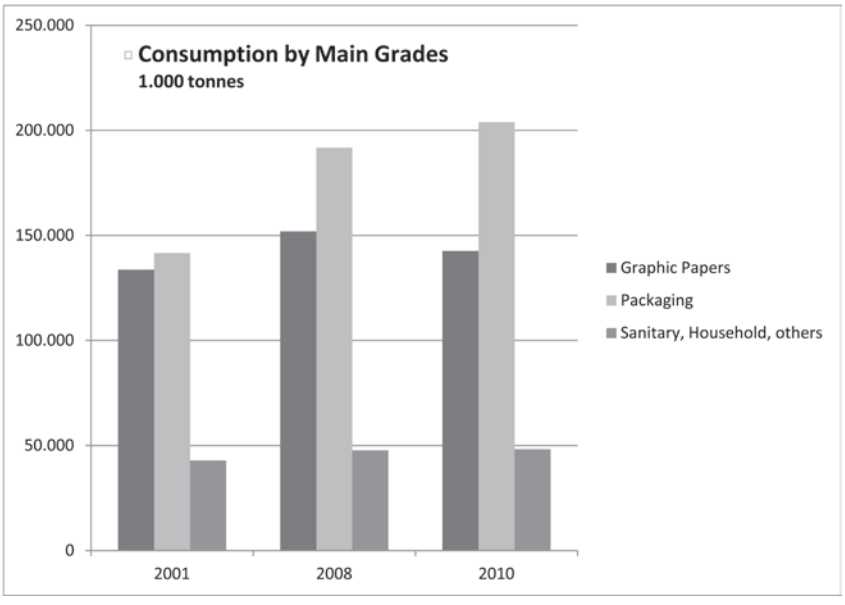


This article interprets statistical data to describe the situation of the paper industry in the globalized world of today. Many of the global economy developments and facts that every newspaper reader has learned about in recent years can be seen in detail in the paper industry.

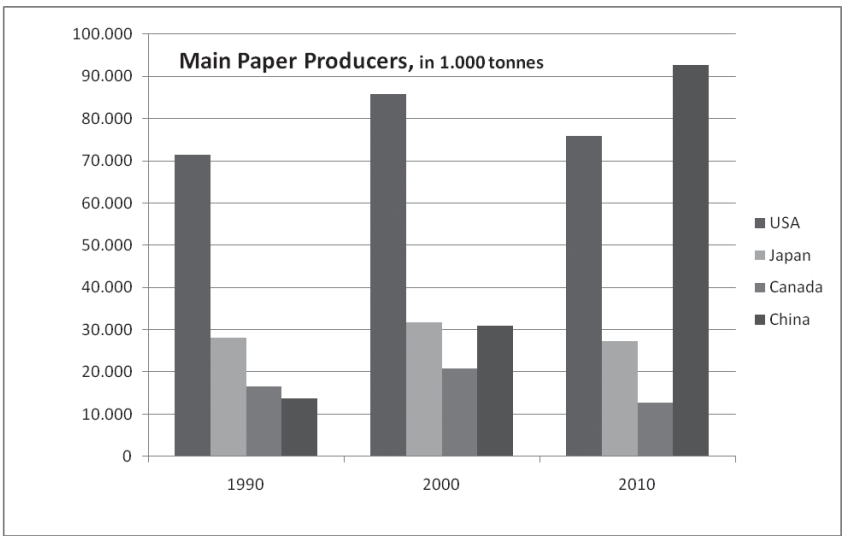
Since the late 1990s, the USA are no longer the top paper consumer country in the world. Nowadays, the consumption per capita is highest in Luxembourg (2010: 474 kilograms), Belgium (330 kilograms), and Finland (281 kilograms). In the USA consumption per capita was 240 kilograms in 2010. Consumption in Japan and in the entire European Union decreased as well; the Romanians have the lowest consumption in the EU (31 kilograms).

The figures show that paper consumption increases in emerging markets, e.g. in China, India, Indonesia, and Brazil. But there are still countries in which the consumption per capita is as low as it used to be in developed countries in the first half of the 19th century.

In the new millennium, the largest increase of paper consumption can be observed in packaging although there was a decrease in the USA and Europe due to the economic crisis 2008/2009. A further increase has been predicted. The same applies to sanitary and household papers. Ken Waghorne from RISI, a paper consulting company, states: „Tissue and Packaging become the Star Performers for the Global Paper Industry." *(B.Taylor 2012, p.1)* The main reason for this increase is the worldwide growth of the middle classes.



On the contrary graphic papers have been losing ground in recent years due to digitalization processes. The biggest loser is newsprint: Between 2008 and 2010 there was a decrease of 12%. A further decrease has been predicted, in particular in the USA, while newsprint markets in Asia are still emerging with a predicted increase of 4% between 2011 and 2013. A development similar to that in the USA - electronic devices substitute paper - is expected for



Asia as well though, only some years later. *(B.Taylor 2012, p.2)*

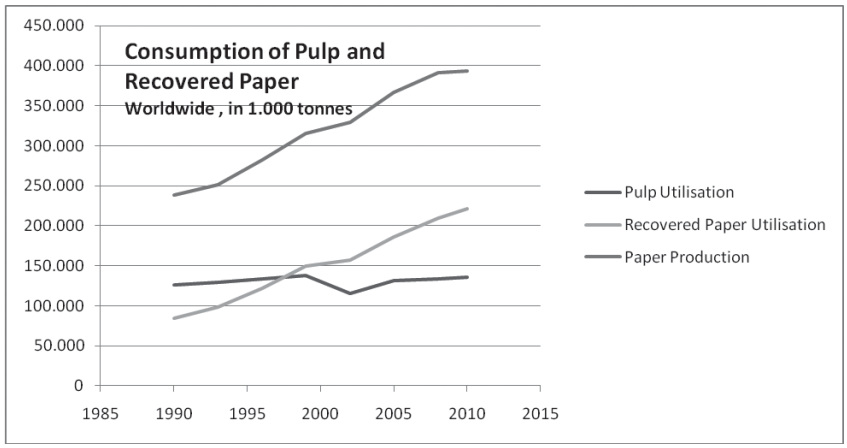
Today's largest global paper producers are more or less the same as 20 years ago, only the ranking within the group has changed.

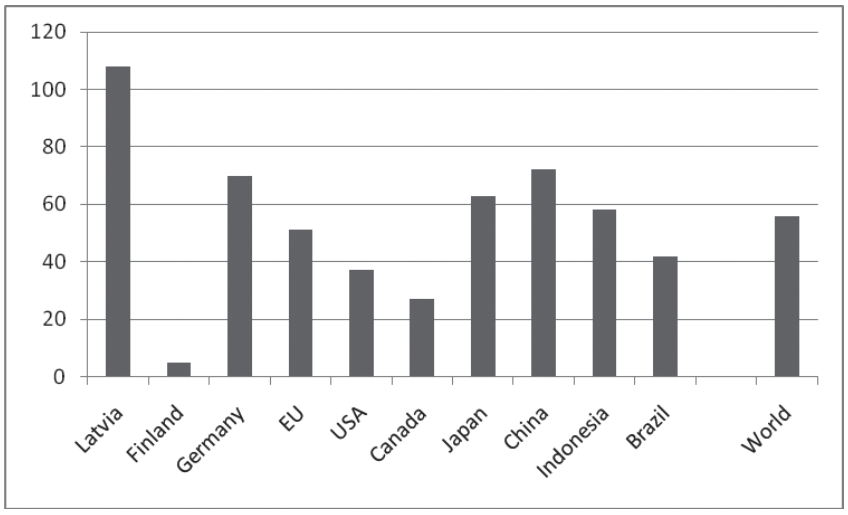
In 1990, the United States were the largest producer by far, followed by Japan and Canada with a large distance.

The ranking was nearly the same in 2000, with China growing, having overtaken Canada. The tonnage had grown in all these countries.

In 2010, China has become the biggest producer in the world. The growth since 1990 was enormous – in 2010 the tonnage was 6.7 times larger than in 1990. The USA produced less than twenty years ago, the same applies to Japan and Canada. One producer has been omitted in the charts for 2010: Germany – 1990 and 2000 on the fifth position in the world – has overtaken Canada, taking position four.

While paper production grew nearly steadily, pulp consumption is approximately on the same level as it was twenty years ago (1990: 126 million tonnes, 2010: 136 million tonnes). The use of recovered paper has increased.





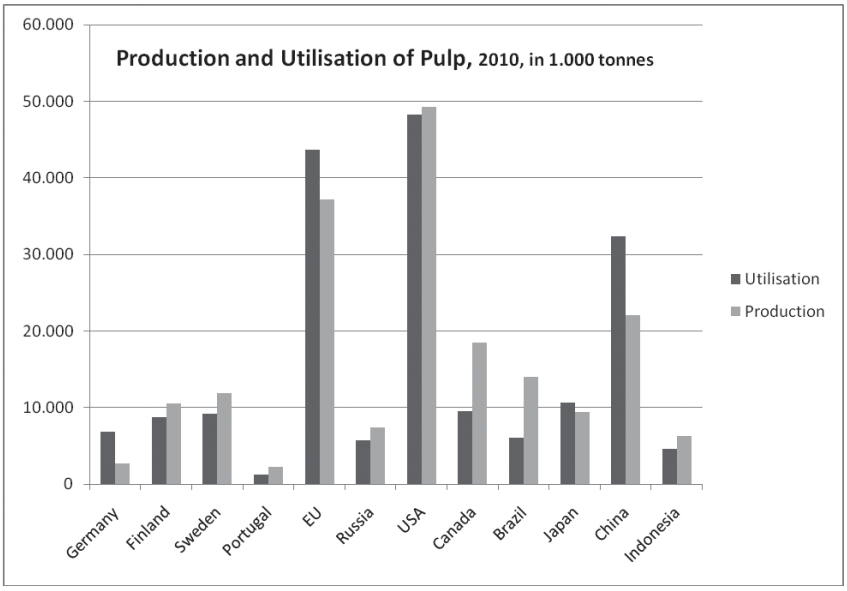
Recovered Paper Utilisation, in % of paper production

Canada, the USA, and Finland in particular have low recycling rates. In the economy of all these countries, forestry plays an important role.

One might expect that in the emerging markets, the recycling rate would be high in order to save resources. But at least some of them – such as Indonesia and Brazil – have important pulp production sites – a fact that limits the growth of the recycling rate.

China as the world largest paper producer has to deal with difficult natural conditions for this industry as it is sparsely wooded. This is why the Chinese paper industry is based on chemo-mechanical pulp which has a higher rate of yield than chemical pulp. Energy-efficient methods are used to produce this pulp, and fast growing species are chosen for the plantations. Recently, China's paper technicians have been trying to increase the ageing resistance of papers produced with this pulp, e.g. by choosing a strict alkaline production

process. Pulp production and paper production sites are usually built side by side which makes drying the pulp unnecessary. *(Wochenblatt für Papierfabrikation 2012/3, S.161 ff)*



Countries rich in non tropical forests often became important pulp and paper producers in the second half of the 19th century. For this reason, their surplus amount of pulp is usually small – Sweden, Finland, Russia, the United States, Canada are examples. Tropical rain forests are not suitable for pulp production – there are too many different species, and the wood is too hard. So it was only in the last 10 to 20 years that pulp and also paper production came to some of the countries with tropical forests, usually based on plantations of fast growing species like eucalyptus or acacia. This applies to Brazil or Indonesia.

One can say by importing pulp, a country exports the ecological problems of pulp production such as logging and the emissions of the pulp producing sites.

These few statistics show that the changes in paper industry were really huge within the last twenty years. They are caused by the global economic development and by digitalization, showing the same emerging markets as in other industries.

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Living paper production among the lanten of northern laos

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Papermaking among East-Asian ethnic groups

On our first trip to northern Thailand and Laos (2004) we witnessed the living tradition of production and use of handmade paper in some Yao and Lanten villages. Believing that the region might offer an interesting field for the study of papermaking by specific ethnic groups such as the Yao, we made a second trip to this area towards the end of 2006. Minorities there were often compelled to withdraw to hilly, less fertile, soils due to pressure from the more extant Han-Chinese populations. Relationships between the Yao and the Chinese cover the whole spectrum from open hostility to almost full integration.

In recent decades, research on Asian papermaking has made progress thanks to the efforts by some academics and enthusiastic amateurs, who have recorded techniques which are gradually dying out. In East Asia one can observe a true ‘archipelago’ of papermaking techniques, with factors such as plant-selection, pulp-production, sheet-formation, etc., being combined in every possible permutation. Thus one can trace the origin of paper by analyzing its manner of production from an ethno-technical point of view. We consider our contribution as a part of a wider, although unofficial, Research Program that others [1] started years ago to obtain a clearer view, not only of papermaking techniques but also of some inter-ethnic dynamics. Selective technical

borrowings (but also rejected techniques) could, perhaps, be better understood through additional observations from the papermaking field.

The Yao ethnic group

The ethnic group known by the generic name 'Yao' has dozens of subgroups. Several waves of Yao migration took place in the 13th and 14th centuries AD towards Northern Vietnam, Yunnan and later further southwest. A realistic estimate of their numbers in contemporary China is 6 million, while in Laos, a Yao branch (called Iu Mien) amount to 20,000 and the Lanten to 5000. In Thailand there are about 45,000 Yao (called 'Mien' there). Traditionally, the Yao tend to establish their small villages on wooded slopes, close to small streams. They produce dry rice using the slash and burn method, while also cultivating maize and vegetables and breeding domestic animals. They are good hunters and traders and are traditionally skilled in cultivating opium poppies. The Yao tend to have little contact with outsiders. In the turbulent decades of the 1960s and 70s, the Yao remained generally apart from the politics of the country in which they were living.

The Yao first appear in historical records of the Tang dynasty between the 9th and 11th centuries and are linked with an important document called the 'Cia Sen Pong', or Yao Charter, a paper scroll supposedly granted by the Chinese Emperor as proof of their rights to settle in hilly landscapes and remain exempt from all taxation and levies. It was, and still is, an efficient weapon for the survival of each Yao group. [2]

It is highly probable that the Yao adopted some aspects of Taoism around the 14th century, combining them with older traditions of their own. Ancestral worship is extremely strong within the general framework of a belief in the continual interaction between this world and the Beyond. Their religion helped them to preserve their special identity in the difficult years of dispersion and wandering. Centuries ago they started using Chinese characters to write the numerous ritual texts needed for their countless ceremonies, the most important being the aforementioned Cia Sen Pong, which was copied again and again by Yao priests and calligraphers to accompany every group in its migrations. This could be the initial act of their written culture, quite rare among South Asian minorities. Closely related to the development of this culture has been their traditional occupation with papermaking.

Lanten views of Papermaking: narratives.

The Lanten, or Lanten Mun, or Lao Huay (River Lao) are a Yao subgroup who immigrated relatively recently to Laos, mainly from Vietnam. They believe that spirits are everywhere: there are family spirits, spirits of the sky, the forest and the trees, and the ubiquitous house spirit. Communal religious life is extremely important. Scheduled feasts are frequent as are others at weddings, funerals etc., where their handmade Taoist books are used.

Our field work in northern Laos, near the Chinese border, took place among Lanten Sha (speaking the Lanten Moon dialect) who still make paper. We visited almost half of the approximately 15 villages not far from the small town of Luang Namtha, conducting interviews in four of them. To have the desired comparisons, some visits to nearby Iu-Mien villages were also planned. As observed, the Iu-Mien had generally stopped making handmade paper, although some of them occasionally produce small quantities. Thus, in 2006 it was still possible to see the large frames of the papermaking moulds hanging on the outer walls of their wooden houses.

As we can conclude from their myths and narratives, the Lanten seem to be dominated by a central belief: they consider themselves inferior to the Yao. On a mythical level they usually define themselves as adopted children of the Ancestor. According to several narratives, the two quintessentially female crafts, weaving and papermaking, were taught by the Ancestor only to his Yao daughters, from whom the Lanten stole them. They do admit that in weaving, the Yao remained superior and so have better decorated costumes (which is indeed the case). In terms of paper, however, things are different. They point out that immediately after the theft, the 'spoiled' Yao began to buy paper from the Lanten, although they also continued to make it themselves. It was not clear to us, despite frequent inquiries, whether this was a matter of money: if they had had more, would they have bought paper from elsewhere? Nevertheless, the Lanten believe that the ancestors prefer their own product to be used in ceremonies, which is why they kept up the technique. There are,

of course, other uses for handmade paper: both the Yao and the Lanten do admit that in the recent past a considerable amount of the production was used to wrap opium, but now opium-smoking is banned, so they do not mention this use at all. However, although some of the traditional uses of paper are in decline, others, such as making items for the tourist market (lamps, umbrellas, albums, etc), are on the increase.

In our efforts to collect as many narratives as possible around papermaking, we managed to record a particularly detailed one, in Ban Phinhor village. Once upon a time, in the first human family, a Yao man married a sterile woman and so he decided to adopt a girl. After this adoption, the woman also gave birth to a girl. The adopted girl, a Lanten, was in an inferior position to her 'sister'. Her 'parents' taught papermaking only to their natural child and she, who "her father did not love", had to do all the heavy work. Thus, in the beginning, only the Yao manufactured paper and the Lanten bought it from them for their ceremonies. However, things became worse because the Yao kept raising the price of the paper. This situation forced the Lanten to steal the technique from the Yao, and so the Lanten soon became papermakers par excellence. In other villages, we recorded similar narratives. In Ban Namdee for example, a more concise, though almost identical version was presented by Nag-Sai, a 50- year-old woman, obviously a person of influence in the community. In the village of Ban Soptut, we heard a slightly different version from the chief's wife, Burkham, a strong personality and a papermaker herself. In this tale, the Ancestor had two wives. The Lanten were the children of the older wife and the Yao the children of the younger. Because the Ancestor loved his younger wife more, he obliged the children of the older wife to do all the heavy work. Finally he expelled his first wife, and then her Lanten offspring stole the art of papermaking. Hereafter the story is quite similar. Burkham put more emphasis on the tense relationship between the two subgroups, which, as we were told, is nowadays even greater than in the past.

Despite minor differences, all the stories maintain a common focus, while the number of versions indicates that papermaking is traditionally something central to the life of all Yao subgroups. One can conclude that the Lanten are more linked with paper, which is perhaps considered inferior to weaving, but still important, spiritually and socially, as a major element in their ceremonial life.

Papermaking in the Lanten communities

For several weeks at the beginning of winter, once rice harvesting has come to an end, the small rivers of every Lanten community become the backdrop to delightful scenes of papermaking activity, with women assembling the large moulds on the ground, pouring bamboo pulp onto them, collecting the dry sheets etc. When we visited the area, however, the papermaking period had not yet begun. Thus, a 33-year-old woman named Nan-La and her daughter performed the entire process for us, and offered a complete overview of papermaking in the village. Paper is pronounced 'tei' by the Lanten ('chey' by the Iu Mien in Laos). Of the 81 families of Ban Namdee village, only ten do not make paper, and these were described to us as the 'laziest'. Nan-La produces approximately 100 sheets every year for her family's ceremonial needs, but also for her children's notebooks. Ban Namdee has some tourism, and Nan-La always insists on selling visitors deep blue cloth from her loom rather than paper. Families of shamans and chiefs normally need more paper. Burkham, the aforementioned chief's wife in Ban Subdut village, produces more than 200 sheets a year for her nine-member family, but she said that part of it is sold –or bartered– to other families. Every family seems to need a minimum of 50 sheets a year in normal circumstances.

The raw papermaking material used by the Lanten is bamboo. Previous generations knew how to make mulberry paper (Saa), but today no one has personal experience of this process. In Ban Namdee, we were told that the best bamboo for papermaking is called 'Mai Bong' and in Ban Phinhor village the type of bamboo that is used is called 'Mai Hok'.

Intending to make paper from early December until February or March (the dry season), the Lanten start cutting the bamboo three or four months earlier, usually in September. They use a length of 5 nodes in the middle part of the culm. All the nodes are cut away and the outer part of the culm is scratched with a knife. The bamboo is then cut into strips (cross section about 1x2 cm). As bamboo is abundant

throughout the year, there is no need for storage. To prepare the strips for pulping, they take limestone from the area and heat it to a high temperature to produce a white lime powder. Extended families, or 5-6 smaller ones, work together to produce this powder, which is then sold to other families. Small villages also buy from bigger ones if there is any left over. Each bamboo strip is rubbed with the lime powder, without the use of water. The material is then arranged in vats, in cross layers, and then clean water is poured in (fig. 1). The vats are usually covered with large leaves called 'Bai-Tong-Jing', similar to banana leaves, which are avoided because they rot easily. The vats are checked regularly to ensure that they do not dry out and to remove the bamboo strips before they start to rot. Vats can be rectangular, built of bricks and covered in plaster, or round and made of concrete, with a hollow at the bottom for drainage. Some families use hollowed logs or iron barrels. Around the end of November, the bamboo strips are checked to see if they are ready for pulping, and then arranged in big bamboo baskets or sacks which are placed in a stream and weighed down with stones so that they are not carried away. After a month, the bamboo strips, cleaned of lime and impurities, are removed and left to dry in the sun.

The next step is to beat the bamboo strips with some water in big wooden mortars -also used for grinding seeds- made of big, hollowed-out logs (about 30 cm in diameter, 5 cm thick and 40 cm high). The pestles are thick, straight logs (diameter approx. 7 cm, with a narrower part where it is held). The beating time is about 20 to 30 minutes. No great force is needed,

Fig. 1. Vats in Ban Soptut village.

Fig. 2. Beating the bamboo.

because the bamboo is already soft (fig. 2). A quantity of pulp is then transferred to a small bucket and diluted with about 95-98% water. Now it is time to add the sizing material to the pulp.

The plant used for sizing is in plentiful supply. Its Lanten name is 'Te Zeiw', meaning 'that which grows in the village' or 'Ziew Muey' ('that which grows in the woods'). In Ban Soptut village, it is called 'Nang Tieng' ('Big leaf' in the Lao language) or 'Kua Mua' (Kua means 'wire' in Lanten) due to its spiny -non edible- fruit. In Ban Phinhor, its name is 'Ziew Muey' or 'Nan Tieng' and also Kua Mua. It is a shrub with yellowish flowers and round fruits. From its leaf shape and the description of its fruit, we conclude that the plant is probably Hibiscus mutabilis, a member of the Malvaceae family

Fig. 3. Sizing preparation.

Fig. 4. Assembling the parts of a mould.

(obviously the equivalent of the Japanese tororo-aoi). Branches of this plant, about 3 cm in diameter, are cut to a length of approximately one metre, the outer bark is removed with a knife, and the remains are crushed, soaked in a bucket with clear water and rubbed by hand (fig. 3). The water becomes gummy (high viscosity). Part of this liquid is poured little by little onto the paper pulp and the consistency is checked with the fingers. When asked why they use it, the answer was that, otherwise it would not be possible to remove the dried paper from the mould.

Lanten papermaking moulds are very big. They consist of a bamboo frame (or less often a wooden one) and a cloth cover. Dimensions vary from 1.20 to 1.40 m. in width and 1.50 to 1.80 m in length. When not in use, they are hung (without the cloth cover) on the outer walls of their storage houses.

The mould cover consists of three or four pieces of self-made cotton cloth, sewn together. The cloth is turned and sewn at the edges, so that thin bamboo sticks can be inserted. This means that the cloth is regular in shape and can easily be placed on the frame and fastened to it. For fastening they use narrow strings of bamboo with a pointed end that can pass through the thick cloth (fig. 4, 5a, 5b). At first, the fastening is loose, so that the cover can be placed approximately on the frame. Three or four fastenings on the short sides and four to six on the long side are usually enough. The cloth cover is then dampened and stretched over the frame. The Lanten do not hesitate to patch any holes in the cloth and these repairs are often visible on the finished surface of paper.

To produce a sheet of paper the mould is placed horizontally on the ground. With a half-cut gourd,

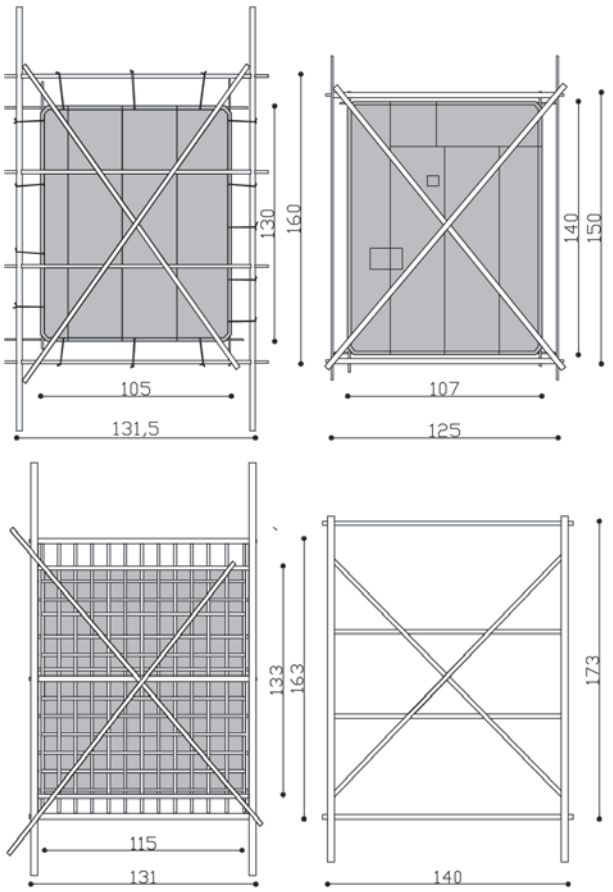

Fig. 5a, 5b. Mould types (back side).

the thin pulp is poured carefully onto the wet cloth, little by little, until the whole area is covered almost uniformly, right up to the edges (fig. 6). Any pieces of pulp that are not well beaten are immediately removed by hand. In the meantime, the diluted pulp is checked and if necessary, more pulp or sizing material is added. It takes approximately 10 minutes to finish layering the pulp and then one side of the mould is raised and propped up at an angle to the ground facing the sun, with a bamboo stick cut into a Y-shape at the end to support it.

Fig. 6. Pouring the pulp on the mould in Ban Nam Leu village.

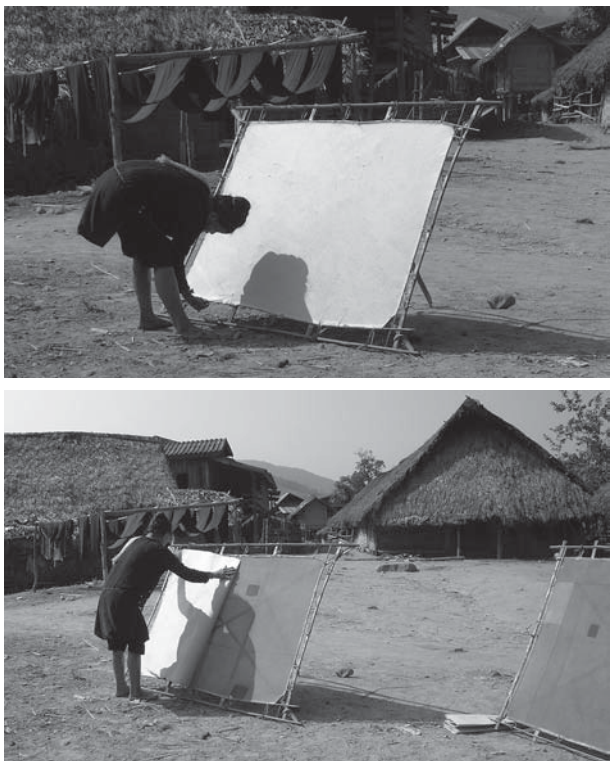

Fig.7a, 7b. Removing and folding paper.

Drying takes many hours and if there is no rush, moulds with the wet sheet on them are kept outside until the next day. When the sheet is totally dry it is ready to be removed from the cloth. The woman-papermaker lifts it carefully, with her fingers or with a pointed tool (usually her hair pin ornament) starting at the corners, and immediately folds the sheet (fig. 7a, 7b). Now the paper is ready for storage.

In Yao and Lanten communities, paper is mainly used for ceremonial purposes, which means that is made to be burned in different forms: as sealed 'paper money' or as unsealed pieces cut into 'coins', in scheduled ceremonies or special events such as illness or death. Depending on the importance of the ceremony, paper money is colored (red and yellow for higher and green and natural colors for lower denominations). Paper also serves as decoration for house altars. It is remarkable that in no Lanten village did we meet anyone who could produce texts in Chinese characters. In an Iu-Mien village about 50 km northwest of Luang Namtha, near the Chinese border, an old 'Sibmien' (priest) knew how to write, and performed his art for us. He said that nowadays paper is brought from China, as is ink, which in the past was also self-made from rice stems and used engine oil. This aged man owned several handwritten books that describe rituals and give instructions for ceremonies. He had started to teach the art of copying sacred texts to his young son, but the latter, growing up, gave up. Generally Yao youth tend to abandon traditional crafts. In our opinion, this change in attitude has to do not only with nearby Thailand and the temptations it offers, as a more liberal society, but also with the special links to traditional crafts of each ethnic group. As indicated, the Lanten had always had stronger links with papermaking, which is something important for their identity and, besides, they live in Laos, a country which for the moment offers fewer opportunities than Thailand or China. However, as socioeconomic pressure increases, cultural factors tend to fade and so the Lanten will also abandon papermaking sooner or later.

As a final note...

As already pointed out, preliminary studies on papermaking techniques among several Southeast Asia ethnic groups, including this one, record their variety and particular features. One can consider the method practised by the Lanten, of pouring the pulp little by little onto a mould, to be the most primitive and historically the oldest. Where does it come from? Can we trace its spread from Yunnan to other areas, and finally gain a picture of where it formerly existed? Although similar surveys have already begun, enormous effort is required in the future. For our part, we look forward to returning soon with some new suggestions within a wider theoretical approach. [3]

References

[1]. See also the field studies of Elaine and Donna Koretsky in several IPH issues as well as their: *The Goldbeaters of Mandalay* - Carriage House Press 1991.

[2]. More on Yao and Lanten ethnography in: Jacque Lemoine, 'Yao Religion and Society' in: John McKinnon-Wanat Bhruksasri (ed.), Highlanders of Thailand - Oxford University Press, New York 1983 / Jacques Lemoine, Yao ceremonial paintings - White Lotus, Bangkok 1982 / Jess Pourret, The Yao: the Mien and Mun Yao in China, North Vietnam, Laos and Thailand - River Books, Bangkok 2002. / Lucia Obi-Shing Müller-Götzfried Xaver, Botschaften an die Götter. Religiöse Handschriften der Yao - Harrassowitz Wiesbaden, 1999.

[3]. A quite different version of this study was presented in German at the DAP meeting of 2007. Here we focused more on the Lanten narratives and techniques, leaving some wider considerations for future elaboration.

Paper and other writing materials in non-specialized museums: Museum of a Book of the Tomsk State University Scientific Library

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"Returning to the things" and museums of paper history

The phenomenon that is known as "returning to the things" is characteristic for History and Humanities in general at the present time [1]. Practically it means increase of attention to the material historical sources, including museum exhibits.

"Returning to the things" generated keen interest to museums, where different aspects of the history of material culture are presented. Russian specialists pointed out the increasing role of social history against scientific history. Among other things, it means great popularity of memorial places; some of them become new museums. So, material historical sources are of great importance for social-oriented history; demand for specialists in material historical sources will increase [2]. Museums of paper history of different countries present a part of material culture history; there are not only samples of historical paper in their expositions, but also reconstructions of papermaking of ancient times. There are a number of specialized paper-history museums in different European countries (Germany, Great Britain, France, Switzerland, Italy, etc.); some of them have their own web-sites: Heron Corn Mill in Great Britain (http://www.heronmill.org/), Basel Paper Mill in Switzerland (http://www.papiermuseum.ch/en/the-museum/) and others.

From the other hand, there are also museums of culture, book history, etc., which subject isn't paper itself. However, it is impossible to understand book history or history of engraving without knowing some details from paper history. So, the question is as follows: what kind of information from paper history is necessary for museums, which do not specialize in paper history?

The answer consists of several parts: what exactly to exhibit, in what ways and how many? It seems that the answer, among other things, is connected with the purposes of the museum or organization affiliated with the museum. Let's consider some ways of possible solution taking the Museum of a Book – a subdivision of Rare Books and Manuscripts Department of Tomsk State University Library (Tomsk, Russia), as an example.

Tomsk State University. Main building.

Museum of a Book in a classical University

Tomsk State University Scientific Library is the oldest university library in Siberia; it was founded in 1880. Rare books are kept in the Rare Books and Manuscripts Department (ORKP) [3]; the stock of which is now about 114.000 items from XII to XXI centuries. There are more than 20 private libraries in the stock of the Department; libraries of counts Stroganovs, prince Golitsin, poet Zhukovskii are among them. Also there are about 20 chronological and thematic collections (Slavonic, European and Eastern manuscripts, incunabula, Russian and European editions of XVI-XX centuries and so on). Different kinds of paper are presented in all those collections, but there isn't a special collection of hand-made paper in the Department.

Most rare and unique items are represented in the exhibition of the Museum of a Book (102 exhibits in show-glasses and about 1500 books on the shelves). The exhibition is located in the old building of the Library, which was built in 1914, in one room of 100 m2. There are about 30 show-glasses in the Museum.

The Museum of a Book, as part of the University, has the purposes connected with the aim of the University:

- support of educational and research processes;

Tomsk State University Scientific Library

- participation in presentation of the university for visitors and creation of corporate identity inside and outside of the university.

Classical university has some characteristic features: universal character of education, departments with different specializations and different educational demands. For example, students of Physical and Mathematical departments visit the Museum with informational purpose only; specialists in Humanities (history, philology, library science, publishing industry and so on), on the contrary, must learn to work with original historical sources, not imitations. It is necessary to note, that there isn't any Department in the University educating specialists in paper history, nobody of scientists study this subject on purpose.

How to introduce paper in the exhibition

There are different ways of introducing paper and other writing materials in the frames of museum exhibition:

- to place in a show-case;
- to make a reconstruction (for example, reconstruction of a paper mill);
- to make an interactive exhibition (for example, reconstruction of paper-making process) – it is not necessary to have original tools;
- to create a digital presentation of the process, tools, and writing materials themselves.

The choice of ways is closely connected with the purpose of introduction and with purposes of a museum in general. So, the way of introduction depends (partly) on the type of a museum. For example, paper history museums frequently use different interactive models.

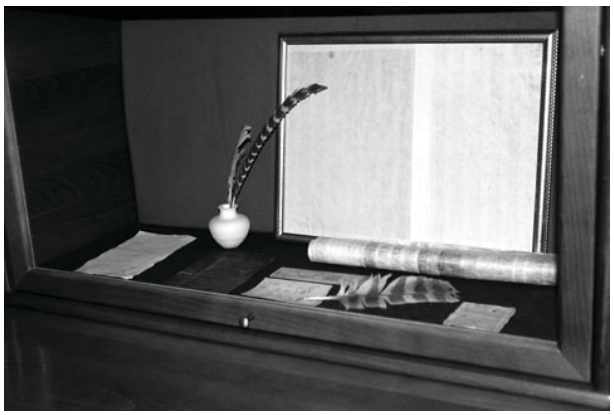
One of the show-glasses in the Museum is devoted to different writing materials: vellum, paper, papyrus, silk, etc.; paper is among them. There is also a small collection of hand-made paper samples, which includes French hand-made paper of XVIII century, one collection with uncut sheets from Russian edition of XIX century, modern hand-made paper from Germany and hand-made paper produced by employees of the Department.

Due to the specific character of the Museum, small size of the room and other characteristic features the following ways of acquaintance of visitors with paper history are used in the Museum of a Book:

- display of the paper in a separate show-case together with other writing materials;
- demonstration of the hand-made paper samples collection. Students can take them and study by viewing against the light;
- demonstration of illustrations showing the work cycle of hand papermaking; pictures from d`Alamber's Encyclopedia (it's also in the exhibition) can be used;
- special attention is paid not only to the way of printing or decoration, but also to writing material or printing during the Museum tour;

Museum of a Book, left side. Tomsk State University Scientific Library

Museum of a Book, right side. Tomsk State University Scientific Library



Show glass with materials for writing. Museum of a Book. Tomsk State University Scientific Library

- studying some textbooks about watermarks and papermaking process, discussion of methods of dating manuscripts in accordance with the watermark data.

Those methods are used in a varying degree depending on the situation. The following methods of work at the exhibition are usually used:

- general excursion. Minimal attention is paid to the paper history; usually it's just an indication of the corresponding show-glass and enumeration of its exhibits;
- in-depth excursions on separate sections of the exhibition. They are usually conducted upon requests from the professors of humanities departments of the University with the aim of advanced familiarization of students with certain theme. The show-glass containing writing materials is discussed in detail; samples of paper are shown to the students, they also can test samples with hands. The subjects of in-depth excursions are, for example: "Slavonic and East-European Manuscripts", "Russian Editions of XVIII-XIX centuries" and so on;
- seminars with use of the Museum materials. They are usually conducted upon requests from professors and together with them. Some documents and textbooks from the main stock of the Department are added to the exhibition in this case. Familiarization with reference literature is provided as well. Students not only study some paper samples, but also determine document's date with the help of reference books. Exemplary themes of the seminars are as follows: "Paleographical and codicological description of Slavonic manuscripts", "Early-printed Russian editions", etc.;
- individual work on diploma paper or doctoral thesis. It is assumed, that a student or a postgraduate has corresponding knowledge and practice for working with manuscripts (including methods of watermark testing); so, only discussions of a particular document are necessary. Sometimes this kind of consultation becomes a long-time joint work.

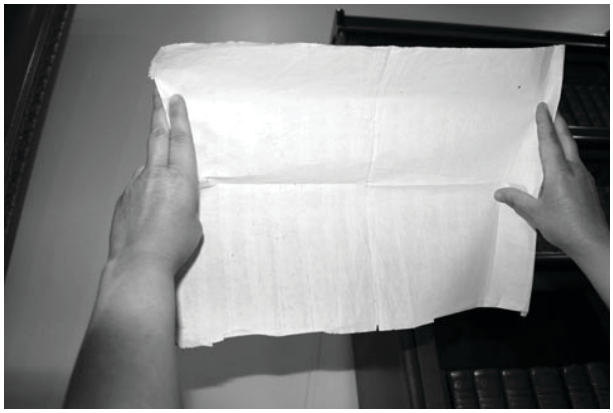
General excursions are most frequent events in the Museum (about 120-130 per year); it allows informing a lot of people about methods of hand papermaking. In-depth excursions and seminars take place about 5-6 times a year; information for listeners is broader in this case, but the number of listeners is limited by the size of a student group. Individual work depends on the subjects of a diploma paper or doctoral thesis and is difficult to predict, because individual consultations are necessary not only for the University students and professors, but also for employees of other universities and institutions.

As for the digital presentation of the Museum, it's under construction now [4].

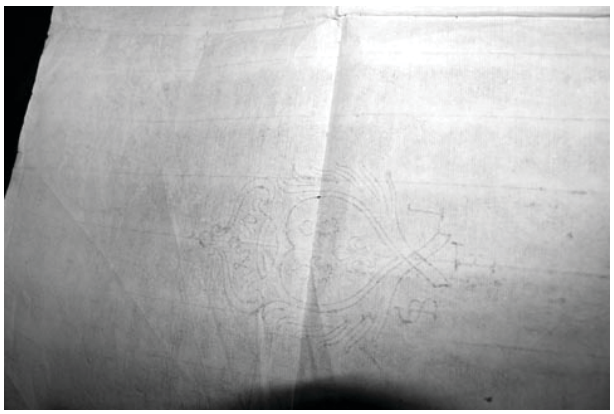
Conclusion

So, there are some possibilities for introducing paper-history in non-specialized museums. Limitations for this introducing come from the following conditions:

Manuscripts and materials for writing. Museum of a Book, Tomsk State University Scientific Library



Demonstration of an exhibit from collection of hand-made paper samples



Watermark on exhibit from collection of hand-made paper samples

absence of sufficient space for exhibiting paper samples and interactive models; logic of exposition: it's devoted to the book history and is built in chronological order; presentation purposes of the museum are also a limiting factor: it's impossible to present a lot of specialized exhibits and literature to the detriment of exhibits connected with book history or showing the history of Siberia, Tomsk and the University.

There are also advantages of presenting paper in non-specialized museums; thus, in the Museum of a Book one can see paper history in the context of book history. So, visitors get acquainted not only with part of the "history of the things" (paper history or history of hand papermaking), but also with application of paper in a manuscript or edition.

Notes

[1] Domanska E. The Material Presence of the Past // History and Theory. 2006. Vol.45. N3. P.337-348.

[2] Malovichko S.I., Rumyantseva M.F. Veshestvennii istochniki v structure sovremennogo istoricheskogo znaniya // Arkheographiya muzeinogo predmeta. Materiali mezhdunarodnoi konferentsii. Moscow, 16-17 marta 2012. M., RGGU. 2012. P.111.

[3] More details about history of the Department see: Kolosova G.I. Muzei knigi Nauchnoi Biblioteki Tomskogo gosudarstvennogo universiteta: istoriya, sovremennoe sostoyaniye, perspektivi // Muzeinie fondi I ekspozitsii v nauchno-obrazovatelnom protsesse. Tomsk, 2002. P. 176-184.

[4] Short information about ORKP and the Museum (in Russian) see at: http://www.lib.tsu.ru/index_about.php?id=811.

The Development of Inverform and associated "Spin Offs"

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A short Description of the Inverform Process is presented followed by details of its development, including the various "Spin Offs" and their application

Introduction

The Inverform/Twin wire process was developed at St. Anne's Board Mill (a subsidiary of the Imperial Tobacco Group) located in the district of Brislington, Bristol. St. Anne's Board Mill produced a wide range of multi ply paper board such as packaging boards, heavy duty packaging boards, gypsum liner board, chip board and a range of speciality boards. The production forming method was using cylinder mould formers. The annual output of the mill was approximately 200,000 tonnes per annum using six machines. The main period of Inverform development was in the early fifties to the late fifties.

St. Anne's Board Mill Company Reputation for R. & D.

St. Anne's Board Mill had an international reputation regarding research and development. The Company had always been associated with development work and in the late 1930's studies were carried out centred around how to improve cylinder moulds. After the Second World War the R. & D. department was established and many important developments took place. For example, studies associated with the examination of mill processes which included a study of overseas developments particularly in the USA and Scandinavia. Specific work covered studies of the dimensional stability of multi layered products and the operation of clothed multi cylinder driers.

Inverform

In 1950 it was decided to start a research development project, the object of which was to design a new method of forming high quality multiply box board at speeds in excess of those obtainable on cylinder mould machines. Following a literature search it was decided to pay visits to mills and machinery manufactures in North America, Scandinavia

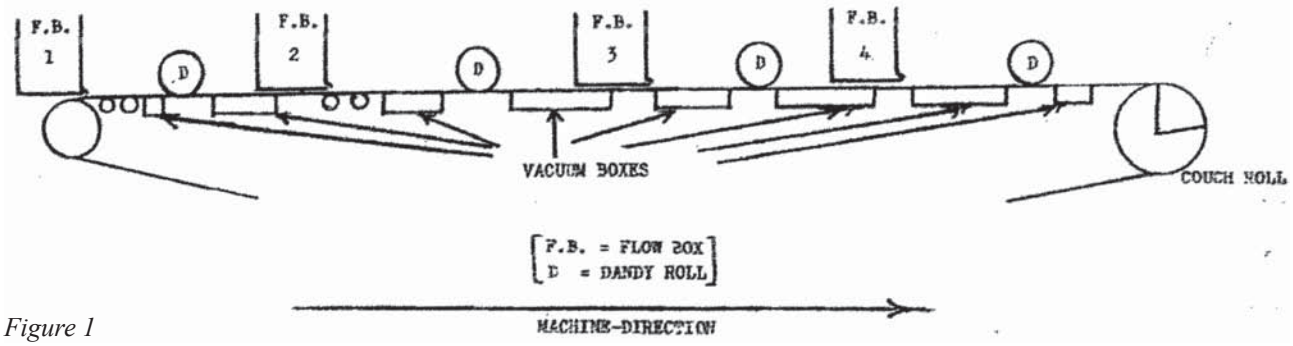

Figure 1

and Germany. The results of the survey were that although developments had taken place relating to cylinder mould machines, there were problems and limitations. What had been examined resulted in studying the use of subsidiary head boxes (there had been considerable commercial experience in the USA producing liner board from Kraft pulps). As a consequence we decided to construct a Fourdrinier forming section and investigate the further application of subsidiary head boxes for the production of multi ply folding box board.

Figure 1 shows a drawing of the general arrangement of the pilot plant constructed for this purpose. It had a trim of just under a meter and initially a drive which gave it a maximum speed in the order of 200-250 m/min. Initial trials were carried out in early 1951, the pilot machine being arranged as shown in Figure 1. The method of operation for these experiments was as follows. The stock was applied to the machine wire through a first flow box and after a given amount of drainage had taken place a further layer was applied using a subsidiary head box. This layer was then drained through the first ply using only vacuum boxes draining in the downward direction. After the required amount of water had been removed a third layer was applied followed by a fourth layer. Samples were removed from the machine and examined in the laboratory.

Using the layout just described, early work studied:

1. Methods of delivering the fibrous suspension to the wire, including flow box design.
2. Determining at which point to apply the second and subsequent layers.
3. A determination of the degree of drainage required before another ply could be applied.
4. Methods of water removal including the design of vacuum boxes and arrangement of the vacuum boxes.

Regarding 4. above a study of vacuum boxes in operation on a commercial Fourdrinier was carried out using high speed photography and from this work a dynamic drainage tester was constructed. Our main problem was one of filtration.

Results of this study gave indication that in a given case if one vacuum box was required for the first ply, then 3 would be required for the second ply, 9 for the third ply and, believe or not, 25 plus for the fourth ply. This fact alone caused this method of producing a multi ply sheet to be impractical for various reasons such as power requirements, the large number of vacuum boxes and wire life.

We were thus faced with the immediate problem of how to drain without taking a large volume of water downwards through the previous plies.

At St. Anne's there had been much experience of operating paper machine wires at the baby press section of a multi ply board machine. The water extracted by the press rolls passing easily through the wire cloth. We then decided to install a top wire at the fourth ply (the ply with the largest drainage problem on the experimental machine). Figure 2 shows the basic arrangement when the top wire was placed on the fourth ply which had been laid on the previous three

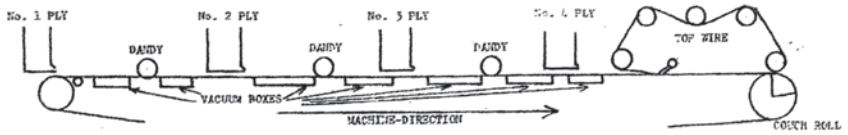

Figure 2

[A]

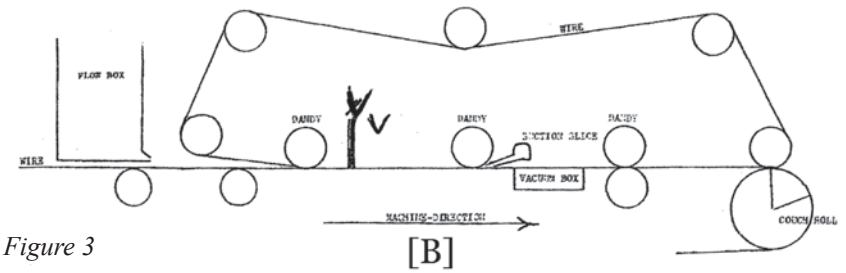

Figure 3

[B]

plies; much of the water associated with it would flow upwards through the top wire where it could be collected and removed, the operation taking place without disturbing the fibrous web.

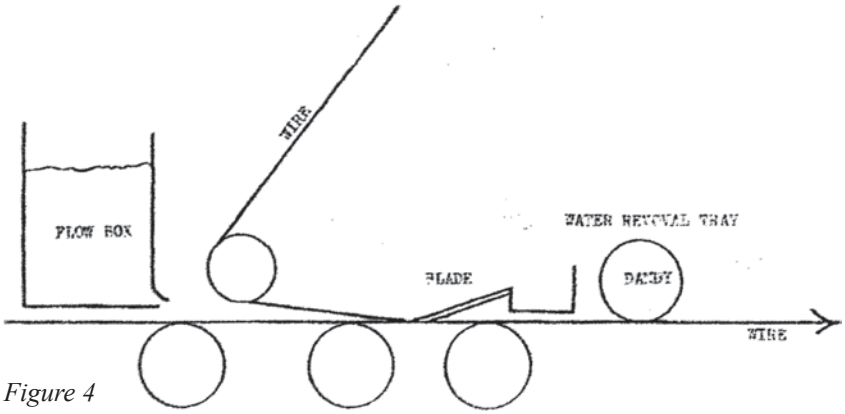

Figure 4

The first trials with this arrangement indicated that there were good possibilities with this operation, and during these preliminary trials it was found that varying the pressure and position of the board **V** shown in Figure 3 not only was water easily removed, but we could also control not only the quantity being removed, but at the same time have a control over the formation of the web. Other work led to the development of units shown in Figures 4 and 5, which we called the auto slice. The water brought to the surface of the top wire followed the blade of the auto slice and was removed from the machine by a collecting tray. This arrangement was indeed simple and many trials were carried out at speeds in the order of 200+m/min. There had been considerable reduction in the degree of vacuum required in this fourth section. At lower speeds the water that had to run up the auto slice required assistance and it developed eventually into the use of a suctionised slice. Figure 6 shows the complete top wire assembly installed in the fourth section of the machine. It was decided that we would call this method INVERFORM. With this arrangement many trials were carried out using:

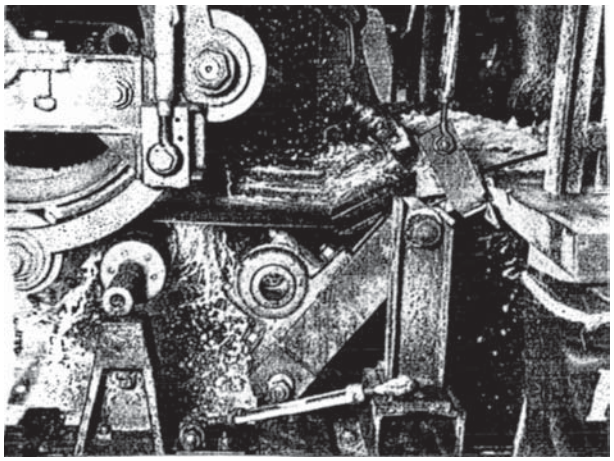

Figure 5

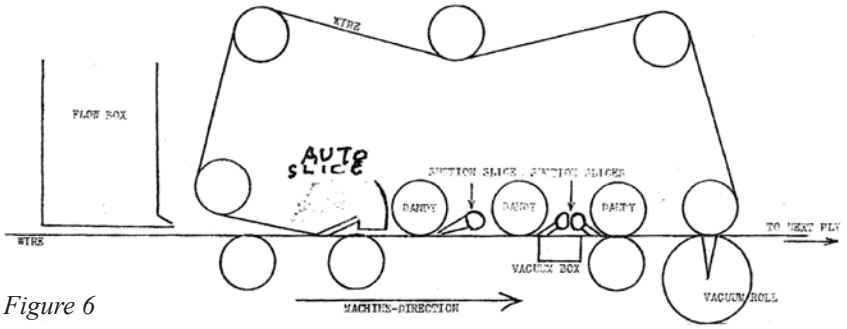

Figure 6

1. Type of furnish
2. Stock consistency
3. Stock velocity from the flow box
4. Method of applying stock
5. Position of the components in a top wire section
6. Speed range
7. Volume of water removed at various sections of the former
8. Determination of the correct condition of a ply for satisfactory reception of the next ply

We found we were able to produce a well formed web from a wide range of fibrous materials and a well formed web at far higher consistencies that was normal practice at that time with a cylinder

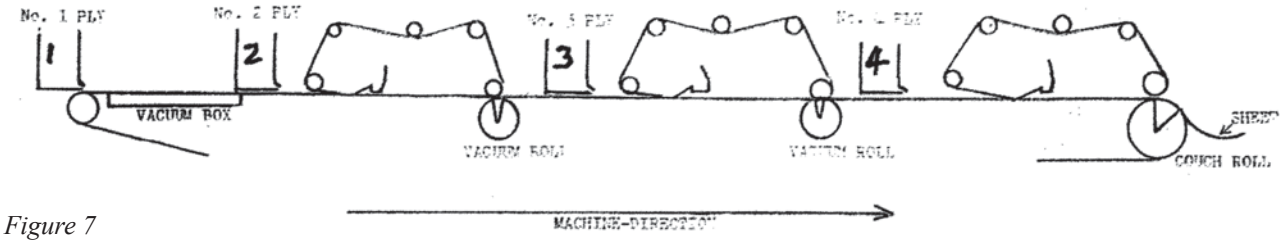

Figure 7

mould. An example of this would be the use of short fibre materials such as ground wood could be applied to the Inverform section with a flow box consistency in the order of 1.5%. Surprisingly it was shown that as machine speed increased there was a tendency for formation to improve. What was required would be a new type of head box, pressurised. Studies were carried out and this type of head box was produced.

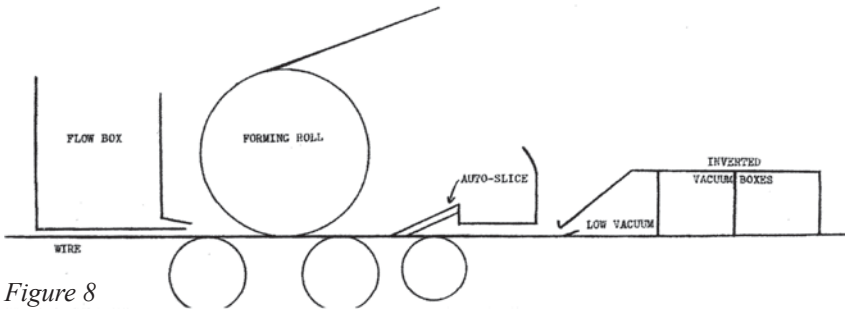

Figure 8

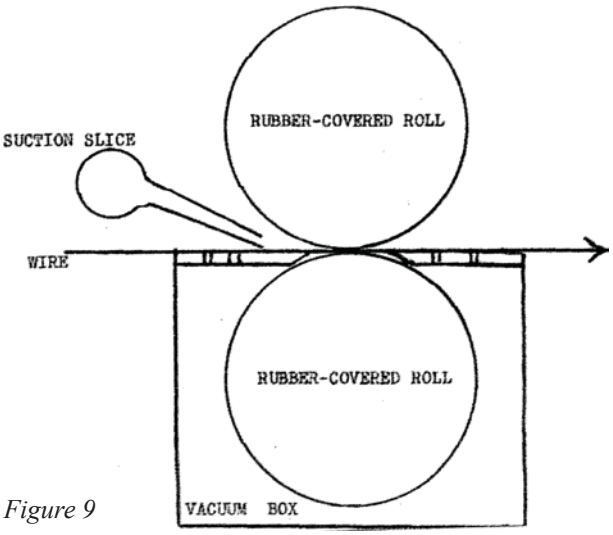

Figure 9

After months of development the pilot plant evolved into the arrangement shown in Figure 7. The last three plies are produced on Inverform units. Using this arrangement a four ply sheet having a total basis weight of 240gsm was produced at 400 m/min.

A problem using the Inverform configuration was the wear of the top wire as it converged on to the auto slice section and also the wear of the auto slice blades. Studies then took place on forming in this zone of the sheet and from this work emerged the arrangement shown in Figure 8 where the stock emerged from the flow box on to the formed web. The stock then moved forward to what we decided to call the forming roll. Much work was carried out on the design of the forming roll and we found that the best arrangement was using a hollow roll rather like a dandy roll and having a hollow construction. Also in Figure 8 is shown inverted vacuum boxes.

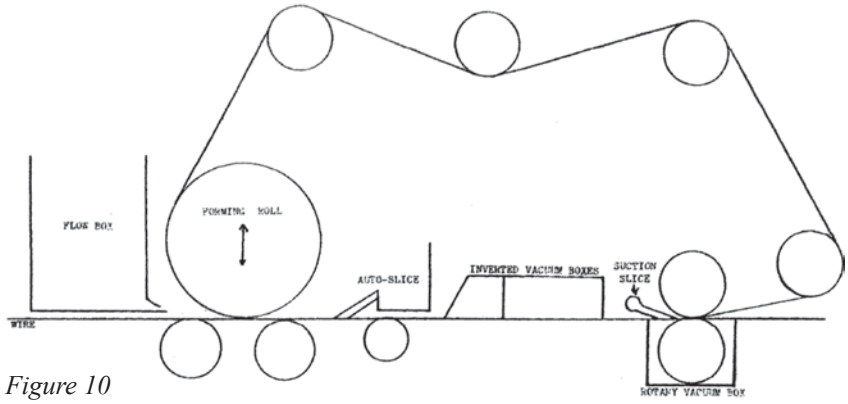

Figure 10

There were other developments as shown in Figure 9, a run through vacuum box which is at the end of the top wire forming section, the purpose being to keep the web on the bottom wire and not follow the top wire. This was quite a difficult task, but yet again success was with us.

All the way through this work we were looking at commercial application and problems which could arise with commercial application, one of which was the wear and the cost of forming wires, and this led to a study of the development and use of what was already being developed in the industry of synthetic wires.

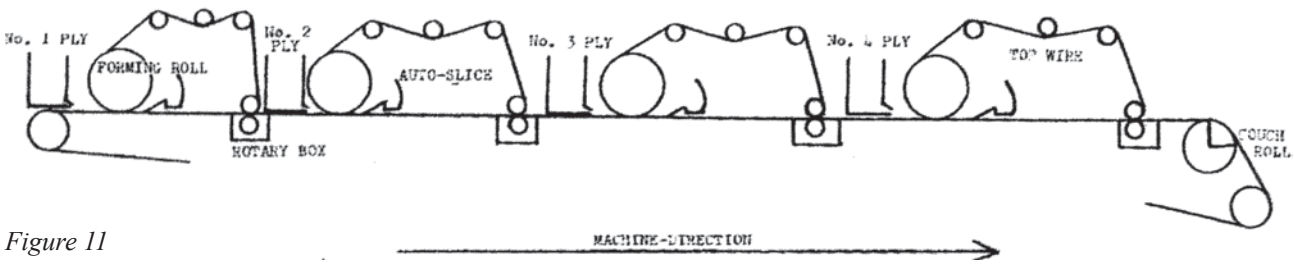

Figure 11

At a later stage in order to make sampling more efficient it was decided to install at the suction roll position suction transfer and pressing. Eventually an Inverform unit evolved into the arrangement shown in Figure 10. Figure 11 shows a typical commercial arrangement using 4 units.

Commercial Application at St. Anne's

By 1955 the pilot work had proceeded sufficiently for design of a production wet end to be completed. This was duly carried out and the construction of the wet end took place, the unit being installed during early 1958. The design of the machine was carried out by St. Anne's engineering section in collaboration with Walker Brothers of Wigan and latterly with Walmsley of Bury and the construction of the machine was carried out at Wigan and Bury. Thus had been developed and produced the first commercial twin wire machine in the world.

Appendix 1

History

Twin wire forming concepts had been examined over many years and a number of descriptions appear in patents, but there had been no commercial application until the 1950's.

When St. Anne's was developing Inverform we applied for a patent in 1952. At the same time David Webster in Canada was experimenting with twin wire forming using a roll system and he applied for a patent in 1953. Undoubtedly both St. Anne's and David Webster were carrying out experimental work at the same time and there was no contact and no knowledge of what the other was doing during that period. Webster considered commercial application, but this did not happen until a much later date, while at St. Anne's a forming section had been built on one of the machines and it was now an Inverform machine which went commercial in 1958. After it had been running for approximately a year a technical paper describing the process and its application was presented at a PITA Technical Section meeting. The St. Anne's Inverform (twin wire) machine was undoubtedly the first commercial twin wire machine in the world. Following publication of the St. Anne's process other organisations started to examine twin wire forming, good examples being Time Inc and Black Clawson developing their Vertiforma twin wire former. The details regarding the Inverform operation served as an inspiration for others to develop twin wire techniques. Work with Beloit led to the Inverform process being used for single ply paper the Twinverform and another development by Beloit was the Bel Bond Former.

Appendix 2

Spin Offs Associated with Inverform Developments

1. In order to study formation of heavy sheet weights St. Anne's developed a beta radiography technique using radio active isotope thallium 204. This was incorporated in a wax block giving a level and even distribution of radiation, used in conjunction with an X-ray film, an image of mass distribution (formation) was obtained. This technique was also used to examine watermarks in paper. This was in 1952 when it must have been a leader in this method of examining of water marks.

2. Studying the action of suction boxes was carried out using high speed photography to examine suction boxes in operation on Fourdrinier machines, and it led to finding that the spacing of the bars played a key role in the degree of dewatering that takes place. This changed the way that suction boxes were designed and used.

3. The study of flow boxes and the fact that with Inverform higher consistencies were possible led to the design of a new compact pressure flow box utilising an explosion chamber developed at St. Anne's. It became standard commercial use on Inverform machines. Importantly it also led to studies that showed that this compact flow box could be used on cylinder machines and from this developed what is now known as pressure. One version developed at St. Anne's in conjunction with Black Clawson is known as the Bristol Former and many are used world wide, something in the order of 700 units have been installed around the world.

4. On the pilot machine studies of various grades of paper allowed single ply and multi ply papers medium/light weight to be produced at high speeds. In order to study the high speed operation a further pilot machine was designed and constructed and installed at St. Anne's in collaboration with the Reed Paper Group.

5. Inverform sections can be installed on existing Fourdrinier machines either changing that machine to a type of twin wire former or being used to add one or two extra plies.

* The paper presented here is based on Brian W. Attwood's presentation at BAPH 22. conference in Canterbury, September 24, 2011.

Brian William Attwood, FRSC; Cchem; FCGI

1942-80 St. Anne's Board Mill Co. Ltd; (Imperial Tobacco Group) Process and Technology Director, inventor and developer of various paper making processes

Past National Chairman of the British Paper Industry Technical Association

Past Director of the Technical Association of the US Paper Industry

Consultant to the paper industry

Liveryman, The Worshipful Company of Stationers and Newspaper Makers

Holder of Gold Medals of the British and USA Paper Industries

Member of the British Association of Paper Historians BAPH

Graf Hugo Hamilton über die Zellstoffindustrie

Auszug des Vortrags von Professor Esko Häkli esko.hakli@helsinki.fi, Finnland und Übersetzung des Auszugs von Archivar Edgar Ytteborg edgary@lycos.com , Norwegen

Am 30. Januar 1890 hielt Nationalekonomiska föreningen ihre Jahrestagung in Stockholm. Nachdem man als Mitglieder oder sogenannte Repräsentanten u. a. Ihre Exzellenzen, den norwegischen Herrn Staatsminister G.W.W. Gram und den Herrn Minister für auswärtige Angelegenheiten, Graf C. Lewenhaupt gewählt hatte, wurde der Jahrestagungsvortrag von dem später so wohlbekannten Graf Hugo Hamilton gehalten. Die Exzellenzen, falls sie unter den Zuhörern saßen, konnten ein langes und aufschlussreiches Referat zum Thema *Über die Zellstoffindustrie in Schweden* genießen.

Die gedruckte Textversion umfasst nahezu 30 Seiten. Sie gewährt dem heutigen Leser einen interessanten Einblick in die damalige Zeit und beleuchtet die zeitgenössische Auffassung von den neuesten Errungenschaften der Papierindustrie. Außerdem enthält der Text natürlich ein hohes Maß an detaillierter Sachinformation, wodurch die anwesenden Nationalökonomen ihre Kenntnisse auf den neuesten Stand bringen konnten.

Der Vortrag ist als Ganzes sehr interessant. Als Kostprobe soll hier ein kurzer Abschnitt wiedergegeben werden, in welchem Hamilton den Übergang zur chemischen Zellstoffproduktion schildert. Nachdem er die Entwicklung der Holzschliffproduktion im Allgemeinen und in Schweden im Besonderen beschrieben hat, schildert er kurz die ersten Schritte der halbchemischen Produktion und führt weiter aus:

„Im Lauf der fortschreitenden Entwicklung wird mittlerweile sogar der nach dem üblichen Verfahren geschliffene weiße Holzfaserbrei bei stetig wachsendem Prozentanteil in die Papierherstellung einbezogen. Im Frühstadium der Fabrikation wird die Menge der Zellulose, die sich dem Lumpenbrei unter Gewährleistung der Papierqualität beimischen lässt, allgemein mit fünfzig Prozent angegeben. Im Jahr 1878 gibt aber ein schwedischer, sachkundiger Autor an, dass man bei Druckpapier von geringerer Qualität mit Vorteil 75% anwenden kann. Im Jahre 1886 behauptet ein anderer Sachverständiger, dass man in «gewöhnlichem Druckpapier» ohne weiteres 90 % Holzschliff verwenden kann. Zumindest teilweise dürfte diese Entwicklung jedoch darauf beruhen, dass die Qualität des Zellstoffs verbessert wurde. Vor allem dürfte sie darauf fußen, dass wir gelernt haben, für gewisse Bedürfnisse mit weniger haltbarem Papier vorlieb zu nehmen, und dass die Zeitungen, die in dieser Hinsicht natürlich keine großen Ansprüche zu stellen brauchen, ein so wichtiger Faktor für das Wachstum der Papierproduktion sind.

Der geschliffene weiße Zellstoff ist und bleibt jedoch nichts anderes als ein Surrogat, das man in Ermangelung von etwas Besserem und auf Grund seiner geringen Kosten anwendet. Kurz nachdem Voelter seine Holzschleifereien konstruiert hatte, erfolgten daher auch allerhand Versuche, sich auf chemischem Wege die Zellulose im Holz zur Papierherstellung besser nutzbar zu machen. Von diesen früheren Versuchen hat jedoch allein das *Natronzelluloseverfahren* bis auf unsere Zeit fortbestehen können. Dieser Methode

zufolge, die wie oben erwähnt, bereits Mathias Koops vorschwebte, wird die Zellulose dadurch hergestellt, dass das von Rinde und Astwerk befreite und zerriebene Holz unter Hochdruck in einer Natronlauge gekocht wird. Offenbar ist dieses Verfahren schon zu Anfang oder Mitte der 1850er Jahre von etlichen Erfindern in Frankreich, England und Nordamerika modifiziert worden. Hierzulande wurde die Methode zu Anfang der 1870er Jahre eingeführt, teils durch den Fabrikanten *Frans Flensburg* in Gefle, teils durch Graf *Sten Lewenhaupt* und Ingenieur *Alb. Seberg*.

Graf Lewenhaupt, der vorher mit Erfolg auf dem Gebiet der Wollfabrikation tätig war, verdankt möglicherweise seine Einführung in die Holzfaserindustrie dem Umstand, dass er durch Zufall davon Kenntnis nahm, dass das Packpapier, das die bekannte englische Firma Huntley & Palmer für ihre weltberühmten Biskuits verwendete, aus Natronzellulose hergestellt war. Als er im Jahre 1871 an Ort und Stelle (in der Zellstoff-Fabrik von Huntley und Palmers in Leeds) mit dem Verfahren bekannt gemacht wurde, das später Ingenieur Seberg von neuem erforschte, ging er daran, es versuchsweise in Schweden einzuführen. Bereits am Neujahrstag 1872 traf in Göteborg aus England der komplette Maschinenpark für nicht weniger als vier Natronzellulosefabriken ein, welche Graf Lewenhaupt in verschiedenen Teilen des Landes installieren ließ. Von diesen wurde *Bruzaholm* in Småland bald stillgelegt. Die andren drei, *Wermbohl* in Södermanland, *Delaryd* in Småland und *Krontorp* (jetzt Bäckhammar) in Värmland sind noch wirksam und arbeiten nun mit einem Erfolg, den sich ihr energischer Gründer während seiner Lebenszeit kaum erträumen konnte.

Die Geschichte des Natronzelluloseverfahrens gibt das schönste Beispiel dafür, was intelligente und unermüdliche Erfinderarbeit leisten kann. Die Benutzer dieses Verfahrens mussten unzählige Schwierigkeiten überwinden, sowohl was die eigentliche Technik anbelangt, als auch mit Hinblick auf die Möglichkeiten, ein Erzeugnis herzustellen, das billig genug war, um mit Erfolg die Konkurrenz mit dem älteren Papiermaterial aufnehmen zu können. Noch nachdem das Verfahren ungefähr 25 Jahre ausprobiert war, zu Ende der 1870er Jahre, findet man sozusagen in der gesamten Fachliteratur die übliche Phrase, dass „diese Methode noch immer den Anschein hat, dass sie sich im experimentellen Stadium befindet“. Und als es zu guter Letzt den Erfindern gelang, das Verfahren weiterzuführen, gerade da erschien ein Konkurrent, der bedrohlicher erschien als die vorhergehenden: eine neue Art und Weise auf chemischem Wege Holzfaserbrei herzustellen, das sogenannte Sulfitverfahren. Die Beharrlichkeit der Erfinder hat es jedoch vermocht, auch diesem Konkurrenten die Stange zu halten; und der beste Beweis hierfür ist, dass trotz des raschen und großartigen Fortschritts noch heutzutage neue Natronzellulosefabriken angelegt werden, nicht nur im Ausland, sondern sogar auch in Schweden, wo die Voraussetzungen für eine solche Fabrikation, jedenfalls bis zu diesem Zeitpunkt, keineswegs die günstigsten gewesen sind.

Eine kurze Übersicht über die Erfindungen, wodurch diese Entwicklung möglich wurde, dürfte nicht ohne Interesse sein. Der Stoff, der in der ersten Phase des Natronzelluloseverfahrens Anwendung fand um das Holz aufzulösen, war kaustisches Natron (Natronhydrat). Aber dieser Stoff war nicht nur sehr teuer; seine Anwendung ist außerdem mit dem Nachteil verbunden, dass er durch Lufteinwirkung leicht in kohlensaures Natron übergeht, das bei weitem nicht mit der gleichen Kraft wie das Natronhydrat das Holz angreift. Man kam daher ziemlich rasch darauf, anstatt des Hydrats Soda anzuwenden, das kohlensaures Natron ist und durch Zusatz von Kalk die Verbindung mit der Kohlensäure aufgibt. Auf diese Weise konnte man sich das Natronhydrat beim Kochen nutzbar zu machen. Aber auch Soda ist ein teures Mittel. Es wurde viel zu teuer, als das Sulfitverfahren aufkam und die Preise anhaltend sanken.

Man musste dann nach neuen Hilfsmitteln suchen; und man fand ein solches im Schwefelnatrium, das genau so stark wie Natronhydrat auf das Holz einwirkt. Dieses Mittel braucht man nicht separat herzustellen. Man macht es sich zu Nutzen, indem man vor dem Kochvorgang das billigere Zwischenprodukt bei der Sodafabrikation, neutrales schwefelsaures Natron (Glaubersalz oder neutrales Natriumsulfat), das eine Verbindung von Schwefel, Säure und Natrium ist, anwendet. Nahezu alle schwedischen Natronzellulosefabriken sind in den letzten Jahren mehr oder weniger zu diesem sogenannten Sulfatverfahren übergegangen, das nicht mit dem oben genannten Sulfitverfahren verwechselt werden darf.

Aber die Erfinder suchten ständig nach noch billigeren Hilfsmitteln. Unter anderem fand man heraus, dass

man zur Verbesserung des Sulfatverfahrens mit Vorteil saures, schwefelhaltiges Natron anwenden kann, das ein äußerst billiges und bisher fast wertloses Abfallprodukt der Salpetersäuren- und Dynamitfabriken ist. Diese Erfindung dürfte für die schwedischen Natronzellulosefabriken von besonderer Bedeutung sein, weil sie dadurch ihre Zutaten, die sie vorher teuer im Ausland einkaufen mussten, innerhalb des Landes erhalten können. Man scheint auch hier bereits auf die Erfindung aufmerksam gewesen zu sein, indem wenigstens eine Fabrik in der Nähe von Stockholm zur Herstellung von neutralem Natriumsulfat vom Abfall unserer Dynamitfabriken gebaut wird. In Deutschland scheint man neuerdings, als eine Folge dieser Erfindung, den Vorteil erkannt zu haben, die Herstellung von Salpetersäure oder Dynamit mit der Herstellung von Natronzellulose zu verbinden.

Gleichzeitig mit der Suche nach immer billigeren Herstellungsverfahren, hat man durch andere Erfindungen in wesentlichem Grad dazu beigetragen, die Produktionskosten niedrig zu halten. In der frühesten Phase der Fabrikation, hielt man die zum Kochen des Holzes angewandte Lauge für wertlos. Bald versuchte man jedoch aus dieser Lauge das benutzte Natron zurückzugewinnen, um es zu kaustifizieren und erneut beim Kochen zu verwenden. Das war ein sehr wichtiges Problem, denn jedes Kilo Natron, das aus der Lauge zu niedrigeren Kosten als dessen Einkaufspreis zurückgewonnen werden kann, repräsentiert natürlich einen dementsprechend reinen Gewinn für den Fabrikanten. Unsere ältesten Fabriken konnten offenbar am Anfang höchstens 40 % zurückgewinnen und die Unkosten für diese Arbeit waren dadurch ziemlich erheblich. Heutzutage hat man eine Rückgewinnung von mehr als 85 %, wodurch sich die Recycling-Unkosten beträchtlich verringern. Abgesehen davon, dass die Kochapparaturen und die übrigen Einrichtungen zwecks Anpassung des Verfahrens durch ständige Erfindungen in vieler Hinsicht verbessert werden, hat man zu guter Letzt sogar mehrere Methoden erfunden, um die vorfallenden Abfallprodukte vorteilhaft anwenden zu können.

Das Sulfitverfahren, die jüngste der bisher allgemein angewendeten Methoden Zellstoff herzustellen, muss im wesentlichen als eine schwedische Erfindung angesehen werden. Freilich erhielt ein Amerikaner namens *Benjamin Chew Thilgman* schon im Jahre 1866 in England ein Patent zur Herstellung von Zellulose durch Kochen des Holzes in einer Lauge aus schwefelsaurem Kalk. In einem zur damaligen Zeit viel diskutierten Prozess gegen den bekannten deutschen Erfinder, Professor *Alexander Mitscherlich*, der am Ende der 1870er Jahre ein Sulfitverfahren entwickelt hatte, das patentiert wurde und in mehreren Ländern eine weit verbreitete Anwendung erfuhr, wurde Thilgman sogar vom höchsten Gericht des Deutschen Reichs ausdrücklich als der eigentliche Erfinder des Sulfitverfahrens anerkannt. Aber genau so wie Mitscherlichs große Verdienste um dieses Verfahren trotzdem als unbestreitbar angesehen werden müssen, so konkurriert mit Mitscherlich auf diesem Gebiet ein schwedischer Erfinder, der Ingenieur *Carl Daniel Ekman,* der nach langjährigen Versuchen selbständig ein Sulfitverfahren bei *Bergvik* nahe Søderhamn entwickelte. Sogar führende deutsche Fachschriften, die sonst nicht so leicht einem Ausländer auf Gebieten, die eigentlich von den eigenen Landsleuten zu Genüge beherrscht werden, den Preis zuteilen, haben ausdrücklich anerkannt, dass Ekman der erste war, der im wesentlichen dieses Verfahren verfeinerte und auf vollständig zufriedenstellende Weise dieses Problem gelöst hat. Bei Bergvik wurde das Verfahren lange geheimgehalten. Erst als Mitscherlich und andere hervortraten, bemühte sich Ekman 1882 um ein Patent für sein Verfahren. Diesem Patent zufolge verwendet er beim Kochen Magnesium anstatt Kalk. Ein anderer Schwede, der sich ebenfalls große Verdienste um das Sulfitverfahren erworben hat, ist der Ingenieur *Carl Waldemar Flodqvist,* ehemals Leiter der Fabriken bei Mölndal. Auf Flodqvists Patent basieren sich mehrere schwedische Sulfitfabriken, unter anderen *Forsbacka* in Elfsborgs Län und die von einer englischen Aktiengesellschaft (Flodqvist‘s sulphite pulp C:o L:d) gegründete große Fabrik bei *Hjerpen* in Jemtland.“

Doch obwohl Hamilton auf diese Weise wichtige schwedische Pioniere der Branche hervorheben konnte, ließ er am Schluss seines langen Referats große Besorgnis um den weiteren Fortschritt der schwedischen Zellstoffindustrie erkennen:

„Es gibt allerdings eine viel größere Gefahr [als der Protektionismus in gewissen anderen Ländern], die ganz ohne Zweifel unsere Zellstoff-Fabriken bedroht. Wie energisch man hierzulande auch in der Zellstoffindustrie arbeitet, lässt es sich doch nicht bestreiten, dass fast alle Verbesserungen von einiger Bedeutung, die in dieser Industrie eingeführt werden, ihren Ursprung im Ausland haben. Wir haben ganz

fleißig Erfindungen importiert; wie es aber oft mit derlei Importen geht, haben wir selten von einer Verbesserung Kenntnis genommen und von ihr Besitz ergriffen, ehe man im Ausland schon einen Schritt weiter gekommen war. Besonders mit der jetzt stattfindenden amerikanischen Erfinderarbeit vor Augen, kann man völlig gewiss sein, dass die Technik noch nicht das letzte Wort gesagt hat, sei es auf dem Gebiet des geschliffenen oder des chemischen Zellstoffs, ohne dass nach aller Wahrscheinlichkeit gerade die nächste Zukunft uns zahlreiche wertvolle Erfindungen auf diesen Gebieten bringen wird. Dies bedeutet ein noch billigeres Erzeugnis und noch schärfere Konkurrenz. Aber je billiger ein Erzeugnis wird, desto gefährlicher wird es auch, zu denen zu gehören, die Verbesserungen im Nachhinein einführen. Der Abstand zwischen Gewinn und Herstellungskosten wird schnell schmäler und schmäler. Für den, der zögert, besteht die unmittelbare Gefahr, dass er leicht gänzlich verschwindet; und danach kommt es darauf an, ob man Ausdauer genug hat für den Wettlauf, der zum Aufholen erforderlich ist.

Für unsere Zellstoff-Fabrikanten ist daher im Augenblick zweifellos das wichtigste Problem, wie sie, die jetzt mit Hinblick auf die Menge der Erzeugnisse in der ersten Reihe stehen, mit originellen und wegweisenden Erfindungen nach vorne drängen können. Denn es gilt hier, wie auf anderen Gebieten: *Nur wer zuerst ankommt, erhält den Preis*"

Selten, wenn überhaupt, hat man ähnlich wohl informierte und scharf artikulierte Ansichten über ein ähnlich komplexes Thema angetroffen, vorgelegt von einem hoch angesehenen Staatsdiener und Politiker. Hamilton wusste, wovon er sprach und vor Nationalökonomen erörterte er nicht nur die technische Eigenart der Zellstoffproduktion, sondern er stellte diesen Industriezweig, sowie dessen Bedeutung und Zukunftsaussichten sogar in einen größeren gesellschaftlichen Zusammenhang.

Der Vortrag liegt im Druck vor in *Nationalekonomiska föreningens forhandlingar* 1890. Stockholm 1891, S. 2-29

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