

**STUDENTS FROM FINLAND'S UNIVERSITY OF JYVÄSKYLÄ, LABORATORY OF APPLIED CHEMISTRY AND FINTAPPI GAIN INSIGHTS ON RESEARCH IN SWEDEN**

## Study tour to Sweden

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*In September 2001, a group of 26 students and staff from the University of Jyväskylä's Laboratory of Applied Chemistry and Fintappi, Finland, visited Lyckeby Stärkelsen Industrial Starches AB (LSIS) in Kristianstad, the Royal Institute of Technology (KTH) in Stockholm, and the Swedish Pulp and Paper Research Institute (STFI) in Stockholm, Sweden. The five-day tour was filled with interesting site and research laboratory visits giving a wide overview of the latest trends in papermaking and other paper-related sciences in Sweden. This study tour was very successful one in every respect. We had a warm welcome everywhere and had a good time during our long drives between destination cities. In addition, the educational value of all the visits was very high.*

The study tour was the idea of Fintappi, one of the student chapters of TAPPI. Fintappi was established in 1996 in cooperation with TAPPI by a couple of active students in the Laboratory of Applied Chemistry at the University of Jyväskylä, Finland. Its members can only be students who are near graduation or are studying as full-time post-graduate students in the areas dealing with wood processing chemistry and physics. The present number of members, currently led by Mari Rautio, president, is about 50.

The overall teaching and research goal of the Laboratory of Applied Chemistry is to understand in detail the versatile chemistry needed for modern pulp and papermaking. In practice, this challenging approach encompasses different pulp analyses, the separation and identification of wood-derived constituents, and their conversion products. In applied physics notable amounts of teaching and research activities have been directed toward numerical methods in fluid dynamics and studies on disordered materials, for example. The main applications in both cases, however, are in the papermaking technology.

Every year the Fintappi students begin their activities by organizing either a domestic excursion or a study tour within Europe to enhance their awareness of advanced technology in the forest products industry. The students decided to visit facilities in Sweden for the September 2001 study tour. Stops included Lyckeby Stärkelsen Industrial Starches AB (LSIS) in Kristianstad, the Royal Institute of Technology (KTH) in Stockholm, and the Swedish Pulp and Paper Research Institute (STFI) in Stockholm. As a result of long hours of planning and careful preparations, the travel arrangements turned out well and we succeeded very well in keeping up with a tight schedule. We also kept in mind the "leisure time" we would have during the two ferry trips between Finland and Sweden and while traveling by coach in both countries. We had lots of videos to watch, lots of reading material, and even worked in some dancing.

### LYCKEBY STÄRKELSEN INDUSTRIAL STARCHES AB (LSIS), KRISTIANSTAD

On Monday, September 17th, we arrived in the beautiful town of Kristianstad (about 74,000 inhabitants), which was about seven hours drive to the southwest of Stockholm. LSIS had arranged an interesting choice of activities for the day. We had a choice of a guided tour in historic Kristianstad (c. 1614) or a guided tour of the rich wetland of the city (representing its versatile nature). Especially in the latter case, we also became very familiar with the "typical" September weather of Sweden's eastern coast in the province of Skåne. As a grand finale to this memorable day, we enjoyed an excellent dinner at the Lyckeby Stärkelsen Research and Technology Centre (LSRT).

LSIS employs about 500 people. It develops, produces, and markets chemically and physically modified starch products for the paper industry and other chemical industries in Europe. The company has a complete range of starch products for the paper industry, the main products comprising wet-end, surface-sizing, coating, and spray starch. Two facilities close to Kristianstad process potato starch and potato fiber into various ingredients and additives that can improve customers' products or processes. The annual production capacity amounts to about 50,000 metric tons of modified starch products.

The group's tour of LSRT, where about 25 people work, began with a brief history of LSIS presented by Olle Wikström, research and development manager. Application manager Jeanette Danielsson followed that with an introduction to LSRT, after which Niclas Skoog presented a comprehensive review of "starch chemistry." After these "theoretical studies," the day's program continued with "practical studies" — a site visit where we finally realized the possibilities for "alternative utilization" of potatoes. Then, with bags full of brochures and samples (including company T-shirts and caps), it was time to say good-bye to our friendly hosts. Our group was very grateful for the opportunity for visiting LSRT and we, already feeling somewhat nostalgic, got onto the coach and headed back for Stockholm.



### ROYAL INSTITUTE OF TECHNOLOGY (KTH), STOCKHOLM

Our way back to Stockholm ended with a get-together at KTH where we once again had the chance to enjoy the hospitality of extremely friendly hosts. During this fine event, we also had an opportunity to meet students and teachers of KTH. With memories of the welcoming party still whirling in our heads, we went on the next morning (Wednesday, 19th of September) to the Department of Pulp and Paper Chemistry and Technology at KTH.

KTH was founded in 1827. It is the largest technical university of Sweden and cooperates with research institutes, industry, and Stockholm University. Approximately 18,000 students attend KTH. In addition, there are more than 2000 active researchers and 3200 employees. The education and research programs cover a wide range of topics, reaching from natural sciences to all branches of technology, including architecture, engineering and business management, infrastructure and planning, and environmental technology. KTH also coordinates a number of national research programs financed by various research foundations.

Our hosts during the visit to the Department of Pulp and Paper Chemistry and Technology were professors Tom Lindström and Monika Ek. This department has been a forerunner in many technical developments within the field of pulp and paper research. For the day's program, Lindström started with an interesting overview of their research, followed in kind with my presentation of the research performed in the Laboratory of Applied Chemistry in Jyväskylä. After these presentations we were shown examples of the laboratory facilities, pilot-scale machines, and testing equipment of different laboratories in their department. The visit to these laboratories was particularly interesting because many of the research activities are similar to those conducted at the University of Jyväskylä.

### PAPER RESEARCH INSTITUTE (STFI), STOCKHOLM

After an excellent lunch at Restaurant Quantum, the afternoon was reserved for a visit to STFI, with an introduction presented by Anders Mähler. STFI is located at the campus of KTH and has 230 employees, of which around 130 have university degrees. It is a research organization financed mainly by the Swedish government and the industrial financing companies that are active within the pulp and paper industry or are its suppliers or cus-



tomers. STFI's research is aimed at creating new knowledge upon which industry can base the development of new products and processes. It also provides an important link between university research and the pulp and paper industry cluster. In 2000, STFI started an extensive joint research program with the corresponding Finnish Institute, Oy Keskuslaboratorio-Centrallaboratorium Ab (KCL), in two major research fields—chemical and mechanical pulp.

During our visits we had an opportunity to acquaint ourselves with EuroFEX, the research paper machine that enables theories, materials, and process technology to be tested under relevant conditions. It is used by the pulp and paper industry, often in cooperation with suppliers to the industry, to test different modes of operation, different raw materials, and different process equipment. We were also shown examples of other research tools, including MS-MS (tandem mass) spectrometry, ESEM (environmental scanning electron microscope), and pyrolysis-GC (gas chromatography).

### FINAL REMARKS

The schedule for our five-day study tour was extremely tight and full of different activities. We not only saw our intended destinations, but also travelled through many small towns and villages and saw the beautiful Swedish countryside. On the whole, the study tour strengthened our faith in the brilliant future of papermaking and off-set any concerns about, for example, a rapid decrease of the role of paper in communications. We thank the organizing committee of Fintappi for a well-planned and pleasant study tour to Sweden. We also wish to thank all those other persons, especially Wikström and Jukka Kilpinen from LIS and Lindström from KTH, who helped in putting together the detailed program of our tour. We could not have made this tour without the support of LIS and TAPPI. We sincerely thanks to these organizations. In my personal opinion, an investment in the young students is also a sound and sustainable investment in the future. This trip formed a novel link to this endless chain. **TJ**

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