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Session 5: Dr J. A. Van den Akker

IN my introduction to the session on printability, I spoke of the complexity of this field. It is a subject that is difficult to come to grips with and, believe me, I find it difficult to organise an appraisal of where we are and what we should be doing in the future!

Over a period of nearly a half century, many excellent people have worked on printability problems. Today, there are laboratories in many countries, laboratories like Pira, that are completely (or nearly completely) devoted to the subject. Then, too, one must recall that excellent work has been done in the research laboratories of the paper industry—and we must include the accomplishments of some of the publications and printing establishments.

John Parker has given us an excellent, properly selective review of past work in the field and, as he is one of the outstanding contributors to the area, he has brought us up to date on his own efforts, as well as on those of other contemporary researchers.

Parker's paper, together with the contributions of Dr Karttunen, Prof. Marton, Truman & Munday, Larsson & Trollsås, Wahren & Bryntse—the *whole* session, including some good remarks from the floor—have given us some new insights of high value.

We now have a much better understanding of such phenomena as ink transfer, penetration of the sheet by the ink, influence of sheet composition and structure—*and variability of structure*—and finally, of special importance, the influence of these phenomena on both the optical properties of the printed surface and the variance of the properties. In considering the appearance of the printed sheet, we must not overlook print-through, an effect studied by Larsson & Trollsås through the use of a new model that appears to work quite well.

A long time ago, the old idea of working with single-valued measures of smoothness of the free and compressed sheet has been abandoned and replaced by techniques that permit evaluation of the minute imperfections in the printed surface that assail the critical eye. One of the difficulties of numerical evaluation in this field is that such imperfections as skips in gravure and half-tone printing and speckle in solid print can ruin the printing quality, whereas macroscopic measures of reflectance (or density) of the printed surfaces may not be affected (for example, an objectionable imperfection may change the macroscopic reflectance by 0·01 per cent or less).

It is in connection with this that one appreciates the importance of the contributions to this symposium by Parker, Marton and Wahren. At the same time, due credit should be given to a number of research people in the laboratories to which I have already made reference.

Looking to the future, I feel that there are two general needs. Firstly, the ongoing work of Parker, Karttunen, Larsson & Trollsås, Truman & Munday, Wahren & Bryntse and generally their counterparts in laboratories of high quality should be strongly supported by their companies or associations. These people know much better than I do what further fundamental work should be done, so that I shall not presume to suggest future courses of research.

Secondly, we should heed the comment from Dr Grant yesterday to the effect that we need techniques and instrumentation that will enable the technical supervisors of papermaking operations to improve and control their products on the basis of our gains in fundamental knowledge. In American parlance, we need a better 'handle' on the basic properties that underlie printability.