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BOOK REVIEW

HYPERFILTRATION AND ULTRAFILTRATION
IN PLATE-AND-FRAME SYSTEMS

R.F. Madsen

Elsevier, Amsterdam, New York, 1977;
hardbound, 367 pages, \$40.50.

Having been active in the same and in closely related fields between 27 and 15 years ago, and having had the privilege to run into the stymieing and apparently only partly soluble problem of what is now called concentration polarization before most others, I started reading this book with great expectations. I finished it with admiration for the tremendous amount of work the author has done, but with some disappointment in realizing that the central problem is brought only marginally closer to a solution, or even to a significantly greater understanding.

The book's nine chapters treat: 1. History; 2. Literature on concentration polarization and membrane fouling; 3. Concentration polarization and membrane fouling, further development and experimental results; 4. Construction of and experience with module 35; 5. Theory on concentration polarization; 6. Conclusions on concentration polarization; 7. Membranes and membrane theory; 8. Permeability measurements; 9. New membrane theories. The work ends with definitions of Nomenclature and Dimensions, a long list of Symbols, followed by the References, and a Subject Index.

The brief chapter the author calls "History" is very sketchy: the author mentions his own work of 1975, but, e.g., the first work with tubes and turbulence, and the first membranes by Dobry-

Duclaux (with which Loeb and Sourirajan initiated their work on anisotropy) are ignored.

However, the book is mainly about the author's own extensive work on the development of optimal plate and frame systems under a variety of conditions and with many different liquids, and on the key problem of concentration polarization. Chapter 5, on the theory of this problem, ends with the conclusion that there are so many parameters that the elaboration of a strict theory is not as yet possible, while chapter 6 treats its more practical and economic consequences. Chapters 7 and 8 treat respectively membrane structure and membrane performance; the latter chapter is supplemented with more than 70 pages of graphs and tables of experimental data. The final chapter discusses various theoretical membrane models.

Notwithstanding a wealth of new experimental data, few novel conclusions seem to emerge from them. But the book can surely be of use for workers specialized in ultrafiltration, hyperfiltration (or reverse osmosis), for its collection of data as well as for some of its theories.

Carel J. van Oss