

book available on writing for professionals.

Its charm lies in its sensible, yet authoritative, approach to writing as a human process. Tichy, out of long experience as a teacher and consultant, offers writers help on getting started, drafting, and revising for specific purposes as well as on supervising the writing of others; she sees writing as a demanding task, not subject to the quick fix, but one amenable to time and patience.

New to this edition is Tichy's instruction on the "flow method," which requires a block of time to write a first draft, time uninterrupted, not only by external interference such as the telephone, but also by one's own impulses to stop to check facts or rules of grammar. Revision can then be fitted into briefer segments of time: "fifteen minutes when a meeting starts late, . . . a half hour now and then in the laboratory while . . . waiting for results."

Tichy offers sound advice on work habits and methods of organizing as well as lucid explanations of grammar and syntax. Typical of Tichy's pragmatism is her view that if your hold on grammar is shaky, deal first with the problems that trouble you rather than reading through material you already know. Whereas most manuals on writing relegate grammar and syntax to a perfunctory review, Tichy offers thoughtful explanations of English usage, taking into account such changes as the need to avoid sexist language. She also tackles issues where disagreement abounds (such as the use of the plural *their* to refer back to the singular *everyone*). She examines such shibboleths as "never split an infinitive," "never end a sentence with a preposition," "never start a sentence with but," "write as you speak" with tact in the service of understanding. In areas where there are no simple answers, Tichy gives the information we need to reach our own conclusions.

Tichy exemplifies her exhortation that above all, the needs of the reader must be considered. She thoroughly discusses the occasions for writing that occur on the job: letters of condolence, complaint and contract, as well as letters of recommendation and application, minutes, style guides, news releases, reports, and resumes. A revised table of contents makes it easy to find material in this edition. Also, this edition adds a chapter on punctuation.

This is a self-help book in the best sense, for it offers thorough explanations of principles in combination with the sensible perspective we need to apply those principles. In fact, Tichy's tone is rather like that of a knowledgeable colleague down the hall you can turn to for help with the sticky points in a piece of writing. Like that colleague, Tichy may sometimes tell you more than you want to hear, but the beauty of a book is that you can pick it up and put it down as you choose. Tichy is well worth many a visit. In fact, if I had to recommend only one guide to writing, I would choose this one.

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### Thin Liquid Films: Fundamentals and Applications

I. B. Ivanov, Ed., Marcel Dekker, Inc., New York, 1988, 1160 pp., \$195.00.

Some years ago, Professor Ivanov took the unusual step of gathering together the prospective contributors to this book in his native Bulgaria, with the aim of establishing a unified approach to the task of writing about the multifaceted subject of thin liquid films. The result is highly successful. Rarely have I seen an edited collection of chapters written by many different authors (23 in this case), give such a comprehensive and coherent account of a diverse topic such as this.

It is not a textbook. The level of presentation is sophisticated; each chapter covers its topic in some depth, and none of them is designed for light reading. The book is aimed at the researcher (a term which includes the advanced graduate student, of course) who wants to learn more about liquid films. It is concerned primarily with films between fluid phases, such as those occurring in foams, emulsions, or biological membranes. Readers could browse through the entire tome to get an overall view of the subject, and that view would be authoritative and comprehensive. Or they could study one or more of the fifteen chapters, ranging in length from 40 to 130 pages, to get a very thorough grounding in particular aspects of liquid films. It would take some deter-

mination to read the book carefully from cover to cover.

The progression of the chapters follows a logical plan. First come two which introduce the thermodynamics of thin films, both presented clearly and carefully. The first, by de Feijter, considers planar films; the second (Ivanov and Kralchevsky) covers the more difficult but more practically important case of curved films. In these chapters the important concept of disjoining pressure is introduced, then in the following four chapters come detailed accounts of the various contributions to it. Rickayzen and Richmond set out the statistical mechanics of inhomogeneous liquids and discuss the structural component of disjoining pressure or "solvation force" between two solid walls. Nir and Vassilieff give a very good account of van der Waals interactions, covering both the theory and experimental determinations in some detail. Electrostatic forces are covered by Grimson, Richmond, and Vassilieff, and Tadros completes the picture with a chapter on steric interactions.

Once armed with a knowledge of these equilibrium interactions, we proceed to a consideration of dynamic effects. The crucial question of coagulation or coalescence depends on the thinning and possible rupture of liquid films. Ivanov and Dimitrov concentrate on the first aspect, in a very thorough and satisfying chapter on thin film drainage. The second, hydrodynamic stability, is addressed by Maldarelli and Jain, in what is probably the book's most difficult chapter. Joosten describes the use of light scattering as a probe of both surface tension and interaction forces across liquid films.

That completes the "Fundamentals" of the book's subtitle. The "Applications" follow in the form of descriptions of particular types of liquid films, starting with a chapter by Hartland on coalescence, which has a far more down-to-earth flavor. At the outset he reminds us of the complexity of film drainage and rupture in real froths and foams, then presents various phenomenological models which can be used to describe their behavior. He concludes with a useful prescription for selecting the appropriate model. Kruglyakov follows with a comparison of free films, foam films, and emulsion films. Malhotra and Wasan give a rather dry survey of the literature on interfacial rheology, and Perez, Proust, and Ter-Minassian-Saraga discuss liquid crystal

films. Then follows one of the highlights of the book: an authoritative and highly readable account of bilayer lipid membranes (BLM's) by Tien. The extensive literature on this topic is distilled down to a clear and concise—though still not brief—description of the methods involved, and the potential they give for studying fundamental biological phenomena using the BLM as a model system. Finally, Chizmadzhev and Pastushenko close the book with a chapter on electrical breakdown of BLM's.

As I said at the outset, the cohesion between the chapters is unusually good for a book of this type, with a logical flow of topics, a uniform level of presentation, and ample cross-referencing. Many of the

chapters give a list of the notation used, helping to avoid the confusion which could otherwise arise from different usages in different places. However, the book does have one serious flaw, which is that it seems to have taken a long time to get into print. Perhaps this is a consequence of the effort which has evidently gone into coordinating the different chapters; whatever the reason, some chapters must have been completed well before some of the others. In one case the authors make a point of stating that their chapter was written in 1982. Judging by the references cited, some of the others appear to be three or four years old, so that they have missed the very latest developments in their fields.

That aside, this well conceived book would be a most valuable acquisition for the library of any department or institution whose activities include colloid science, biology, biophysics, mineral separation processes, coating technologies, or any of the other fields in which thin liquid films play a role. It would also be welcome on the shelf of any scientist with an interest in liquid films who wants a reference work which is as broad as it is deep.

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