BOOK REVIEW

*General and Applied Toxicology*, second edition, edited by B. Ballantyne, T. Marrs, and T. Syversen, Grove's Dictionaries, Inc., New York, NY, Volume 1, 609 pages, Volume 2, 1414 pages, Volume 3, 2199 pages. $575.00. 2000.

*General and Applied Toxicology* appeared in its first edition in 1995 and was reviewed by this Journal. In its second edition, just published, *General and Applied Toxicology* is clearly improved by simple inspection. Originally published by The MacMillan Press, Ltd., through its Stockton press subsidiary, the second edition is also published by The MacMillan Press, Ltd. but this time through a subsidiary known as Grove's Dictionaries, Inc. The latter has produced a much more handsomely bound three-volume second edition than the original drab, two-volume first edition.

Expansion of the first edition totaling 1,356 pages to the second edition with its 4,222 pages means that the buyer of the second edition is literally purchasing 68% more toxicology information this time around. But the second edition is even more useful than the first, with the addition of two new indices repeated in each of the three volumes, a 116 page Subject Index, and a 38 page Chemical Index. The first edition had a single index in the standard format, which we personally have found both frustrating and ineffective. The second edition's two indices relieve that frustration and are effective tools to find what one is looking for in *General and Applied Toxicology*.

The last change is that the third editor of the first edition, Paul Turner, who passed away, has been replaced by Tore Syversen joining the chief editor, Bryan Ballantyne, and the second editor, Timothy Marrs.

At the outset we must observe that the task is mammoth for any toxicology text entitled *General and Applied Toxicology*. While the goal is much better attained in this second edition, there are some areas that can still be improved.
Volume 1 contains Part One: Basic Science; Part Two: Techniques; and Part Three: Toxicity by Routes. Part One was entitled Introduction and Basic Concepts in the first edition, but we find the new title more descriptive. Of the original 10 chapters in the first edition’s Part One, 6 have survived and we agree with those dropped by the editors. Basic Science now includes 14 chapters and those that have been added are good choices, such as Circadian Rhythms and The Toxicology of Chemical Mixtures.

Part Two: Techniques, appears to be expanded to 11 chapters from the first edition’s 8 chapters, but on close inspection the added chapters have merely been repositioned in Part Two from Part One.

Part Three: Toxicity by Routes, has had two chapters added on mixed routes of exposure and the role of gastrointestinal microflora in the metabolic and toxicological activities of xenobiotics. We struggled with the sense of this section in our review of the first edition, and do not find it improved in the second edition. For example, the skin and the eye are clearly exposure routes, but are not discussed here. Rather they are found in Volume 2 under Part Four: Target Organ and Tissue Toxicity. Percutaneous Absorption as a chapter is not a route but a process by which some chemicals can be transported through the skin to be picked up by the dermal blood system and therefore become systemic toxicants. The same is true for the eye. In Part Four, entitled Target Organ and Tissue Toxicity, we find a chapter on Neurotoxicology. Neurotoxicology is clearly not a target organ nor are neurons correctly classified as a tissue in human anatomy and physiology.

All of which is to say we found Parts Three and Four in need of reorganization under new headings that are accurate reflections of their content; and major toxicology subdivisions that are consistent with human anatomy and physiology.

Part Four has some confusing chapter headings. While Cutaneous Toxicology is proper and is used in both editions, the change from Ophthalmic Toxicology to The Toxicology of the Eye is a step forward. The editors should consider keeping the first edition’s title for this chapter or changing it to the term of art in toxicology: Ocular Toxicology. Further on the area of cutaneous toxicology: a chapter on Peripheral Sensory Irritation should be subsumed under the Cutaneous Toxicology chapter, as we will discuss in more detail later.

Part Five is retitled to Genetic Toxicology, Carcinogenicity, Reproductive and Developmental Toxicology from the first edition’s meaningless title, Special Toxicology. This is an improvement.

The first edition’s Sections on Regulatory Toxicology and Toxicology in Special Situations, which were not titled well in the first edition, are not improved in the second edition with the title Specialization. The reorganization of Regulatory Toxicology in the second edition is a big improvement but lacks any information on consumer products, which is a very large category of product exposure to individual chemicals and combinations of chemicals. The Specialization section continues to be
confusing, with chapter titles such as Pharmaceutical Toxicity followed by Medical Toxicology. Drugs are chemicals and toxicity is not the same as toxicology.

The second edition then adds three new sections on Environmental Toxicology, Issues Relevant to Toxicology, and Special Groups of Substances. As to the latter section, why pesticides, food, food additives, and metals are “Special Groups” is not clear, especially when there is a chapter on chemical warfare agents in the same section.

With 101 chapters in the second edition, this reflects the addition of some 34 new chapters on various toxicological subjects.

As for specific chapters, we found Chapter 99 on Nitrate, Nitrite, and N-Nitroso Compounds good as far as it went in describing the toxicology of these chemicals in foods. However, the issue of nitrosamine formation in consumer products, which is a current and significant toxicology issue, is absent. This is a glaring deficiency for a chapter so titled. The references in this chapter are also deficient. Only 2 of the 11 IARC monographs on N-nitroso compounds are cited. Neither of the two ECETOC risk assessments on N-nitroso compounds is cited. And, perhaps more important, the 1998 Canadian Health and Welfare Agency risk assessment on diethanolamine is missing as well. This chapter clearly needs considerable rewriting.

We found the chapter on the Toxicology of Pesticides to be guilty of overgeneralizations about classes of chemicals that can exhibit differing toxicities within the same class. The chapter also suffers from giving too much attention to one class of pesticide, pyrethroids, and mentioning only by name others, such as malathion. These two pediculicides are of great interest currently. Many consumer advocacy groups are tarring the pharmaceutical use of malathion with the same agricultural pesticide malathion brush. Pyrethroids are described as “having a low toxicity” in one paragraph but clearly causing neurotoxic effects in the next paragraph. What’s wrong with this toxicology picture? And no mention is made of the point mutations that have now been identified in lice by overuse of pyrethroids as over-the-counter drug products. Malathion as a prescription pediculicide has not exhibited the ability to produce point mutations in lice to date.

Both the chapters on N-nitroso compounds and pesticides appear to be written from a well-informed but myopic perspective on these topics. Simple research would correct the deficiencies we describe here for these chapters.

Little has been added to the chapter on Cutaneous Toxicology between the first and second editions, except that we found some key references missing from the second edition. This could be a fault of changing publishers rather than the author. We also found it odd that no references for repeat insult patch testing are given in either edition. There are several terminology inaccuracies in the human testing section. While “allergic contact dermatitis” is used, “irritant dermatitis” rather than the correct “irritant contact dermatitis” term is used to describe the most common of skin reactions. More serious deficiencies in this chapter include a less than ade-
quate review of photosensitization and a very poor coverage if one can call it a coverage, of acne and chloracne.

The chapter on Peripheral Sensory Irritation is unchanged from the first edition and reviews the classic chemicals that can produce sensory irritation responses as well as some of the standard animal tests used to assess this potential in new chemicals. The most serious deficiency in this chapter is the absence of any discussion of currently used human cutaneous and ocular toxicology tests to evaluate both chemicals alone and chemicals formulated into consumer products.

The chapter on the Toxicology of the Eye is also unchanged, but of all the chapters we reviewed in detail this warrants the least criticism, with the exception that human responses of tearing are not addressed nor how to test for them.

In conclusion there is no question that the immense improvement in the second edition of *General and Applied Toxicology* warrants its purchase by all toxicologists in every field.

Also we found the second edition to be a much better platform for an improved third edition than the first was for the second. What is needed now is an in-depth reevaluation and updating of each chapter, with consideration given to adding authors to single authored chapters in an effort to expand the usefulness of these chapters. *General and Applied Toxicology* is well worth its price and should be on every toxicologist's book shelf.

*Edward M. Jackson, Ph.D.*

REVIEWER
BOOK REVIEW

*Industrial Surfactants*, second edition, edited by Ernest W. Flick, Noyes Publications, Park Ridge, NJ, 547 pages. $145.00. 1993.

Surfactants are among the most important of all classes of chemicals for both consumer and industrial products. However, one of the most frustrating experiences for analytical chemists, formulators, and toxicologists is dealing with trade names when the chemical name of a surfactant is really required for their work. Resolving that difficulty while providing meaningful information about a given surfactant is what *Industrial Surfactants* sets out to do, and does extremely well.

The editor has gathered information on over 2900 surfactants from nearly 50 surfactant suppliers and laid out this information in an easy-to-use and well cross-indexed format.

The Contents and Subject Index is in the beginning of this reference and lists the surfactant suppliers in alphabetical order. Following this standard subheadings such as Industrial Surfactants or Ethoxylated Amines are used for all company listings. Under these standard headings are listed the proprietary names of that company’s surfactant products in that class of surfactants. If one knows either the surfactant supplier or the supplier’s tradename for that surfactant, this index will guide one to the right surfactant.

But the author does not leave it at that. A very handy trade name index in alphabetical order is at the back of this reference for quick reference to any surfactant in the text.

The main body of this volume is the Product Information section. Here the author lays out clearly and precisely the name of the surfactant supplier, the class of surfactants, an alphabetical listing of the proprietary names of the surfactants manufactured by that supplier, with a very useful one-line description of the weight, the percentage of surfactant, and a vehicle or substrate the surfactant is supplied
with. Following this listing is a detailed paragraph on each surfactant, which in itself is worth the price of the reference.

Finally, the text also includes current and up-to-date contact information under the section entitled Suppliers’ Addresses.

Rarely is a reference so valuable as to be indispensable. But we give this accolade to *Industrial Surfactants* because it is so richly deserved.

*Industrial Surfactants* in its second edition is a reference guide that analytical chemists, formulators, and toxicologists will find essential as an addition to their library.

Edward M. Jackson, Ph.D.
REVIEWER
BOOK REVIEW

Percutaneous Absorption: Drugs–Cosmetics–Mechanisms–Methodology, third edition, edited by R. L. Bronaugh and H. I. Maibach, Volume 97 in the Drugs and Pharmaceutical Sciences series, Marcel Dekker, Inc., NY, 955 pages. $225.00. 1999.

Few toxicologists recall the dual aegis of this volume on percutaneous absorption, so they bear repeating. This field is one of the few that has been led by a regulatory agency, the United States Food and Drug Administration (FDA). Dr. Robert Scheuplein ably headed up the percutaneous absorption research efforts at the FDA. He was replaced by Dr. Robert L. Bronaugh, who trained under Dr. Scheuplein and has become a leader in this field who is recognized around the world.

The second aegis is the joint FDA–Society of Cosmetic Chemist meetings held periodically in Washington, D.C., in the 1970s and 1980s. These meetings, made up of the rapid-fire presentation of data, were the foundation of the first edition of Percutaneous Absorption, which has now gone through a second edition and this wonderfully expanded third edition.

Percutaneous Absorption is organized into three main sections. The first section, Mechanisms of Absorption, is comprised of 10 chapters beginning with Mathematical Models in Percutaneous Absorption through In Vivo Relationship Between Percutaneous Absorption and Transepidermal Water Loss, and ending with In Vivo Percutaneous Absorption: A Key Role for Stratum Corneum/Vehicle Partitioning.

The second section, Methodology, has 24 chapters and covers all aspects of both in vivo and in vitro methodologies. We found Dr. Bronaugh’s chapter, entitled Determination of Percutaneous Absorption by In Vitro Techniques, to be one of the best chapters in this section. However, it is generally accepted that the original Franz cell used to detect passive percutaneous absorption and the Bronaugh flow-through cell used to estimate the dynamics of percutaneous absorption are the two best approaches. This being the case, we found no reference to and no clear discussion of...
the original Franz cell in this chapter. There are still times when this approach yields
the required information. Another excellent chapter in this section is that by Surber
on Tape-Stripping Techniques. At times a chapter like this can be worth the price
of the entire book. However, many chapters in the third edition of *Percutaneous
Absorption* can claim that distinction.

The third and final section of the book is on Drug and Cosmetic Absorption.
In our view this section contains the most valuable and useful information in the
third edition of *Percutaneous Absorption*. Nevertheless, the consecutive chapters on
Safety Evaluation of Cosmetic Ingredients followed by Percutaneous Absorption of
Fragrances, with two authors common to both chapters, should have been combined
into one. Individual fragrance ingredients are discussed in the first under cosmetic
ingredients and the same information on these ingredients reappears in the very next
chapter. We found the division of cosmetic ingredients into noncarcinogenic and
carcinogenic to be sterile, theoretical, and inappropriate, especially since no exam-
pies of alleged carcinogenic cosmetic ingredients are cited.

The chapter on Hair Dye Absorption is one of the most useful in this section,
if not the entire book, because it reviews data generated on specific hair dyes using
several systems, but contrasts these with data generated under conditions of real hair
dye use. This permits rational and balanced conclusions to be made on the percutane-
ous absorption of this important class of cosmetic ingredients.

The chapter on Percutaneous Absorption of Alpha-Hydroxy Acids (why alpha
hydroxy is hyphenated here we do not know) is also very good, since it contrasts
adjusted-pH AHA products with actual commercial products. Again this permits ra-
tional and balanced conclusions to be reached on the percutaneous absorption poten-
tial of the two alpha hydroxy acids reviewed in this chapter: glycolic acid and lactic
acid.

Another worth-the-price-of-the-book accolade goes to the chapter on Perme-
ation of N-Nitrosamines Through Human Skin. We found this chapter to be complete
in its review of this subject, practical, and extremely useful in terms of the nitroso-
amine formation issue for cosmetic products.

There is no question that *Percutaneous Absorption* is invaluable for toxicolo-
gists, formulators, and anyone utilizing this valuable research tool.

*Edward M. Jackson, Ph.D.*

REVIEWER
BOOK REVIEW

Atlas of Contact Dermatitis, by R. L. Rietschel, L. Conde-Salazar, A. Goosens, and N. K. Veien, Martin Dunitz Publishers, London, England, 325 pages. $165.00 (£89.95). 1999.

The first impression of the handsomely bound volume entitled Atlas of Contact Dermatitis, with its four-color photographs on the front cover, is that this is the type of book one was used to seeing but that has now become a rarity in the publishing world. The light green flyleaf picture carries through the background of the hard back cover of the book, which is a nice touch. The picture itself is a field of 3m tall giant hogweed (Heracleum mantegazzianum), the full color print of which is found on page 138 of the text as Figure 5.37(b). Its placement is appropriate because this chapter is on plant dermatitis.

The authors state in their brief forward that the Atlas of Contact Dermatitis is meant to supplement existing contact dermatitis texts. There is no question that the authors achieve their goal. The Atlas is made up almost exclusively of well-reproduced color photographs with just enough text and figure legends to let the color photographs speak for the many cases of contact dermatitis depicted in the book.

After a chapter entitled Introduction and Background, there follow chapters on Patch Test and Prick Test Techniques, Management of Contact Dermatitis, Contact Dermatitis by Specific Body Region, Patterns of Contact Dermatitis, Specific Categories of Contact Dermatitis, Occupational Contact Dermatitis, and a final chapter on Unique Cases.

The Introduction and Background chapter clearly differentiates between irritant contact dermatitis and allergic contact dermatitis, and provides a detailed table on diagnostic criteria for irritant contact dermatitis. This is unusual, since until recently the contact dermatitis literature was myopic about irritant contact dermatitis, which is by far the most prevalent contact dermatosis. The photographs in the Back-
ground and Introduction chapter clearly depict these diagnostic criteria, exemplifying a differential diagnosis for each. One oddity about this chapter is the failure to cite a primary reference on diagnosing irritant contact dermatitis written by the lead author.\(^1\)

The chapter on Patch Test and Prick Test Techniques is equally well done, not yielding to the temptation to become drowned in the "how tos" of patch and prick testing but its "whyfores" instead. We also find it unusual to see both these techniques treated in the same chapter in any book, whether on contact dermatitis or allergy.

The chapter on Specific Category of Allergens warrants some comments. The section on cosmetics is balanced, which makes a refreshing change. The authors state that of all the reactions to cosmetic products, reactions to the preservatives and to the fragrances in these products make up over 50% of all reported actions. The photographs of the dimethylglyoxime test showing a positive nickel reaction are a rarity and most welcome in a text using the impressive name of Atlas in its title.

There are some deficiencies here, however. The section on plants deals almost exclusively with allergic contact dermatitis to plants, with no mention of irritant contact dermatitis. This is a standard deficiency in such texts, but we refer the reader to a reference worth remembering for its coverage of irritant contact dermatitis to plants.\(^2\)

Another deficiency is the mismanagement of the chemistry of plastics, confusing methacrylates (and the contact dermatitis literature's error of placing parentheses around "meth" in methacrylates) with acrylates with cyanoacrylates. These three chemical classes are distinct and the contact dermatitis potential of individual chemicals in these classes can also be quite different. This is exemplified by methyl methacrylate (MMA) and ethyl methacrylate (EMA) in the methacrylate class.\(^3\) This confusion continues in the chapter on dentistry in Occupational Contact Dermatitis. We must hasten to add, however, that this is more the fault of errors in the general contact dermatitis literature than it is of the authors themselves.

The final chapter on Unique Cases is worth reading in detail and in its entirety. Lucid explanations with superior photographs of unusual contact dermatitis manifestations are on every page of this concluding chapter. As the saying goes, it is is worth the price of admission; or, in this case, the chapter is clearly worth the price of the book.

A final comment on the lone Appendix in the book. This Appendix lists all the allergens commercially available in the United States and in Europe in standard trays of allergens. This in itself is a contribution, rather than drowning the reader in details on how to obtain what one might term black market allergens, or bemoaning the fact that there are not more commercial trays available. This is all true, but of little help to the practicing clinician and of little interest to the referring physician.
**Atlas of Contact Dermatitis** is clearly worth its price and ought to be in the office of every dermatologist, practicing or otherwise, every cutaneous toxicologist, and every formulator of consumer products.

*Edward M. Jackson, Ph.D.*

**REVIEWER**

**References**

1. R. L. Rietschel, Diagnosing irritant contact dermatitis, In *Irritant Contact Dermatitis*, E. M. Jackson and R. L. Goldner, Eds., New York, Marcel Dekker, Inc., 1990.
2. W. L. Epstein, Irritant contact dermatitis: House and garden plants, in *Irritant Contact Dermatitis*, E. M. Jackson and R. Goldner, Eds., New York, Marcel Dekker, Inc., 1990 (reprinted on pp 207–235 of this Journal issue).
3. E. M. Jackson, The sensitization potential of methyl methacrylate and ethyl methacrylate, *Am. J. Contact Derm.* 10(1): 49–50, 1999.