those who experience it, as well as in those who read about it. Such adjectives as hostile, frigid, barren, pure, beautiful, forbidden, cruel and isolated have been used to describe arctic environments. However, in recent years, the word "polluted" has joined the list of adjectives. Now, one thing the Arctic does not do is generate apathy. If apathy about the arctic pollution exists in the reader, it is probably due to the reader's unawareness of the extent of the industrial pollution that drifts "in patchily with air masses from lower latitudes." One of the first things that this book does is to wake the reader (if unawaken) to the high degree of air pollution that exists in the Arctic and create a real sense of urgency and seriousness. As Len Barrie, of the Atmospheric Environment Service (Canada), states in his paper "Arctic Air Chemistry: An Overview" (the first paper in the book):

> The first documented report of Arctic air pollution (coining the term "Arctic haze") was published nearly 30 years ago by Michell (1956). . . . The Arctic atmosphere is no longer a pristine environment untouched by man.

Arctic haze has become almost synonymous with arctic air pollution. This is what the book is all about.

This book brings together a series of "edited versions" of the papers presented at the International Symposium on Arctic Air Pollution held at the Scott Polar Research Institute, Cambridge, England, 2-5 September 1985. The conference was attended by scientists from "arctic nations" with deep and vested concern about the pollution of the arctic environment. Lack of Russian participation was very unfortunate in this regard. The papers in this volume focus, as Glenn E. Shaw from the University of Alaska points out in the introduction, on "discussions about the location of pollution sources and transport pathways, climatic influences of Arctic air pollution, and possible effects on human health." It is along these divisions that the book is structured.

The book is divided into four basic parts, each beginning with a short introduction summarizing some of the main points of the papers in that part: Part I — composition, source areas and transport pathways, comprising 6 papers; Part II — local, regional, global, ecological and climatic implications, comprising 8 papers; Part III — health and ecological issues, with 7 papers; and Part IV — international cooperation and state responsibility, making up 6 papers. The book ends with a section on conclusions and recommendations adopted by the participants of the conference.

Part I successfully characterizes the main features of arctic air pollution in terms of meteorological and chemical processes and attempts to establish the reality and seriousness of the pollution. Results of research in Canada, the United States, Sweden and Denmark are summarized, with measurements identifying the composition of the pollution as particulate matter (such as carbon soot and sulphate aerosols) and gases (including sulphur dioxide and oxides of nitrogen). Air pollution becomes particularly acute in the Arctic during the winter season due to strong surface temperature inversions, which effectively prevent vertical dispersion of pollutants originating mainly in industrial areas in lower latitudes, including northern Europe and Russia.

One of the major concerns resulting from air pollution in the Arctic is its impact on regional and global climate. This concern is brought out and discussed in Part II. Significant perturbation of the solar radiation budget due to changes in albedo caused by graphite carbon particles, changes in vertical distribution of atmospheric heating rates caused by presence of arctic haze and upsetting of energy budget in the Arctic due to the increased amount of low clouds induced by haze particles acting as cloud condensation nuclei are presented and assessed.

A unique feature of the Cambridge conference, and therefore of this volume, compared to previous conferences and meetings on arctic air pollution, is the inclusion in Parts III and IV of issues related to impacts of air pollution on human health, ecological systems and processes, as well as political, legal and policy questions and strategies. Part III manages to bring out quite clearly the susceptibility of human health and the vulnerability of arctic natural ecosystems. The conclusion of Part III seems to be, however, that present observational data indicate very minimal impact on human health and ecological systems. But more data are required to determine the trend in arctic air pollution to assess potential danger.

One of the more interesting aspects of the volume is a discussion on the presence of several radionuclides (including strontium-90 and cesium-137) that could accumulate to potentially dangerous levels, causing health hazards such as cancer. For example, a paper by W.C. Hanson, of Hanson Environmental Research Services, gives a startling (at least to this reviewer) indication of radioactive body burdens in Inuit populations up to "200 times greater than those in human populations of temperate latitudes." Another paper by C.D. Stutzman and D.M. Nelson also addresses the human issues related to radioactive fallout from nuclear weapons testing in the 1950s and '60s.

Political, legal and policy implications of arctic air pollution are presented in Part IV. Many ideas and opinions are raised in regard to controlling air pollution in the Arctic. For example, Louis Rey, from Comité Arctique Internationale, suggests the possibility of some kind of an international law in a "joint development" with "analytical chemistry [and] dynamic meteorology" to "fingerprint" polluted airmasses and to identify their sources accurately. There is also a call for more international cooperation in scientific research and monitoring of arctic air pollution. Part IV concludes with a short paper by Matthew Bean, of the Association of Village Council Presidents in Alaska, pleading that "something must be done about air pollution" in the Arctic. He ends his presentation by calling on the "Arctic nations, and those other industrial nations whose air pollution is settling in the Arctic, to join with [them] in seeking solutions to this problem of Arctic Haze."

A good summary of the findings from the Cambridge conference is provided by C.C. Wallén (World Meteorological Organization) in Part V. Recommendations and proposals for further research to increase our understanding of arctic air pollution are also presented.

The book, to some extent, achieves its objectives of examining "the problem of Arctic air pollution in an integral, comprehensive and multidisciplinary fashion." However, there are always some difficulties and problems associated with a book composed of a collection of papers written by different authors because of uneven approach, different levels of technical expertise and repetitive (and sometimes conflicting) presentations of observations and definitions. The present volume suffers somewhat from this, mainly because of its multidisciplinary approach. The book is not designed as a textbook, since it lacks synthesis to tie observations and interpretations into a coherent scientific story. It is, however, a very good and informative reference book for those already acquainted with arctic air pollution.

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ALASKA'S WILDERNESS MEDICINES: HEALTHFUL PLANTS OF THE FAR NORTH. By ELEANOR G. VIERECK. Illustrations by DOMINIQUE COLLET. Edmonds, Washington: Alaska Northwest Publishing Company, 1987. 107 p., 45 illus., glossary, index, bib. Softbound. Cdn$12.65; US$9.95.

This small, attractively presented book, designed for the general public, features 38 types of Alaskan wild plants that are alphabetically ordered by common name and illustrated by black-and-white drawings of each. The author briefly discusses healthful uses of

plants and provides advice on collecting and preparing leaves for tea. She includes comments about their distributions and potential medicinal active ingredients when known and discusses the medicinal uses both native and European, and in some cases culinary and other uses. At the end she includes a summary list of therapeutic uses of Alaskan plants and another list of conditions that can be treated with these Alaskan plants. The illustrations are artistic and botanically accurate but could have been further enhanced by an indication of scale on each. The author includes only species that are very common, excluding any that are potentially rare or endangered. In fact the ranges are so broad that 37 of the 38 occur all across northern North America.

The stated objectives are "to acquaint people with Alaskan wild plants which can be used to promote health and healing, for first-aid emergency care, or to maintain wellness." The book promises to be "the first of its kind . . . integrating and combining Alaskan ethnobotanical lore with European and American herbal traditions to serve as a natural history guide to medicinal plants of Alaska and their uses." The back cover suggests that the reader will be told where to find each plant and how to collect and brew healthful herbal teas, and that the book makes a valuable contribution to plant lore.

Unfortunately, this book does not live up to its initial, pleasing impression, nor does it fulfill its stated purposes. It is flawed with several serious errors and many trivial but irritating editorial errors, as if a very early draft somehow made it into print with little editorial attention.

The most serious error was detected prior to this review. An *errata* page was issued correcting the names on an illustration, which incorrectly identified the root stock of *Angelica* as that of the poisonous water hemlock and vice versa. Initial copies of the book were removed from bookstores and the *errata* page was included. The *errata* page, however, is a loose insertion and unless it is glued over the flawed illustration, the potential for serious consequences still exists. The possibility of confusion between these two plants continues, in spite of the *errata*, because she uses *Cicuta* root in the text but only the common name, water hemlock, on the diagram.

The most continual, if trivial, faults with this book lie in the lack of attention to editorial detail. There are numerous typographical errors, the most common being the consistent placing of citations between sentences. The inaccuracy of citations and references is most irritating. For example, the statement: "The juice of *Angelica* is used both in Eurasia and America to relieve pain in a decayed tooth, and is one of the many herbs considered a tonic to improve well-being and mental harmony (Lewis and Elvin-Lewis)" cannot be fully attributed to that reference. Lewis and Elvin-Lewis do mention its use to relieve tooth pain, but the tonic effect is probably a confusion with uses attributed by many (but not Lewis and Elvin-Lewis) to ginseng. Incidentally this reference to Lewis and Elvin-Lewis (1977) is incorrectly given throughout the text and in the list of references as Lewis.

Other citations are not referenced (Heinerman, Pfeiffer, Leek and White, to name a few) or are incorrectly cited: (Viereck) for Viereck and Little; and (Simonite-Culpeper) for Simonite and Culpeper. Other errors in references may be present but have not been detected because most references are not readily available.

Other major editorial errors include the listing of the Latin name for Labrador Tea as *Larix laricina* (larch) instead of *Ledum* (Hulten, 1968) and the mislabeling of one part of the drawing of Horsetail as *Equisetum hiemale*, when it is actually the fertile stem of *E. arvense.*

Information regarding actual chemical constituents of the plants covered is extremely limited. This is not the fault of the author but the lack of research into such. The author has listed chemicals from related species in the genus or family when available. These may or may not apply to the Alaskan plants. The lack of scientific knowledge about the chemical constituents of the plants should in itself make a reader wary, particularly about ingesting teas made from plants that are poisonous to livestock such as Yarrow and Horsetail.

Sections dealing with traditional uses of each plant are a compendium of uses copied from other sources, as well as a few personal testimonies from the author and friends. Those interested in ethnobotanical information would be better served by original sources such as Kari (1977) or several cited anthropological papers. Those wishing practical information on treating ailments with Alaskan plants will be frustrated. The author sometimes uses undefined terms such as anthelmintic, scorbutic, haemoptysis and menorrhagia. She also refers to old-fashioned ailments such as poor blood, stomach weakness, chest or kidney trouble, and treatments such as blood purifier, kidney tonic, preventive tonic, and strengthening to the brain without translating them into modern parlance.

A major weakness in both the text and summary lists is the author's failure to distinguish between uses that are probably ineffectual from those that are efficaceous. Boldfaced plant names in the two summary lists: "Conditions that can be treated with Alaskan plants" and "Therapeutic uses of plants" indicate those plants "thought to be the most effective." However, the mere listing of plant names after conditions as diverse as alcoholism, bedwetting, diabetes, gout and stings implies some possible beneficial effect. In many cases I seriously doubt the effectiveness. Suggestions of treating serious, life-threatening, infectious diseases such as tuberculosis and syphilis with herbs such as Juniper, Soapberry, and Currant or abscesses with Chickweed poultices could be dangerous to both the victims and their friends.

Exhortations on the author's benefit from using particular species would ordinarily promote their use. In the case of Chickweed, she compounds the Alaskan plant with many other plant materials not so readily available or even found in Alaska, thus defeating a purpose of the book.

I am concerned about glowing anecdotes such as her friend's recommendation of a Chinese herb don quai, thought to be an *Angelica* species, for pain-free menstrual periods. This may lead many women to experiment with Alaskan *Angelica*. And after mentioning the use of an infusion or tincture of coltsfoot for diarrhea and in a cough syrup, she briefly warns about the abortive properties of large quantities of coltsfoot tea and cites Heinerman. How large is large? She does not say and Heinerman does not appear in the references.

Little information is provided on concentrations or frequencies of applications. Instructions for harvesting and processing some plant materials such as birch sap are quite detailed. In other cases such instructions are missing or incomplete. Detailed instructions provided for the preparation of dried Dandelion root fail to indicate what to do with the chunks once dried. For treatments using barks, inner barks, stalks, or root tissues, readers are generally uninformed.

Culinary uses are also listed for some species, but not for Crowberry, Currant, Dandelion, High Bush Cranberry, Juniper, Sourdock, Strawberry, and Bearberry. Such interests are better served by Walker (1984), Szczawinski and Turner (1978, 1980) and Turner and Szczawinski (1978, 1979). The inclusion of a section dealing with these same herbs as winter survival foods might further the utility of other editions of this book.

Several additional warnings should be passed on to the reader. Many people allergic to ragweed or other members of the Compositae can be severely allergic to several Alaskan herbal plants, such as Camomile, Yarrow and Wormwood, particularly when flowers are included in the preparation. Also omitted is the painful photodermatological reaction that can occur to the hapless collector who gets plant juice of *Angelica* on the body and then exposes the area to sunlight. This action is difficult to avoid when collecting. Nor does the author make any mention of how painful contact with thorns of Devil's Club can be when merely passing by it, let alone the reactions one might get when attempting to collect it!

Even though the author has stated that this book is not intended as a self-care manual of medicine, it would be appealing for just

such a use. The lack of care with simple items such as labels and references reduces my belief in the reliability of her suggestions as to the medicinal uses of the plants. Because of these numerous errors and omissions I cannot recommend the use of this book.

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Response from the author:

Of the three errors in the printing of the labels on illustrations in my book, the most serious and potentially life-threatening one is the mix-up in the illustration for *Cicuta* and *Angelica*, I totally agree. Although the reviewer infers that I use only the Latin name in the text and the common name on the diagram, there is both common and Latin name in the text in the same paragraph. Still, the possibility for confusion is there and it is most deplorable indeed. I would not agree that the placing of citations between paragraphs is a typographical error, but rather a choice of style in which this publisher is not obliged to follow a particular convention. I disagree with the reviewer that the omission of more detailed and consistent culinary information is an error; the edible wild plant uses are thoroughly covered in other references such as Christine Heller's fine field guide.

I agree again with the reviewer that it is well to be wary in the ingesting of wild plants and teas where there is a potential for poisonous effects. Is it not true that all drugs are potentially poisonous? How many children die each year from eating aspirin? And so any plant which contains a medicinal or psychoactive drug is likely to cause harm. One could extend this generalization to its logical extreme by postulating that all powerful things such as fire, money, even love are hazardous if misused. I have pondered over the wisdom of writing about such difficult issues and I have indeed, suffered many qualms over the publishing of a book that may lead someone to harm themselves or the environment. This philosophy is discussed briefly in the section on collecting plants, pp. 2 and 3, and the admonitions, warnings and disclaimers that this book is not a self-care manual are repeated in several places: pp. 1, 82, and 85.

The reviewer, for whose detailed attention I am truly grateful, touches upon another issue that has given me great concern, that of the credibility of the information in the literature on plant medicines where folklore and superstition are mixed in with more scientifically valid data. As I said on page 85, "Some of the alleged plant uses may be apocryphal or unfounded". Much of the information from the ethnobotanical literature is anecdotal. And my experience has been that a home remedy with herbs that works well for some persons may not be efficacious for others. The mind-set and attitude of the student or patient seem to be especially important. In other words, if they believe that the remedy is going to help them the chances are improved that it will do so. Thus it is beyond my wisdom to distinguish between uses that are probably ineffectual from those that are efficacious.

To continue commenting on the issue of which remedies are efficacious, there is obviously a lot about the art of medicine that we do not know; botanic medicine is no exception. The psychosomatic element in medicine is something that has eluded the logic of the scientific method. This emotional factor may be involved in more than half of the illnesses that bring patients to doctors. And certainly the placebo effect is a well-established phenomenon in healing with remedies. A placebo is a preparation containing no medicine that is given merely to humor the patient. There is little doubt that many so-called herbal remedies have been placebos; this is also true of a great deal of mainstream medical therapy. Wise doctors know that they do not heal patients, they merely improve the conditions for self-healing. Joan Borysenko has founded a Mind/Body Clinic at the Harvard Medical School and describes the work of this clinic and the field of psychoneuroimmunology in her book *Minding the Body, Mending the Mind*. So, a simple cook-book list of remedies needs to be considered in context of the whole situation.

I chose to include the term "avatar" in the glossary to bring attention to the spiritual element in healing. And I chose to use the old-fashioned vocabulary of herbal medicine, with terms such as "blood purifier" and "scorbutic," without translating them into modern parlance because I wished to keep the reader reminded of the fact that we are dealing with a rather antique art and lore in the world of herbal remedies. It would be well to remember the difference between a cup of willow bark tea and an aspirin tablet. Translating the poetic language of herbal lore into modern parlance was simply not appropriate because the modern research has not been thorough enough to make it feasible. I chose to cite the references to herbal remedies for serious diseases such as tuberculosis even though there are synthetic drugs that are far more efficacious, not to try to encourage someone to go back to the middle ages in medical treatment, but to emphasize the historical and traditional aspect of the subject as opposed to the idea that this is a modern recipe book for self-healing with herbs. I even chose to quote the astrological herbalist who says of chickweed, "It is a fine, soft, pleasing herb, under the dominion of the Moon" (Culpeper, n.d.).

I have not recommended dosages; after all, this is not a self-care manual, and the issue is very complicated because dosages are difficult to determine due in part to the variability in human beings and they are unreliable due to the variability of the content of plant constituents, which vary daily, seasonally, geographically and genetically. This has been the subject of numerous botanical researches and in the essential oil production industry there are extensive selections under way to isolate what are known as "chemotypes", plants that have a desirable chemical constitution (Lavabre, 1988). Thus, even in the industry there is awareness of the variability among members of a plant species with respect to their content of drugs or other important chemicals.

To conclude, if there is one quality that may be of unlimited value it could be "wisdom." However, wisdom is not a simple thing that can be quantified or measured in a linear scale. Learning and information are more quantifiable and the aphorism "a little learning is a dangerous thing" suggests that there are indeed hazards on the path. Is a lot of learning going to lead to wisdom? Not necessarily; consider the issue of atomic bombs, the logical outcome of a lot of learning in nuclear physics. No! Wisdom requires balance, balance between the scientific and the ethical, balance between the intellectual and the emotional, balance between the sensual experience and the intellectual analysis. So in the path of herbology, herbal remedy use, medicinal herb study, or "wildcrafting" the student must deal with decisions as to where to begin. I would recommend my book as a place to begin, fraught with errors as it is, for those errors will be corrected in the second edition. But I agree with the reviewer that I would not recommend *the use* of this book. The admonition is clearly stated in several places that the book is not intended for *use* in self-care. In order to use a book for the purpose of self-healing, one needs a lot of wisdom, which requires balance, discrimination, and attention to the whole situation. It also requires experience, and in order to benefit from the experience of authorities and experts in the field one must study and search for the most reputable sources available. In an area such as botanic medicine, where there is controversy and disagreement, one needs to listen to different points of view. The examination of various points of view on an issue is best pursued in the pages of a journal such as *Arctic*, to whose editors I extend my appreciation for the opportunity to debate these issues in greater depth.

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ENDANGERED SPECIES: CANADA'S DISAPPEARING WILDLIFE. By CLIVE ROOTS. Markham, Ontario: Fitzhenry & Whiteside, 1987. 89 p., 59 black-and-white drawings. Hardbound. Cdn$22.50.

Endangered species share a high profile in the public arena with large birds and mammals. Disappearing wildlife are of great concern to 84% of society (Filion *et al.*, 1983). They are symptoms of our abuse of this planet. Author Roots claims to "have produced a testament to what Canada once had and a warning of what it may lose if its legacy of life is not cherished" (from the jacket cover). Unfortunately the testament is flawed in so many ways that they make this book difficult to recommend.

To the book's credit, it chronicles not only birds (23 species) and mammals (27 species), but the often ignored amphibians (12 species), reptiles (18 species), and fish (22 species). Unfortunately no plants or insects are presented. After a one-page introduction each species has a brief text. There is no general discussion of endangered species. The 50 species of birds and mammals receive most of the attention for 69 pages, while the other 52 species are covered in 17 pages. Each species is illustrated with a black-and-white line drawing by Celia Godkin. Some illustrations are excellent, while others are mis-proportioned.

The author did not appear to keep a tight definition of the species that are included. Some species are extinct, such as Passenger Pigeon, while others are common and increasing, such as Merlin and black bear. Several mammals, such as wapiti, pronghorn and bighorn sheep, have well-managed populations and cannot properly be considered part of "Canada's disappearing wildlife."

The book does alert the reader to the major causes of declines of species in Canada. Historically market hunting was a major factor in the decline of many species. Habitat loss is the major factor today and is identified as a problem for several species. Toxic chemical concerns are more difficult to identify as species decline, but they are a problem for peregrine falcons and implicated for burrowing owls. Road kills, introduced herbivores, introduced predators and egg collectors are less important. Disturbance of wildlife especially at the nest site is not stressed and should be, for example, with White Pelicans.

Wildlife authors must strive to educate the public and not perpetuate inaccurate broad statements. In this book hunters are identified frequently but incorrectly as a threat to several species. For example, "Nevertheless, its [Hudsonian Godwit] habit of trying to mob hunters and other predators makes [present tense] the godwit easy prey for the shotgun" (p. 10). Why are hunters singled out as objects of mobbing behavior? Godwits are not under threat from today's hunters. Historically market hunting for large shorebirds was a major concern, but this has stopped and should not be confused with today's sport hunting. Likewise, "Winter then does what clumsy hunters have failed to finish" (p. 13) to injured Ross's Goose. One could argue that hunters' kill is of concern for some species, but hunters have contributed a great deal to wildlife conservation. The recurrent theme of hunters causing species' declines is unwarranted with today's wildlife management.

The author does not present an enlightened view of wolves. The author states that the grey wolf "is feared by reputation, praised by legend and often misunderstood by layman" (p. 52). The last sentence of this account does little to create a better understanding. "Usually the result of starvation or rabies, such attacks (on humans) show that despite the wolf's resemblance to the domestic dog, it is best left the beast it is at heart."

Many birds and their nests are protected in Canada by the Migratory Bird Convention Act. There is no endangered species legislation that could protect all threatened wildlife. The Hudsonian Godwit is not "Protected in Canada as a rare bird" (p. 10). Rather, it is protected as a migratory bird, along with all other shorebirds.

There is little mention of constructive action that has been taken to save wildlife. The author did not include conservation actions in his list of objectives of the book, but I feel it would have been a stronger effort if the reader had learned of some recovery efforts.

The author does not define his use of the terms endangered, threatened and rare. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which was established in 1977, has created a set of definitions that now have broad national support. In addition the status of many species has been determined by COSEWIC. Burrowing Owl is classified as threatened, not rare as stated (p. 14). The Piping Plover is endangered, not "considered to be threatened in Canada" (p. 29). At least six species are said to be extinct in regions of Canada. This is a misuse of the word extinct, which means to no longer exist anywhere. The term extirpated correctly describes the local and regional disappearance of a species.

Some terminology should be defined for the general reader or not used; for example, a reference to the origins of antelope from the "Eocene Epoch" does not tell the reader that this was 40 to 60 million years ago.

The book suffers from poor editing. Besides spelling errors, e.g., "racoon" (p. 40) and "Halioeetus" (p. 22), there is repetition, such as "they found Funk Island" (p. 4) in two consecutive sentences and on page 50 the kit (swift) fox's alleged inability to flourish where man has settled is repeated in the first and last of four paragraphs of the swift fox account. Likewise in the Burrowing Owl account the first and last of four paragraphs discuss why this owl is rare.

The Burrowing Owl account is also inaccurate. This owl is said to be rare in the first paragraph "because of its habit of nesting near highways and airport runways" (p. 14). While road kills may be a local problem, it is not thought to be a major cause of declines. Then in the last paragraph of the account, "burrowing owls are rare, victims of their tastes for nesting sites and the use of agricultural chemicals that, naturally, drain into their burrows." The application of agricultural chemicals would never be at a dosage that would result in actual flows into depressions. Pesticides are a problem through direct exposure or secondary poisoning from insects, particularly grasshoppers. No mention is made of the shooting of these owls when ground squirrels are being eliminated.

There are many other incorrect statements — the major drawback of the book. Here are some examples. Trumpeter Swan populations number 11 000 to 12 000 (Shandruk, 1987), not several hundred, as stated on page 13. The experimental fostering of Whooping Cranes to Sandhill Cranes has not been successful, since no whoopers have paired or bred (Kuyt, 1987, and pers. comm.). Historical estimates of Whooping Crane numbers are about 1300 (Allen, 1952), not "the thousands" quoted (p. 20). Another incomprehensible statement, "John James Audubon bagged seven [Whooping Cranes] in one day in 1810 — more than all the chicks that have survived during decades of conservation and breeding during this century" (p. 20). In fact over 20 chicks have survived each year since 1986 (E. Kuyt, pers. comm.). Whooping Cranes mature at age 4 (Kuyt, 1987), not 5 to 7 years. Both Bald Eagle and Golden Eagle nest in eastern Canada (Cadman *et al.*, 1987), not just in western Canada as stated. The Prairie Falcon breeds commonly in Saskatchewan and its populations have not been "decimated by agricultural chemicals," although pesticide residues have been found in these birds' eggs (unpubl. data). It is stated that Merlins "occasionally . . . winter