Wilderness Medicine Letter

The official newsletter of the *Wilderness Medical Society*

An international nonprofit professional association serving the medical interests of the outdoor and wilderness community.

Vol. 7, No. 4 October 1990

SOCIETY BUSINESS

Board of Directors

Dr. Joseph Serra, an orthopedist from Stockton, CA, and Dr. Susan Snider, a family practitioner from Spruce Pine, NC, were inducted into the Board of Directors at the Annual Meeting. The Board has now been increased in size to nine members. Dr. Iserson, Treasurer, and Dr. Geehr, Chairman of the Finance Committee, will serve an interim term for one more year.

In This Issue

Newly elected Board members, Dr. Joseph Serra and Dr. Susan Snider.

Nominations for Board Positions

Four positions on the Board will be up for election next year. ***Anyone interested in serving on the Board should submit his or her name to the Chairperson of the Nominating Committee (currently, Dr. Edward Geehr) between the months of October and January, inclusive.*** The nominating committee will then make its recommendations to the President. A slate of candidates will be chosen and biographical sketches will appear along with a ballot and the conditions of the election in the April newsletter. The new Board members (and officers, if it is an officer election year) will be installed at the Annual Meeting. Terms of office for Board members and officers begin and expire at the Annual Meeting.

Board members participate in decisions concerning Society planning and programs, such as the newsletter, revision of constitution and bylaws, Annual Meeting, special projects, finances, membership benefits, and so forth. Meetings are held every few months via telephone conferences. Serving on the Board is an excellent way to assist the Society, and should be undertaken with a realistic but ambitious attitude towards the work necessary to foster the growth of a young medical organization.

By-Laws Change

During a review of the by-laws of the Wilderness Medical Society it was noted that there was no provision for making changes. During a general business meeting at the Annual Scientific Meeting, the following amendment to the by-laws was proposed and accepted by the members present: "These by-laws

may be adopted, amended or repealed by the approval of two-thirds of the Regular Members of the Society voting. The proposed changes of the by-laws will be published and distributed to the membership at least 60 days prior to the vote. The vote may be by mail ballot or at a regular scheduled annual or interim meeting of the Society."

Dr. Edward (Mel) Otten will review the entire by-laws and recommend to the Board any further changes that are needed.

Membership

Current membership numbers more than 2,200 with steady growth.

Sponsors for First World Congress

The WMS is seeking sponsors for the *1991 Annual Meeting and First World Congress of Wilderness Medicine.* Financial sponsors will allow us to keep registration fees as low as possible for our members while allowing the program committee to assemble an outstanding international faculty. Furthermore, the Annual Meeting is a major source of revenue for the Society and mitigating our costs for the educational meetings allows support of other projects. Dr. Bruce Paton has joined the Program Committee with a focus on fund raising. Other members are encouraged to seek support from any business that might have an interest in our educational program. Corporate membership, at $1500, receives multiple benefits including free admission and a display booth at the Annual Meeting. A Patron, at $3000, will receive recognition on the Meeting brochure. A Benefactor, $5000, will be recognized by a named lecture.

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Howard Backer, M.D., *Editor*
Eric Weiss, M.D., *Associate Editor*
Send inquiries or comments to:
P.O. Box 397
Point Reyes Station, CA 94956
(415) 663-9107

Membership information/application is located on the last page.
Appropriate advertisements accepted.
Copies of most past issues are available.

Officers and Board of Directors

Items available from the Society

The following can be ordered from the WMS office.
(Price includes postage)

Three Ring Newsletter Binders (with printed cover and spine)	$7.00
Reprints of WMS Position Papers	3.00
Past Issues of the Newsletter	1.50-2.50
WMS Patch (with logo)	4.00
T-Shirts: 100% cotton, white with large WMS logo in colors: Med, Lg, X-Lg	10.00

American College of Sports Medicine (ACSM)

The WMS and the ACSM are exploring a relationship to share their many areas of mutual interest. ACSM President Neil Oldridge will participate in our meeting at Crested Butte this February, and the ACSM has been invited to present a one-half day symposium on human performance at our 1991 Annual Meeting in Whistler. The WMS was invited to participate at the ACSM meeting in Seattle, 1992.

Wilderness Art

The WMS Board approved a unique proposal to sponsor a series of three original paintings by the accomplished wildlife artist Ralph J. McDonald. He will produce a trilogy entitled "Keepers of the Wilderness," capturing the concept of "mind, body and spirit" through scenes depicting woodland Indians. Each painting will be reproduced in an edition of 1000 signed and numbered prints that will be available first to WMS members for $125 each. Unsold prints will be distributed through his usual network of dealers nationwide. The WMS will invest only in a brochure to advertise the prints to our members and will receive 50% of gross sales to members and 10% of sales released to the general market. The Board reviewed a detailed sketch of the first painting and is excited to arrange this special offer for the members of the Society.

Wilderness Medicine Letter Award

Dr. Karl Neumann was selected to receive the Wilderness Medicine Letter Award for his contributions to this newsletter. His section on Travel Medicine has been one of the most consistent features during the past four years. Dr. Neumann received free tuition to the 1990 Annual Meeting and will receive a plaque in appreciation of his work.

NASAR EMT Advisory Committee

Dr. Peter Hackett, a member of the WMS Board of Directors, was appointed to represent the American Alpine Guides on a program advisory board for the National Association for Search and Rescue (NASAR) Wilderness Medicine program. Mel Otten, WMS Board of Directors and Chairman of the WMS Prehospital Care Committee, will represent the WMS on this committee. This advisory board will consist of representatives from thirteen national organizations that have a direct interest in the wilderness EMT

training program that is being refined and sponsored by NASAR. The board's function will be to review the program annually, to comment on any proposed curriculum changes, and to advise NASAR Medical and Education Committees as requested.

Wilderness Prehospital Emergency Care (WPHEC) Curriculum

The Prehospital Care Committee (consisting of Mel Otten [chairman], Warren Bowman, Peter Hackett, Mike Spadafora, and David Tauber) submitted their draft of a curriculum for teaching WPHEC, which was reviewed and approved by the WMS Board of Directors. The entire curriculum will be published in the *Journal of Wilderness Medicine.* In addition to serving as a guide for wilderness medical responder courses, this curriculum and standards will serve as a basis for developing curricula for medical students.

The second part of this project, the standards for performance, will be derived from the *WMS Position Statements* (second edition, 1989). These will be expanded and updated as necessary within the next year. Any member interested in participating in developing and reviewing the Position Statements should contact Dr. Otten or Dr. Ken Iserson, indicating specific areas of expertise.

MEMBERS' BULLETIN BOARD

Regional Chapters

As the Wilderness Medical Society comes of age and grows in size, some of our objectives may be best accomplished on a local or regional level within the national organization. With this hypothesis, the Annual Meeting at Snowbird saw the formation of a task force on "Regions." The organizers were Mark Constance (Washington), Michelle Lundy (Arizona) and Ken Zafren (Alaska). Howard Backer represented the Board of Directors at the first meeting.

Among the proposed benefits for regionalization are enhanced ability to recruit new members and the offering of Continuing Medical Education (CME) and other activities on a local level.

CME courses offered by regions would need to be approved locally by a hospital, or if they are to be sponsored by the WMS, by the CME Committee. The WMS does not engage in joint sponsorship of CME courses. Beyond this requirement, the task force reached no conclusions about the form that regions will take.

Several issues were raised. Dr. Backer planned to poll the members of the task force about the optimum boundaries of regional areas, criteria for the formation of a region (for instance, should we require a certain number of members to express interest), restrictions, obligations, and administrative responsibilities of regions. The group hoped to avoid additional dues associated with regions. All members of regional subgroups must first be members of the WMS.

Meanwhile, the proposed Alaska Region will forge ahead. We have called a meeting this month of all interested members in Alaska. All members who would like to participate in the task force or in the Alaska Region should contact Ken Zafren (10181 Curvi St., Anchorage, AK 99516; Phone 907-346-2333; FAX 907-563-7017).

Ken Zafren *Anchorage, Alaska*

Suggestions Solicited for Book

I shall be starting work this winter on the thirteenth edition of *Mountaineering Medicine—A Wilderness Medical Guide.* Any constructive suggestions for improving the new edition would be carefully considered.

Fred Darvill, M.D.
809 South 15th St.
Mount Vernon, WA 98273

American Andes Biomedical Research Expedition Update

The American Andes Biomedical Research Expedition (AABRE) returned to Bolivia in late May 1990 to investigate the efficacy of acetazolamide plus dexamethasone in preventing acute mountain sickness (AMS) symptoms. We accomplished our research mission and placed 16 of 22 climbers on the summit of Cheroco (20 219'). Data collected includes: visual evoked potentials, visual acuity, tactile acuity, pulmonary function tests, performance assessment, environmental symptom questionnaires, oximetry, ECG, serum samples for stress hormones, exhaled gas monitoring, ambient gas monitoring in a portable hyperbaric chamber, transcutaneous PO_2 and PCO_2 measurements, vital signs and results from physical examinations. Preliminary review of data suggests that one 500 mg Diamox Sequel® for 6 days plus 4 mg of dexamethasone BID, beginning the day of departure from sea level, prevents AMS symptoms more effectively than one Diamox sustained release capsule taken daily at 4 PM.

AABRE plans to return to Bolivia in 1991 to continue its research mission. Research protocols will need to be submitted for review four months prior. Research will be accomplished at sea level, LaPaz (12 500') and in a ski hut (17 300') on Days 3 and 4 of ascent. Subsequent ascents of Illampo and Ancohuma, extreme skiing and glacial cross country skiing, trekking at altitude, Amazon Valley excursions and sightseeing can be planned. The Maryland Institute for Emergency Medical Services Systems (MIEMSS) and the Shock Trauma Center Anesthesiology Department will be asked to sponsor AABRE 1991. As before, protocols will be submitted to the University of Maryland Medical System (UMMS) Human Volunteer Studies Committee for approval.

Those interested in participating as research investigators and/or subjects should contact William N. Bernhard, M.D., MIEMSS Anesthesiology Dept., Shock Trauma Center, 22 S. Greene Street, Baltimore, Maryland 21201. Climb Director and Expedition Organizer will be Frank Gibney, 795 Williston Rd., Williston, Vermont 05495. Telephone numbers: (802) 657-7315 (day) and (802) 879-7419 (evening).

AABRE trip and climb expenses are estimated to be $2,000, which includes air travel from Miami to LaPaz and return trip to Miami. Additional trips, treks and excursions are inexpensive and easily arranged by our head guide in Bolivia, Bernardo Guarachi.

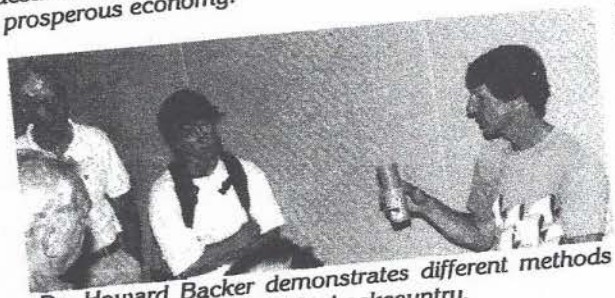
William N. Bernhard, M.D.

1990 ANNUAL MEETING HIGHLIGHTS

Eric Weiss, MD

In his keynote address, Gaylord Nelson posed the question: "Can we have both a clean environment and a prosperous economy?"

Douglas Gentile, M.D., WMS Program Chairman for the 1990 Annual Meeting and for the World Congress, Whistler, B.C., 1991.

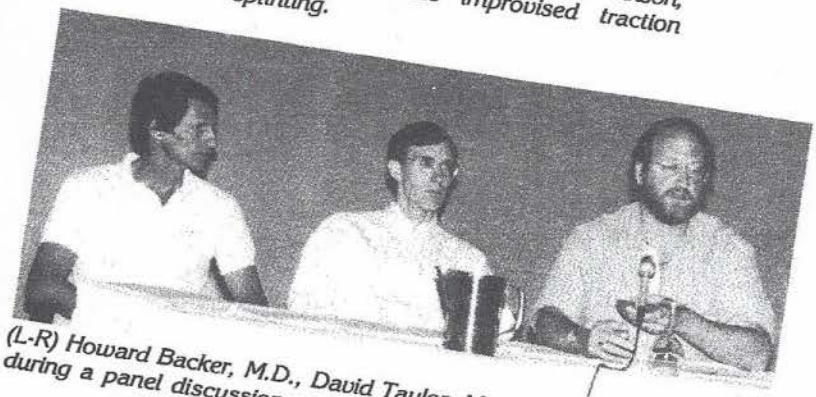


Dr. Howard Backer demonstrates different methods of disinfecting water in the backcountry.

Howard Donner, M.D. and Lanny Johnson, R.N. demonstrate improvised traction splinting.

Dr. Henry Herrmann, demonstrating techniques for managing dental emergencies in the field.

Photos Courtesy of Eric Weiss, M.D.



(L-R) Howard Backer, M.D., David Taylor, M.D. and David Shlim, M.D. during a panel discussion on Wilderness Infectious Diseases.

At the Sixth Annual Meeting of the Wilderness Medical Society in Snowbird, Utah, 35 distinguished speakers from around the U.S. and several foreign countries gathered to present new insights and information on Wilderness Medicine. The Society's meetings are unique because they go beyond review material to focus on recent updates on wilderness medical topics. In addition, the Annual Meeting assembles multiple authorities in a specific field to present panel discussions of controversial topics. Some of the highlights from the lectures and workshops are presented below.

Wilderness Trauma

Joseph B. Serra, M.D., one of the newly elected Board members of the Society, presented his double-slide lecture on the management of dislocations and fractures in the wilderness environment. Dr. Serra has been an advocate for realigning fractures and reducing dislocations in the field if the "rescuer is comfortable with attempting a reduction and if the victim is agreeable." Following the lecture, Dr. Serra gave his popular workshop demonstrating different techniques of reduction and immobilization of orthopedic trauma in the wilderness.

Whitewater Medicine

According to a 1988 National Sporting Goods Association survey, there are 10 times as many participants involved in canoeing, kayaking and rafting as there are in both climbing and mountaineering. Reflecting this increased popularity, the topic of whitewater medicine was presented to the general assembly by Dr. Eric Weiss. This was supplemented by an afternoon workshop-demonstration on safety techniques and swift water rescue, where Dr. Weiss was assisted by Anne Dickison, M.D., and Roger Sherman, M.D.

Animal Bites

Ken Kizer, M.D., a founding member of the WMS and director of the Department of Health for the State of California, received the award for the most gory slides during his presentation on management of animal bites. He emphasized the importance of differentiating high risk wounds (i.e., punctures, hand and foot wounds, treatment delay exceeding 9-12 hours) from low risk wounds in determining the best management. Dr. Kizer also warned of the hazards from the growing popularity of pet ferrets. According to Kizer, ferret play often assumes the form of mock attacks and serious wounds have been inflicted on infants who may be perceived by ferrets as prey. Dr. Kizer advises medical and public health organizations to oppose the keeping of ferrets as pets.

Wilderness Infectious Diseases

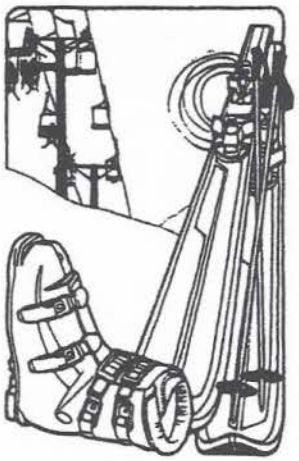
Drs. David Taylor, David Shlim, and Howard Backer, presented various topics related to infectious diseases among foreign travelers, and then combined in a panel discussion to answer questions and debate aspects of controversial medical management. This included the pros and cons of two new drugs, ciprofloxacin and mefluoquine, for the prevention and treatment of travelers diarrhea and malaria respectively.

Dental Emergencies

For the first time at any wilderness medical conference, a lecture-demonstration on the management of wilderness dental emergencies was given. Henry Herrmann, D.M.D. showed techniques of dental anesthesia, cavity replacement, and repair of fractured teeth, and distributed free samples of Cavit® (temporary filling material) to all of the participants. We hope to hear more on this topic at the Wilderness Medicine World Congress in 1991.

Keynote Address by Gaylord Nelson

Gaylord Nelson, a U.S. Senator (D-Wisconsin) from 1962-1980 and co-founder of "Earth Day," presented a stirring address on the economic, social, and political importance of preserving our natural resources, emphasizing that "it is this resource base that defines the habitat and the limitation for survival of all species, plant and animal, including humankind."



Winter Wilderness Medicine Conference "Great Expeditions"

The first winter scientific meeting of the Wilderness Medical Society will be held in the rugged splendor of Mount Crested Butte, Colorado, February 13-17, 1991. If your idea of paradise is wide open, sunny skiing in a town that is rated "one of the ten most romantic ski resorts in America," interspersed with outstanding lectures by world authorities on the current management of frostbite, hypothermia and avalanche danger, then this conference is for you.

Two panels, one on controversies in frostbite and hypothermia, and the other on the problems of extreme altitude, will feature experts including three physicians who have summited Mt. Everest. Morning workshops will include demonstrations on polar equipment and clothing, and the use of dogs in avalanche rescue. Activities will allow participants to practice winter survival techniques including the construction of snow shelters and the search for buried victims of an avalanche slide.

Highlights of Winter Wilderness Medicine 1991

- Panel discussion of hypothermia and frostbite.
- Workshops/demonstrations:
  1. Avalanche prediction and rescue techniques.
  2. Cold weather survival techniques.
  3. Expedition clothing and equipment.
  4. Physical conditioning for wilderness activities.
- Evening programs:
  1. The West Ridge of Everest by Thomas Hornbein.
  2. The 1990 American Kangchenjunga Expedition by Frank Coffey.
  3. The 1989-90 Traverse of Antarctica by Geoff Sommers.

Crested Butte Features:

- Over 877 acres of great skiing for every level.
- North Face and Phoenix Bowl areas rank as Colorado's best extreme skiing.
- Children's ski and day care center.
- Site for the U.S. Alpine Ski Championships.
- Many fine restaurants.
- Cross-country skiing.
- Horseback and sleigh rides.
- Indoor tennis and racquetball.

EDITORIAL

Wilderness Medicine Education Meetings

At the 1990 Annual Meeting, one of our new members from the Midwest asked me, "Is there any difference between all the Wilderness Medicine meetings? Does the WMS sponsor all these meetings?" Like tens-of-thousands of other doctors across the country, he had received three or four brochures for various Wilderness and Mountain Medicine programs each held in resort areas and noted many of the same faculty members speaking at each conference. He and his wife chose the WMS conference by date and location, assuming all other factors to be equal. The WMS has obviously not succeeded in distinguishing its programs.

Our Annual Meeting, and beginning in 1991, our winter meeting at Crested Butte, are the *only* educational programs currently sponsored by the Wilderness Medical Society. Other programs are sponsored by various universities through their Continuing Education Programs, or by individuals through local medical centers or private ventures. While the WMS is supportive of other programs providing quality education in wilderness and environmental medicine, we have no formal relationship with these programs. In fact, our accreditation status does not allow us to jointly sponsor programs.

The primary mission of the WMS is to further excellence in education, research and practice of wilderness medicine. Our scientific meetings and our publications form the core of this mission, and the success of these meetings is essential to the health of our Society and to our ability to succeed in our goals. Proceeds from our meetings are one of the major sources of revenue for the Society; these proceeds are then used to support our other programs such as research and publications (the journal is *not* self supporting through dues). Profits from meetings sponsored by others are used to sponsor other continuing education meetings with no relation to wilderness medicine or go into individuals' pockets.

Despite many of the same names on the different programs, the educational content is not the same. [illegible] concepts, but to keep members current on the latest developments and issues. We select faculty from around the world and we vary the program each year to try to cover the huge spectrum of topics in wilderness medicine. We decided at the beginning *not* to use a fixed format for the educational component or the location and time; this allows our members to experience a different program and area with each meeting, and brings our meetings to various areas of the country.

Most participants at the WMS Annual Scientific Meeting are actively involved in some aspect of wilderness medicine, and the gathering provides an exceptional opportunity to meet with other members and discuss projects and areas of common interest. The opportunity is also provided to become involved in some of the work of the WMS. There is a special congeniality and collegiality at a gathering of WMS members, based on their dual interests in medicine and the outdoors. A large number of amenities and meals are included in the conference cost, encouraging further social contact. Be assured that the locations are chosen for their scenic beauty and ready access to wilderness as well as excellent conference facilities.

Clearly, the WMS has not succeeded in distinguishing its programs from those of others. And unfortunately, most physicians choose a wilderness medicine conference by date and location, not by careful evaluation of the program. We can only hope to clarify these issues to our members. Support your Society's educational programs to our mutual benefit and encourage your colleagues to do the same. All wilderness medicine conferences are *not* created equal.

Howard Backer, M.D.
Berkeley, CA

PRESIDENT'S COLUMN

Blair D. Erb, M.D., F.A.C.P.

Regionalization: An Idea Whose Time Has Come?

There is movement within the Wilderness Medical Society to organize chapters to facilitate local and regional wilderness medical activities. With maturation of wilderness medicine as a special professional concern, members who live in certain natural geographic foci wish to gather together to discuss common interests in wilderness and in wilderness medicine.

The concept of regionalization was initiated by Alaskan members. Drs. Ken Zafren, Peter Hackett, and others held a planning session in February 1990 at a wilderness medical conference in Anchorage. Members from Arizona, Colorado, Washington, Tennessee, North Carolina, California, Virginia, West Virginia, and New England have all expressed interest in chapters. The common denominators seem to be: 1) unique geographic and environmental characteristics, 2) relative isolation (real or perceived), 3) local energy among WMS members [illegible] resolve local and regional issues related to medical care in the wilderness setting.

There are both advantages and problems associated with such an initiative. For example, we can all accept chapters as a means of involving membership, addressing local issues, and for sponsoring more frequent meetings. But at what cost? Will there be fragmentation of the national Society? Will the national meeting suffer in attendance, or will it be enhanced because of local growth and enthusiasm? How can the chapters communicate with the national organization, among themselves, or even within themselves? How should local and national leadership interfere: should chapter governors be represented by a board of governors within the national organization? And of no small concern to the administration, how do we pay for this initiative?

As we address the issue of regionalization, we must keep in mind the fundamental question, "What is the purpose of chapters?" Is it Continuing Medical Education (CME)? If so, we must function with the national WMS CME committee because ACCME Category 1 Accreditation depends on the National Committee's involvement in all CME activities that it accredits.

Is research a purpose of regionalization? There is a simultaneous movement by the WMS to develop regional Centers for Research and Education in Wilderness Medicine.

It is the consensus, and certainly my opinion, that chapters, properly structured and supported, will be a major asset to the Wilderness Medical Society. There will likely be rapid growth of membership within the WMS generated through recruitment by local enthusiasts. Non-medical organizations will learn more about wilderness medicine, resulting in Society involvement in regional wilderness planning. Most important, the health and medical care of those who venture into the wilderness will be improved.

What is your opinion?

MEMBER'S PROFILE:

OSWALD OELZ, M.D.

by Howard Backer, M.D.

Dr. Oswald Oelz has combined a lifetime of mountaineering and twenty years of experience in medical research to become a leading investigator in altitude illness. He is also the vanguard of the Wilderness Medical Society's efforts to tap into the immense interest and experience in wilderness medicine that exists in Europe.

Oswald was born in the Austrian Alps, near the border of Switzerland. His mother, an accomplished mountaineer with many first female ascents, began teaching him to climb at the age of five. Her motive was to provide a guide for herself in her older years, and, indeed, by age twelve, Oswald was leading his mother. He began serious rock climbing at age fourteen and was considered expert by the age of sixteen, when he climbed a difficult route on the Matterhorn. The Alps offered endless challenges to improve his skills and confidence. But he always dreamed of climbing 8000 meter peaks.

Oswald's decision to pursue medicine came more as a revelation than a calculated decision. There were no physicians in his family, but medicine conveniently did combine his interests in biology and people. Oswald began to carry a medical kit on his climbs. Although this simple kit contained mainly bandage materials, it enabled him to treat a friend who fell 25 meters and suffered a deep wound to his back with profuse bleeding. Oswald's conviction to study medicine was affirmed.

From 1961 to 1968, he studied medicine (in addition to climbing and skiing) at the University of Innsbruck. Dr. Oelz then moved to Zurich, Switzerland, and worked for three years in an endocrine research laboratory. Subsequently, he completed his internship and residency in internal medicine.

In 1970, he and Dr. Gert Judmaier climbed Mt. Kenya, a fairly remote and infrequently climbed peak at that time. During the descent, while Oswald was setting up a belay, his friend fell. Although the rope severely burned Oswald's hand, he was finally able to arrest the fall when his companion struck a ledge. He found his friend unconscious with multiple injuries, including a shattered, open tibia. Leaving him with clothing and all their provisions (a small amount of alcohol and fruit), Oswald went for help as a storm developed. At the base of the mountain, he encountered some people and sent them for help. When he returned to his friend 48 hours after the accident, he found him still alive but dehydrated, vomiting all fluids, and hallucinating. However, it was impossible to lower his friend without a stretcher. By this time 100 people had gathered at the base of the mountain with medical supplies, but none were good enough climbers to reach the victim. Despite his own damaged and cold fingers, Oswald managed to start an intravenous line on his friend who was still bivouacked on a narrow ledge. On the sixth day after the accident, Oswald worked to set up cable relays to move his injured friend despite the near certainty of death from his injuries. Again he was forced to bivouac. Unbeknown to those on the mountain, the news of this ongoing drama had been picked up by the world press. Seven Austrian friends had received the news upon return from a Himalayan expedition. They immediately flew to Kenya and were able to provide the crucial mountaineering assistance to evacuate their injured companion on the seventh day after his fall. The victim survived and, twenty years later, Oswald and he again climbed Mount Kenya.

Recovering in the hospital back in Innsbruck, Austria, Judmaier's roommate was Reinhold Messner, who had just lost his toes from frostbite. Oelz and Messner quickly found common interests and aspirations. Dr. Oelz was invited on a future climb to Manaslu South Face (8156 m) in Nepal. Subsequently, he has been a climbing partner and physician on many expedition climbs with Messner. And thus he learned and adopted Messner's style of light, rapid ascents.

Dr. Oelz's mountaineering career has included climbs on many of the world's highest peaks. His routes are usually vertical rock and ice, Grades VI-VII, often in the winter. But no one can climb great mountains without skirting death, and rapid ascents of 8000 meter peaks provide experience with altitude illness. Many of Oswald's climbing partners are now dead.

In 1979, set for a climb of Ama Dablam in Nepal, Oswald's team watched an avalanche hit another group climbing on the mountain. They then risked their lives to rescue Peter Hillary and companions from a face that was repeatedly swept by ice and rock fall. In 1972, at an elevation of 7200 meters on Manaslu, Oswald experienced his first episode of high altitude pulmonary edema (HAPE) while he and Messner were storm-bound and both suffering from frostbite of the toes. He treated his HAPE with oxygen and treated their frostbite with intraarterial reserpine and ATP—the treatment of choice at the time among Tyrolean mountaineers. They both improved and were able to climb down. Oswald kept all his toes until 1983 when he suffered frostbite on Glacier Dome, 7200 m in the Annapurna region of Nepal, resulting in the loss of several toes on his left foot. He had a second episode of HAPE in 1978 on Mt. Everest, but, after descent and further acclimatization, was able to reascend and summit. In 1982, at 5200 meters during an ascent of Cho Oyu South Face (Nepal), Oswald developed HAPE a third time. He decided to test a recent theory that positive end expiratory pressure would be beneficial. Indeed, his pulmonary edema improved but he became comatose from cerebral

edema and had to be evacuated by his fellow climbers.[1] Again in 1986, climbing rapidly with Marcelle Ruedi at 7400 meters on Makalu (Nepal), Oswald once again developed pulmonary edema. This time he self-tested nifedipine. This drug resulted in rapid dramatic improvement, allowing him to ascend to a ridge under his own power, then descend via an easier route.

Although he was able to help himself on three of these four occasions, there is no doubt that luck has played a role in Oswald's survival. Older now—though he doubts he is any wiser—Oelz is not quite as eager to push irrationally rapid ascents. He attributes this climbing style partly to his companions and partly to the time limitation imposed by his medical career.

Indeed, in addition to these mountaineering adventures, he has pursued a full-time academic clinical and research career in medicine. From 1974 to 1977, he was a research associate and instructor in medicine and pharmacology at Vanderbilt University in Nashville, Tennessee. Here, he worked on biosynthesis, physiology and pharmacology of arachidonic acid metabolites—and turned his outdoor energy to kayaking. Since 1977, he has been on the faculty of the Department of Medicine at the University Hospital in Zurich, Switzerland, where he has earned the rank of Professor of Medicine (and has become a Swiss citizen).

Although his mountaineering experiences sparked his interest in high altitude physiology, his research interests remained quite separate. By 1986, Dr. Oelz had published about 70 articles in medical journals, mostly original laboratory and clinical research, but he had written only one article pertaining to mountaineering medicine.[2] Then, a student asked him to be the thesis advisor for a field study surveying climbers in the Alps for symptoms and signs of acute mountain sickness (AMS).[3] This stimulated Dr. Oelz to turn his extensive research experience to the question of AMS.[4, 5] At that point in his career, he had the time and energy to initiate his own research projects and the credibility to attract funding. With a grant from the Swiss Natural Science Foundation, and the support of the Italian Mountaineering Society, he set up a laboratory in a high altitude climbing hut. The Capanna "Regina Margherita" perches on a knife ridge at 4559 meters on Monte Rosa in the Alps Valais, offering an ideal location to gather and study subjects with AMS. This laboratory has now become the leading European center for high altitude research, investigating the pathophysiology of AMS.[6-11] In addition, Dr. Oelz continues to publish case reports and clinical studies on diverse internal medicine topics and to write book chapters on altitude medicine.

In 1986, Oelz accompanied Messner to Antarctica to climb the Vinson Massif, the highest peak on this continent. Realizing that he now had climbed three of the seven continental summits (Mt. McKinley, Mt. Everest, and Mt. Vinson), he decided to try for the remainder. On his return from Antarctica, he used a five day layover to climb Mt. Aconcagua (6960 m) in Argentina. In 1987 he climbed Mt. Kilimanjaro in Kenya and in 1989, he climbed Mt. Elbrus (5743 m) in the Caucasus mountains on the border of Russia and Turkey, and Mt. Kosciusko in Australia.

But he was not satisfied, because there is a higher and much more difficult peak (Carstensz Pyramid) in Irian Jaya that many feel should be considered the summit of the Australo-Pacific continent. However, this remote area has been tightly restricted and off-limits to most travelers and climbers. Messner wrote him a letter from the South Pole (during his traverse of Antarctica) on January 1, 1990, saying that he knew someone who might have a permit to climb the Carstensz Pyramid. Oswald asked to join this group, but was turned down due to suspicion of self-aggrandizing motives. Then unexpectedly, after speaking to others in the mountaineering community, the group members changed their minds. (It turns out that the leader, Brian O'Connor, was the son of Supreme Court Justice Sandra Day O'Connor and had more than a little help getting the permit.) The expedition was cohesive, enjoyable and successful. So, earlier this year, Oswald became the third person after Pat Morrow and Reinhold Messner to climb the "Seven Summits," including the Carstensz Pyramid.

Capanna "Regina Margherita"

When asked by Chapman and Hall Publishers what he thought about the idea of a medical journal for environmental and wilderness topics, Dr. Oelz said it was a great idea. Then, when this idea was developed into the *Journal of Wilderness Medicine,* the official journal of the Wilderness Medical Society, Dr. Oelz agreed to be the European editor and co-editor with Dr. Paul Auerbach. That was the first he heard of the Wilderness Medical Society.

This year, at the Annual Meeting, Dr. Oelz finally had a chance to meet some of our members and participate in one of our programs. Those in attendance had an opportunity to hear him discuss some of his mountaineering adventures and his altitude research. After marvelling at his accomplishments, one is struck by his humor and humility. He believes the WMS is headed in the right direction and comments that it is important for us to maintain a high level of consciousness on environmental issues. He predicts that the *Journal* will attract many more international members, adding to the breadth and scope of the Society. We are pleased to welcome Dr. Oelz to the Wilderness Medical Society and honored to have such a distinguished mountaineer, physician and scientist among our members.

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MEDICAL KITS FOR WILDERNESS TRAVEL

This is the second in a series of medical kits for wilderness activities. Most articles on medical kits are too general; the kits in this series are designed for specific trips. The authors are veteran wilderness travelers describing what they take on their trips. These kits were designed from empiric experience, not as an academic exercise.

Readers are welcome to comment.

OVERSNOW FIRST AID KIT

Warren D. Bowman, M.D.
(Practice of Internal Medicine, Billings, Montana; National Medical Advisor, National Ski Patrol; Medical Director, National Association for Search and Rescue.)

This kit is for use in North America on trips of several days to two weeks duration, with all equipment carried by backpack or sled. The amount of equipment carried depends on the length of the planned trip, the difficulty of obtaining medical help, the number of party members, and the type of transportation. The requirements of a one-day ski tour are obviously different from those of a three-week Alaskan expedition. In order to avoid unnecessary interruptions and an excessively heavy kit, my practice is to require the other members of the party to carry basic items for personal use. Emphasis is on minimal weight and bulk, low cost, maximum chance of use, and multiple use.

The items that could be added are endless and if no restraint is exercised the kit could become too heavy to carry. In point of fact, in 25 years of backcountry skiing, I have seen very few injuries or illnesses. People who come on these expeditions tend to be fairly healthy, well-coordinated, and careful.

BASIC KIT

To be carried by each party member in a small, nylon stuff sack.

Cravats (2):
- triangular cloth bandages for slings, sprained ankle support, bandages, etc.

Roll of 3- or 4-inch self-adhering roller bandage (e.g., Kling®) (1).

Roll of 2-inch cloth adhesive tape (1):
- various uses including butterfly bandages, blister prevention and treatment, sprained ankle taping, etc.

Sterile non-adhering gauze compresses (e.g. Telfa®), 3- or 4-inch (4).

Bandaids (6).

Analgesic tablets (20): aspirin, acetaminophen, or ibuprofen;
- for minor pain; ibuprofen for frostbite risk or menstrual pain.

Sunscreen.

Lip salve.

Large safety pins (3):
- useful in improvising slings and bandages, minor repairs, etc.

Small knife with scissors and tweezers.

Plastic sandwich bags (2):
- many uses including a cold pack by putting snow into bag.

Personal medications:
- diabetics include tube of glucose or ampul of glucagon with syringe and needle (2).

Optional for women, on long trips:
- Miconazole vaginal suppositories (one treatment course).
- Metronidazole tablets (30).

Water disinfection: First Need® or Katadyn® filter, bottle of Potable Aqua® tablets, etc (one set for each 2 people).

Moleskin (1 sheet):
- for blister prevention; may substitute cloth adhesive tape above.

For Multiday Trip, add:

Sleeping pills (benzodiazepine) of choice (1 per night):
- optional and controversial, but few persons sleep well in a snow cave the first night; caution at high altitudes since may decrease respirations and increase risk of altitude illness.

Pee bottle:
- anyone who has needed to make a nocturnal pit stop from a snow cave knows what this is for. Women may wish to add a Sani-Fem funnel.

MASTER KIT (PHYSICIAN'S KIT), ONE PER PARTY (Multiday Trip Only)

Carried in a nylon stuff sack. Put breakables, especially injectables, in a separate hard-sided container in the sack.

Bandages/First Aid

Extra cravats (at least 6 per party):
many uses, including improvising a ski pole traction splint.

Extra sterile, nonadhering gauze compresses (12).

Extra self-adhering roller bandages (2-inch [2], 3-inch [2]).

Large absorbent pads (ABD®) (2 medium, 2 large):
for large wound dressings.

3-inch rubberized bandage (Ace®, etc.) (1 or 2):
pressure bandage.

Materials for femur traction splint:[1]
30 inches of 1/8-inch nylon cord to set up 3:1 pulley system for traction;
8-inch piece of ski pole with a hole drilled at each end to be used as a spreader for ski pole splint, putting the end of each pole in a hole.
There are multiple methods for improvising traction splints with available materials. Having these few materials available allows me to quickly fashion an effective splint. Kendrick Traction Device® is another option, weighing only 20 oz.

Splint (SAM®) (1 or 2):
Use as extrication collar, upper extremity splint, etc.

Small bottle of antiseptic cleanser (10% Betadine®, etc.).

Thermometer, hypothermia.

Pocket mask (preferably) or Mouth Shield with one-way valve.

Oropharyngeal airways, at least 2 sizes.

Rubber bulb or Asepto syringe (1), for suction.
The three items above are for airway management in cases of potentially reversible loss of consciousness, such as head trauma or lightening strike.

Instruments/Minor Surgery

Sewing needle (1):
many uses, including blister treatment and splinter removal; may prefer hypodermic needle for medical uses.

Single-edge razor blade or packaged sterile #15 scalpel blade (1):
for draining abscesses, shaving hair, etc.

16 gauge Angiocath (1):
improvise one-way chest valve with finger of sterile glove.

50 cc catheter-tip syringe (1):
wound irrigation and airway suction—used with foley catheter.

Cricothyroidotomy set—optional.

Suture equipment—optional:
I do not feel that suturing wounds in the wilderness is a good idea and prefer to bandage them open or tape them closed. However, I know this is a controversial subject and so I have included suture equipment as optional.

Miscellaneous Equipment

Seam ripper:
small, lightweight; avoids irreversible damage to expensive ski pants to evaluate a leg injury.

Disposable rubber gloves, sterile (2 pairs).

Notebook and pencil.

Light-weight stethoscope—optional:
the ear against the chest wall works quite well.

Foley catheter and sterile lubricating jelly—optional (1):
suction catheter, chest tube or urinary catheter.

Notes: I do not carry endotracheal intubation equipment, sphygmomanometers, or tongue blades. A flashlight and a spoon handle serve to inspect the mouth and throat. I don't need an otoscope to diagnose an earache and don't need an ophthalmoscope, although on a high altitude expedition (such as to Mt. McKinley), I would probably take both since I own a light-weight set.

Medications, Topical and Oral

Neosporin topical/ophthalmic ointment or Garamycin ophthalmic ointment (one small tube):
for infected cuts, conjunctivitis.

Diphenhydramine hydrochloride capsules, 25 mg (12):
for allergic reactions, itching; substitutes as sleeping pill.

Oral pain medication (acetaminophen with codeine, propoxyphene napsylate with acetaminophen, nonsteroidal antiinflammatories, meperidine, etc.) (12).

Diphenoxylate/atropine or loperamide (12):
for diarrhea.

Thiethylperazine or prochlorperazine rectal suppositories (6):
for vomiting or severe nausea.

Ibuprofen, 600-800 mg (20):
for frostbite treatment, pain, inflammation.

For Extended Trips Into Remote Country:

Antibiotics of choice (at least enough to last one person the length of trip):
ampicillin, erythromycin, or a cephalosporin (choose one), and tetracycline or doxycycline. I take erythromycin (because of penicillin allergy) and doxycycline. The choices of antibiotics are arbitrary, based on my experience and the types of organisms likely to be troublesome in the winter wilderness to basically healthy travelers: strep, pneumococcus, H. flu, Campylobacter, possibly Salmonella/Shigella, Mycoplasma, staph.

For High Altitude, Add:

Acetazolamide 250 mg (2 tabs per person per estimated day at risk):
AMS prevention, Cheyne-Stokes prevention, treatment of mild AMS.

Dexamethasone 4 mg (4):
for treatment of HACE.

Injectables:

Pain medication (meperidine, morphine) tubex (4):
for severe pain.

Epinephrine tubex—optional (2):
especially if history of anaphylactic shock in party member;
alternative: require susceptible party member to carry "bee-sting kit," since physician might not be present when needed.

Notes: Since this list is for an oversnow North American expedition of several days to two weeks maximum rather than a Himalayan expedition, I did not include any injectable antibiotics.

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TRAVEL MEDICINE

Health Information for International Travel

The 1990 edition of "Health Information for International Travel" is now available and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 017-023-00187-6. Price $5.00 per copy.

DERMAL MYIASIS

Karl Neumann, M.D.
(Private practice in pediatrics; Associate clinical professor of pediatrics, Cornell Medical College; syndicated columnist on travel medicine.)

Travelers returning from the tropics with one or more furuncle-like lesions may have myiasis, a skin infestation caused by the larvae of flies.

In rural parts of Central or South America myiasis is most likely due to the larvae of the human botfly *(Dermatobia hominis);* in rural, sub-Saharan Africa myiasis is generally due to the tumbu fly *(Cordylobia anthropohaga).* However, many other species of flies can cause myiasis.

Rarely, in North America, myiasis is seen in non-travelers. Several species of flies in North America produce larvae that infest neglected wounds.

The botfly catches other biting insects, often mosquitos, in midair and attaches its eggs to their bodies. When the biting insects feed on a human, the botfly eggs hatch and the larvae enter through the puncture wound. The larvae develop in the dermis and breathe through two small air openings in the skin. The larvae reach a size of about 15-20 mm. After about thirty days they leave their host. Occasionally, the larvae remain in the skin for much longer periods.

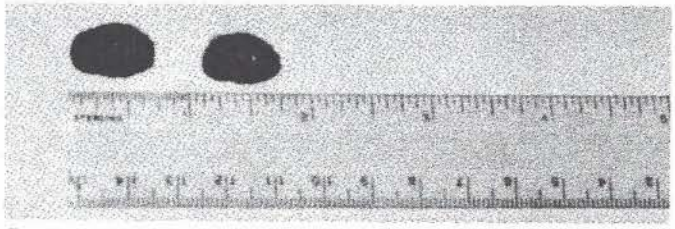
Botfly myiasis may occur on any exposed surface of skin but often it is found in the scalp as a single, dome-shaped erythematous papule.

The tumbu fly lays its eggs on the ground or on clothing — apparently preferring clothing that bears traces of urine or sweat. Clothes hanging on wash lines or laid out on the ground to dry are frequent targets.

The tumbu eggs hatch on contact with human skin. The larvae burrow into the skin and produce a characteristic boil that contains the developing maggot. The boils are usually multiple and are most common over the back, arms, scrotum, thigh and around the waist. The larvae mature and vacate the host after six or seven days but, these too, may remain in the skin for prolonged periods.

Clinical Features

Myiasis may closely resemble furunculosis but there are several distinguishing characteristics: (1) the patient has recently been in the tropics; (2) myiasis lesions are not as tender as most furuncles; and (3) one or two, 1 mm, black, punctate air holes can be seen on the surface of the lesion. The lesions frequently are pruritic and have a seropurulent or serosanguinous drainage. Patients occasionally detect movement in



Dermatobia hominis larvae

the lesion, which can often be confirmed by the examiner placing his finger on the lesion. Sometimes the diagnosis is made when furuncles fail to respond to antibiotics.

Other forms of myiasis exist but are rarely seen in travelers: dermatitis with no penetration of the skin; infection of injured or ulcerated skin; and, involvement of the eyes, nasopharynx, ears, intestine, and urethra.

Treatment

The preferred treatment of myiasis is incision and removal of the larvae with forceps. Then, the lesions should be well cleansed and bandaged to prevent infection. An occlusive dressing or petrolatum over the lesions blocks the air holes and causes asphyxiation of the larvae in three or four days.

Prevention

Never walk barefooted in the tropics. Keep skin clean and treat all suspicious skin lesions. Dry bed sheets and clothing in fly-proof environments. Use a hot iron to press clothing and sheets that have dried outdoors.

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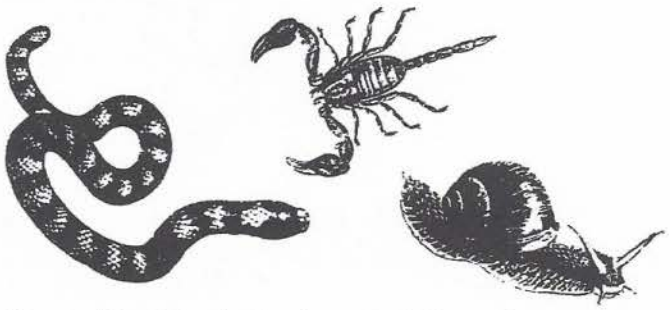
THE BEST OF TOXICON, 1989

Willis A. Wingert, M.D.
(Professor, Joint Appointment Pediatrics, Community Medicine, Public Health and Emergency Medicine, University of Southern California; Director, Venom Laboratory, USC.)

Toxicon is the official journal of the International Society on Toxinology. It publishes research papers on both plant and animal toxins, generally concerning the biochemical and physiological aspects. This column will review several clinically oriented articles that appeared in Vol. VII, 1989.



The epidemiological characteristics of scorpion *(Centruroides* sp) stings from the central part of Mexico were reported by Dehesa-Davila.[1] One referral center reported 38,068 cases over a six-year period. Deaths annually have averaged 46. Cases were equally distributed between males and females; 77% of victims were under 30 years of age and 33% were teenagers. The majority of stings occurred inside a building during the spring. Local symptoms of envenomation included local pain, edema, and skin inflammation. Systemic manifestations occurred in about half of the victims and included a variety of severe symptoms, notably hyperexcitability; convulsions; ataxia; hyper- or hypotension; tachycardia; vomiting; lachrymal, nasal and salivary secretion; dysphagia; and dysphoria. Fifty-three percent of the patients received intravenous treatment with one ampule of lyophilized horse serum (produced by the Zapata Laboratories in Mexico City) mixed with 10 mg chlorpheniramine. All patients who received this therapy recovered within 3 hours and no allergic reactions or serum sickness occurred! The absence of allergic reactions was attributed to the concurrent use of the antihistamine.

Glenn and Straight[2] analyzed the venom of the Mojave rattlesnake *(Crotalus scutulatus scutulatus)* from three different geographic areas of the Mojave desert and found that venom from snakes in the California and northern Arizona sections of the desert contained a phospholipase enzyme that was highly neurotoxic but lacked hemorrhagic and proteolytic activity. Therefore, bites from rattlesnakes in this geographic area will likely result in nerve paralysis but without marked local edema or ecchymosis. Lack of local reaction may lead some physicians astray in underestimating the severity of the bite and administering an inadequate amount of antivenom. The toxin of this snake is highly lethal and the most potent of all American rattlesnakes, and it has been the policy of Dr. Findlay Russell and myself to administer 10 vials of antivenom in known *scutulatus* bites regardless of the local reaction. In southern Arizona, the Mojave rattlesnake venom is low in neurotoxin but contains hemorrhagic and proteolytic enzymes. Swelling should be anticipated but the venom is far less lethal. A hybrid snake whose venom contains all three components occurs in central Arizona.

Crosland[3] investigated the effect of two common drugs as therapy for envenomation by the highly poisonous Formosan Krait *(Bungarus multicinctus).* This venom contains both postsynaptic, a toxin that blocks acetylcholine at the muscle receptor, and a presynaptic toxin that inhibits acetylcholine release from neurons. Envenomation therefore can result in paralysis and respiratory failure. Since the toxins are phospholipase A2 enzymes, Crosland used either chlorpromazine or quinacrine, both phospholipase inhibitors, in lethally envenomated mice. In doses of 1 to 5 mg/kg both drugs were effective antagonists of bungarotoxin when injected immediately after the venom, decreasing the lethality of the venom 5 to 11 fold. Unfortunately, the drugs did not protect the mice from rattlesnake *Crotalus durissus terrificus* neurotoxins, so these results cannot be extended to treatment of Mojave rattlesnake envenomations.

If you enjoy eating escargots, avoid this gastronomic delight when visiting Scandinavia or Japan.[4] The local edible whelks *(Neptunae antiqua* and *N. arthritica)* contain a potent water-soluble and heat stabile neurotoxin, tetramine, which causes short periods of blindness or blurred vision, vertigo, a reeling gait and a feeling of intoxication. Actually tetramine occurs in a great number of marine phyla[5], especially *Cnidaria* and *Mollusca* species, including squid. However, I am not aware of any poisonings after calamari.

Brevetoxin is produced by the marine dinoflagellate *Ptychodiscus brevis* and causes fish-killing red tides around Florida and the Gulf of Mexico. Contact with this toxin in sea spray can cause ocular and respiratory irritation; consumption of contaminated seafood, notably shellfish, results in neurotoxicity. The toxin binds to specific receptor sites on sodium channels of nerves, causing a sodium flux, persistent activation and subsequent depolarization of excitable neurons. Apparently, brevetoxin attacks the brain and spinal cord as well as the peripheral nervous system. Using a rat model, in addition to marked toxicity to the nervous system, Templeton[6] noted a precipitous fall in core body temperature, a marked decrease in respiratory rate (probably central nervous system dysfunction) and cardiac arrhythmias, especially A-V block and ventricular tachycardia. The rule of thumb is: Eat oysters only in months *with an R* in the name.

Polytoxin is one cause of ciguatera fish poisoning. This toxin causes severe muscle spasms that can result in maked elevations of muscle enzymes CPK (up to 41 000 units), LDH and SGOT, and myoglobinuria. This occurs in addition to the usual symptoms of ciguatera poisoning including paresthesia and dysesthesia, sweating, weakness, nausea and diarrhea. The case reported occurred after eating smoked mackerel imported from the Philippines.[7] However, Japanese crabs and parrotfish also have been implicated.

The symptomatology of ciguatera poisoning further appears to vary according to the type of fish ingested. Eating carnivorous fish such as the amberjack causes severe cardiovascular problems in nearly half of the cases, whereas none occur after consumption of herbivorous fish. Kodama[8] lists the frequency of 27 symptoms, noting that manifestations of ciguatera poisoning vary widely; clinical syndromes are probably caused by a combination of several dinoflagellate poisons.

What is the therapy for a patient bitten by an unknown species of exotic imported snake, or by a known species for which the local zoo has no antivenom? Fortunately, snake venoms contain common antigens (e.g. phospholipase A2) even among unrelated species and genera. Consequently, there is a high degree of cross-reactivity in current commercial antivenins. Kornalik[9] found that two polyvalent antivenoms, Wyeth anti-crotalidae and Behringwerke North African anti-viperidae, offered excellent protection (in mice and rats) against the venoms of both genera of snakes, although they did not neutralize the

hemorrhagic diathesis. Therefore, in serious envenomations when homologous antivenom is not available, the use of any polyvalent antivenom may decrease the severity of symptoms or make the difference between life and death.

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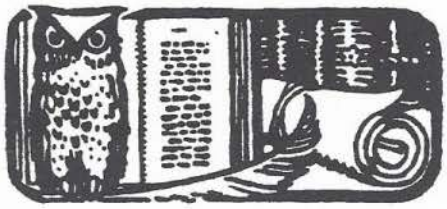
Seventh International Hypoxia Symposium

The Seventh International Hypoxia Symposium will take place at the Chateau Lake Louise, Alberta, from February 26th to March 2nd, 1991, sponsored by McMaster University and the Arctic Institute of North America.

The Hypoxia Symposium has become a biennial event, attracting many speakers and a large audience from North and South America, Europe, Asia and Australasia. As is traditional in these symposia, parallels will be drawn between the basic sciences and clinical situations. A full day will be devoted to **High Altitude Physiology and Medicine,** in conjunction with the **International Society for Mountain Medicine.** Throughout the conference, open discussion will be given priority. Free communications in the form of posters are also encouraged.

The deadline for abstracts and early registration is November 1, 1990. For information, contact Conference Coordinator, Room 1M10, Faculty of Health Sciences, McMaster University, 1200 Main Street West, Hamilton, Ontario, Canada L8N 3Z5.



BOOK REVIEWS

Reviews by ***Charles S. Houston***
(Professor Emeritus, University of Vermont, College of Medicine; Principal Investigator, Operation Everest II; Author and Mountaineer.)

High Altitude Medicine and Pathology

Donald Heath and David Reid Williams. London: Butterworths, 1989. 352 pages. $95.

This is strictly a scientific text, an excellent companion to the clinical book by Ward, Milledge and West. Surprisingly few revisions have been made in the 1981 edition and many of the references have not been updated. The two authors are authorities in altitude pathology.

The authors hypothesize that symptoms experienced by lowlanders going to altitude are "normal;" they also urge classifying altitude sickness as either "benign" or "malignant." They do not clearly differentiate between immediate reactions and the slower changes of acclimatization, and adaptation over generations. Acclimatization is mentioned frequently rather than summarized in one place. Short chapters on high altitude telescopes, the abominable snowman, exercise at altitude and sleep are not appropriate in a pathology text—and these are weak.

There are many older references, and the index is excellent. This is still the definitive textbook of pathology, but of interest mainly to scientists interested in altitude.

High Altitude Medicine and Physiology

Michael P. Ward, James S. Milledge, and John B. West. London, Chapman and Hill, 1989. 515 pages. $89.95.

It may come as a surprise to some that mountain sickness is not limited to mountain climbers: in fact, many more cases occur among the millions who ski, climb, trek, or hike on smaller hills. So this is a timely book, written primarily for doctors but good reading for anyone going to the mountains. Quite simply it is the best and most complete medical text about high altitude and a few other hazards of the hills.

The authors describe the history, geography and demography of mountainous regions and the many ways in which we react to oxygen lack. They tell amusing stories of how we learned what we know today, and why we breathe as we do, and how the heart, lungs, blood, and cells adjust to shortage of oxygen. Many case reports highlight what we know and don't know about the various forms of altitude illnesses. There are some stimulating comparisons of healthy man at altitude with hypoxic illness at sea level—a subject still relatively unexplored.

Since high places are always cold, hypothermia and frostbite are well described and there is an excellent discussion of how thermal balance is controlled. The three authors are experienced climbers and skiers who have managed illness and accidents in high places and have contributed to research as well. They draw heavily from their own rich experience, and there are ample references for those who want to read more. Unfortunately the index is poor.

This is primarily a medical text, but it is good reading for anyone seriously interested in going high, where the air is thin and cold, and it's the best source of information for the mountaineering doctor.

NEW MEMBERS

Timothy Almquist, M.D., San Diego, CA
Bob Baer, M.D., San Jose, CA
Elizabeth Baerg, M.D., Vancouver, B.C.
Barbara Lee Bailey, M.D., Goleta, CA
Gaeron Glenn Baker, M.D., Louisville, KY
Karen A. Baldi, M.D., Colorado Springs, CO
Woodson Barnes, Walton, KY
Crawford F. Barnett, Jr., M.D., Atlanta, GA
Michael N. Baxley, Pittsburgh, PA
G. Montgomery Baylor, Huntington, WV
Bruce L. Beck, M.D., Prince Frederick, MD
Bruce Becker, M.D., Providence, RI
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Alfred B. Brady, M.D., Beaumont, TX
Chip Brenn, Albuquerque, NM
Franc Brodar, M.D., Tucson, AZ
Allan Brody, Ph.D., Davis, CA
Michael E. Brookings, M.D., Galveston, TX
D.R.C. Brown, M.D., Ft. St. James, B.C.
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Andrew Zechnich, M.D., Portland, OR
Daniel Jeffrey Zimmerman, M.D., Hawthorne, NJ