

SECOND EDITION

CANCER
AND THE SEARCH FOR
SELECTIVE
BIOCHEMICAL
INHIBITORS

E. J. HOFFMAN



CRC Press
Taylor & Francis Group

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Preface

It goes almost without saying that one should view cancer personally and should anticipate its eventuality, whether in oneself, family members, or friends. The cancer victim, unfortunately, is too often a pawn in a vast money-making machine. The available information is conflicting, calling for discernment or “buyer beware caution” — with the poor and noninsured mostly forsaken. The seeking out of preferred modes of treatment reduces to an impasse between medical orthodoxy and alternative medicine. Inasmuch as medical orthodoxy is as close as one’s family physician — and the success rates for conventional cancer treatments are too often dismal — the emphasis here will be otherwise: on alternative therapies.

We are therefore to a considerable degree also talking about manageable home therapies and keeping the costs down — way down — but at the same time these alternative anticancer therapies of choice are to be viable and, ultimately, death-defying, although, we can, of course, consider going to any of the numerous orthodox cancer clinics, which are of ever-increasing numbers, or to any of the few alternative cancer clinics available — if we are well endowed in the money department. One can even go outside the country, say, to alternative medical clinics in Mexico or Germany, etc. However, their charges are not “on the cheap,” as is often the expectation.

A problem with alternative medicine is, of course, that it attracts much in the way of anecdote and hearsay; some people will claim almost anything. So what to believe? A resolution involves seeking the disclosure, in an understandable and unassailable fashion, of the underlying biochemical principles, whenever known, for alternative cancer therapies — a purpose of this exercise. Of particular concern are selectivity and the avoidance of conventional cell-toxic chemotherapy, with its adverse side effects, notably against the immune system — versus sometimes more vague and slower-acting alternative therapies.

Additionally, many or most of the alternative treatments may not work on a given patient, but trying to determine ahead of time the best route to pursue is like comparing political parties and campaigns, given the contentious standoff between medical orthodoxy and alternative medicine. One route to pursue is to try them all (or at least those few perceived as most promising), the everything-but-the-kitchen-sink approach as was advocated by the well-known physician Robert Atkins (now deceased). However, there is a matter of time and the potentially debilitating effects from treatment, whatever the treatment. The two go together, hence there is the need for a close and rapid monitoring system to see if the patient is responding in the right direction. Not only this, there is the need to counter any adverse side effects, like hyperallergenic anaphylactic shock. Enter, of course, the advisability or even

necessity of working with a medical professional — and, needless to say, the more objective the professional, the better.

Causes and biochemical mechanisms for cancer formation are, to a degree, known — and to some extent can be avoided, environmentally and nutritionally, say, by the practices of what is called *chemoprevention*. However, when cancer does, in fact, strike, there is then the question of a preferred treatment or treatments — hopefully leading to immolation or at least to long-term remission. Surgical excision for solid tumors is at times successful, radiation less so, and conventional (cytotoxic, or cell-toxic) chemotherapy much less so, depending. So, if or when these orthodox therapies prove unsuccessful — which is too often the case — then what is to be the alternative? It is called *complementary and alternative medicine* (CAM) or by other names now, the latest perhaps being complementary, alternative, and integrative medicine (CAIM). The warfare then begins between medical orthodoxy, or establishment medicine, and the contrary. Never mind that in the case of cancer, especially, the choices are life-determining. And, obviously, anything that kills the patient will kill the cancer.

It is interesting to note that the central focus of study of conventional (cytotoxic) chemotherapy — indeed, all medicinal regimens — is the same as that of alternative and complementary medicine. The subject in both cases is, in general, that of biochemistry, or call it the “biochemical revolution.” That is, both are ultimately concerned with cell metabolism and its various biochemical pathways and/or cycles for growth, maintenance, and modulation or immolation — which are embedded with, or controlled by, the proteinaceous biocatalysts called *enzymes*. In turn, the action of these enzymes — each specific to a particular biochemical reaction — is modulated or blocked (and rarely promoted) by a class of organic and inorganic substances broadly known as enzyme inhibitors.

In fact, much of modern medicine is based on enzyme inhibition, with the most famous instance being that of the antibiotics, which block one or another of the critical metabolic processes occurring in bacteria. Unfortunately, any given inhibitor is usually nonspecific to a particular enzyme, and may act against still other enzymes — even in the case of antibiotics, some of which become toxic to humans (although acting against cancer). This nonselectivity is the source of side effects, which may be either adverse or adverse in the extreme. (At the extreme end are poisons, being enzyme inhibitors that can, notably, shut down respiration and/or produce cardiac arrest.) So it is with conventional chemotherapy, where the side effects can be debilitating, sometimes even more so than the consequences of the cancer itself.

A key, therefore, is to find enzyme inhibitors that will selectively shut down cancer cell metabolism or growth without too adversely affecting normal cells. A notable example is that of antibiotics, previously mentioned, which will destroy bacterial (prokaryotic) cells in one way or another, but mostly do not affect human or mammalian (eukaryotic) cells. (There are exceptions, of course, for some antibiotics — including those acting as anticancer agents — are overtly toxic to humans.) This brings up the possibility that a large number of natural substances — as distinguished from synthetic substances — can act as readily available anticancer agents. Moreover, some are nontoxic, notably those used as foodstuffs. This distinction, between the synthetic and the natural, largely separates medical orthodoxy —

and the drug or pharmaceutical industry — from alternative (and folkloric) medicine. (And becomes an economic and political standoff, maybe more so than a scientific one.)

Nevertheless, although there are presumably many natural substances or extracts that can be — and have been — declared anticancer, there is the matter of effectiveness, which brings us to methods of administration, dosage levels, and frequency. Moreover, many of the anticancer substances can be toxic and extremely so, there sometimes being a fine line between life and death (as in the well-known case of digitalis for heart disease). This, in turn, may call for a close monitoring of vital signs by a medical professional, and the modification or abandonment of the treatment. (Hence, the oft-used caveat that the dosage *is* the poison.) Beyond this, the various means for assaying effectiveness — test-tube or *in vitro*, animal or *in vivo*, and human or clinical — do not necessarily give the same results. What works in one sort of test does not necessarily work in another or others. There is also the problem of biochemical individuality among humans. Moreover, there is a tendency for cancer cells to develop a resistance, say, to chemotherapeutic treatment, whereby the cells utilize other metabolic pathways.

An overriding complication is emerging, namely that of cancerous stem cells — stem cells being those that keep on proliferating no matter what. This aspect is explored in Chapter 10. A distinction can be made between “normal” cancer cells and a relatively few but significant super-active cancerous stem cells. Thus, the “normal” cancerous cells can be killed off by a standard treatment or therapy, whereas the initially few cancerous stem cells are immune to treatment and remain free to proliferate and spread or metastasize — and do so. (An analogy can be made to bacteria, where part of a bacterial population may develop a resistance to an antibiotic or may be inherently resistant. The usual course of treatment with an antibiotic is simply to overwhelm the bacterial population by the treatment or else to utilize a different — and stronger — antibiotic.) However, at the least, there seems to be a particular enzyme (or enzymes), or growth factor, that favors cancerous stem cell metabolism and proliferation, and the search is on to determine or develop inhibitors for this particular enzyme or growth factor. The problem may be that these countering substances — natural or synthetic — may also inhibit other, absolutely vital stem cell proliferations, such those generating new blood cells within the bone marrow. Thus, these further developments must walk a fine line.

Lastly, the ultimate word is always that of clinical successes, and for this reason it is advocated that a network of cancer clinical research centers (CCRCs) be instituted — or the equivalent — to serve initially as a court of last resort for advanced or terminal cancer cases, and later on for any case. These would be primarily staffed by M.D.s and D.O.s, and backed by a system of supportive pharmacologists, biochemists, botanists and ethnobotanists, biologists and zoologists, plus assorted naturopaths and the like — even if considered unconventional, but which are possibly a vital link in the therapeutic chain.

So ... instead of heading for the hospital emergency room, where the indigent are likely to be refused entrance, anyway, an advanced or terminal cancer patient could be taken to the nearest local CCRC. There, the patient would be treated (researched) using one or another, or several, alternative therapies, under the auspices

of eminently qualified and objective M.D.s and/or D.O.s. This would circumvent the more usual scenario: an advanced cancer patient eventually goes to a non-M.D. or non-D.O., or whomever and whatever, as a “last resort” and “ray of hope,” after medical orthodoxy has given up. In turn, if and when the patient dies, the non-M.D. or non-D.O., say, will reap the whirlwind from medical orthodoxy and the media, although never a word would be said if the patient had died under, or immediately after, orthodox treatment and care.

In the meantime, the choices are few. Either go with conventional medicine — surgery, radiation, or chemotherapy — or engage in alternatives, now more commonly called complementary and alternative medicine, or CAM. Here, as well, there are dilemmas: who are we to believe? Whereas chemo is most successful against blood-related cancers, such as leukemia, the prognosis is not at all clear with solid tumors or cancers, which are different. And the myriad anticancer substances — both natural and synthetic — do not necessarily translate into cures. Nevertheless, in some instances a positive track record exists. Consider, for example, the following: Massive dosages of vitamin C, preferably intravenous, as they are administered at the Riordan Clinic in Wichita (Center for the Improvement of Human Functioning International, 3100 North Hillside Avenue, Wichita KS 67219 [316-682-3100]) or by A. Hoffer, M.D., Ph.D., in Vancouver BC (2717 Quadra Street, Suite 3, Victoria BC Canada V8T 4E5 [250-386-8755]). There is also the antineoplaston therapy of Stanislaw Burzynski, M.D. (Burzynski Clinic, 9432 Old Katy Road, Suite 200, Houston TX 77055 [713-335-5697]), or Julian Whitaker, M.D., (4321 Birch St., Suite 100, Newport Beach CA 92660 [714- 851-1550]), and Coley’s Toxins (Cancer Research Institute, 681 Fifth Avenue, New York 10022 [212-688-7515]). For the patient without the financial means, vitamin C may be the route of choice. Nevertheless, the intent herein is to pursue an array of possibilities.

It will be noted time and again that there is a difference between the metabolism of cancer cells and normal cells, and the determination of selective and nontoxic enzyme inhibitors for cancer cell metabolic pathways may provide the elusive “magic bullet.” Lastly, it can be said that the exciting developments about selectively inhibiting or blocking cancerous stem cells, as described above, give an extra hope to cancer victims.

1 Crossroads

INTRODUCTION

What should a person who has just been told that he or she has cancer do? This chapter has been written so that the patient does not have to start at ground zero, hunting for information and sources.

In fact, the time for a person to start reading up about cancer treatments and alternatives, specialized sources for help, and open-minded doctors is now, today, preferably before the disease strikes. It takes some sifting to settle on a strategy for dealing with cancer. The following pages are intended to provide this information in a compact, readily available fashion.

Of first importance are cures and causes. There is a notion that nothing is perfect; only, some cancer treatments are less perfect than others, and conventional treatments may be the least perfect of all. It is time, therefore, to consider alternative medicine, sometimes called *complementary medicine*, or *holistic medicine*, or *preventive medicine*.

(If time is of the essence, the concerned reader may wish to skip directly to the last chapter, Chapter 11, and at the same time consider that there is a dark side to conventional treatments. For biochemical insights of a more technical nature, Chapter 3 is more specific.)

The causes of cancer are inextricably linked with cures or containment; the one goes hand in hand with the other, from the claims for alternative remedies such as laetrile to the “refutations” of medical orthodoxy. As for the well-publicized laetrile controversy, it has been commented that if laetrile or some other alternative therapy, for instance, should indeed prove a deterrent or cure for cancer, the whole structure of the medical establishment would come tumbling down. This may be an overstatement, but cancer mythology and facts have been previously explored, for example, in *The Cancer Blackout*, by Nat Morris. Continuing our examination of some of the extant literature, there is a book called *The Politics of Cancer*, by S. S. Epstein and another by Robert N. Proctor titled *Cancer Wars: How Politics Shapes What We Know and Don't Know About Cancer*. Proctor, who teaches the history of science at Pennsylvania State University, takes on the political establishment more so than the scientific one, with television programs and documentaries sometimes coming under attack. Among other things, the efforts of medical research are challenged. In the introduction to Proctor's book, not only is the conclusion reached that the war against cancer is being lost, but also that the cancer research establishment itself is suspect (Proctor, 1994, pp. 4, 14, 15). The title of Proctor's first chapter is “A Disease of Civilization?” which provides grist for further speculation. A book by an academic press is James T. Patterson's history, *The Dread Disease: Cancer and American Culture*, which among other things traced the American Cancer Society (ACS) from its origins as the American Society for the Control of Cancer (ASCC).

There are a number of other books about the machinations that have been going on in the name of “cancer therapy correctness.” Thus, Robert G. Houston has written *Repression and Reform in the Evaluation of Alternative Cancer Therapies*. John Heinerman leads off with a dynamic first chapter titled “Medical Science — A House Divided Against Itself” in his book on *The Treatment of Cancer with Herbs*, introduced by Robert Mendelsohn, M.D. Dr. Mendelsohn is the controversial but respected physician-author whose pyrotechnics light up *Confessions of a Medical Heretic* and other books, and some of his more pungent comments are highlighted by Heinerman.

Also, there is another book by Ralph W. Moss, first titled *The Cancer Syndrome* and published in a revised edition as *The Cancer Industry: Unraveling the Politics*. It is almost too infuriating to read, and once again illustrates the old French saying that the more things change, the more they stay the same. Moss, formerly with the Memorial Sloan-Kettering Cancer Center, sees the state of affairs not as a conspiracy but as the end result of the human failings of an all-powerful “cancer establishment,” paralyzed by internal politics and egos. Cures outside the hallowed mainstream are not considered, and more unorthodox remedies such as vitamin C and even laetrile are not pursued, presumably because they are not patentable. Richard Walters, in the initial and concluding chapters of his book *Options: The Alternative Cancer Therapy Book*, is particularly damning about the orthodox cancer treatment establishment. He says that several fund-raising cancer agencies would be put out of business if cures were found.

A later book by Moss, *Questioning Chemotherapy*, takes a hard look at chemotherapy and its success rates, and lists the major chemotherapy drugs, their properties, and side effects. Largely ineffective against most cancers, the only surefire successes seem to be with blood-related cancers. In addition to a newsletter now called *The Moss Reports*, Moss is also involved in producing other publications (as per his phone number, 1-800-937-WELL). The lack of effectiveness of chemotherapy has been noted by others, for instance, by Georgia oncologist Guy Faguet, M.D., in *The War on Cancer: An Anatomy of Failure, A Blueprint for the Future*, published in 2005. A review is furnished by Ralph Moss in the August/September 2006 issue of the *Townsend Letter for Doctors & Patients*. Faguet’s book has been endorsed by John Bailer III, M.D., and former editor of the *Journal of the National Cancer Institute*, and by Gerald E. Marti, M.D., Ph.D., who is Chief, Flow and Image Cytometry Section, Laboratory of Stem Biology, National Institutes of Health. Faguet speaks out against cytotoxic, or cell-toxic, chemotherapy and instead favors gene therapy, which requires much more research.

Ralph Moss has also written *Free Radical: Albert Szent-Györgyi and the Battle over Vitamin C*. Although Szent-Györgyi was awarded a Nobel Prize in 1937 for the discovery of vitamin C, there was considerable controversy at the time about who had discovered what. In Moss’s biography of Szent-Györgyi, there is very little about cancer, and nothing about vitamin C and cancer although Szent-Györgyi claimed that he had a cure for cancer. Linus Pauling’s notable work about vitamin C and cancer came along later. Along these lines, there is a substance called *Avemar* that is derived from fermented wheat germ, traceable back to Szent-Györgyi, as presented in an article by Dan Kenner in the August/September 2006 *Townsend*

Letter for Doctors & Patients. The theory is that there are two chemicals called *quinones* occurring in wheat germ that are liberated by the action of the yeast enzyme glucosidase and which chaperone cellular metabolism, thereby countering the hyper-metabolism of cancer cells, in the process serving as anticancer agents or at least modulating the adverse side effects of chemotherapy.

Also bridging the gap between the alternatives and the conventional is Michael Lerner's *Choices in Cancer Therapy: A Complete Guide to Conventional and Alternative Cancer Treatments, Including Nutrition — Mind-Body — Newest Drugs — Surgery — and Much More.* Lerner has also written another titled *Choices in Healing: Integrating the Best of Conventional and Complementary Approaches to Cancer.* Lerner confesses at the outset that though he has gathered much information in the 10 years or so spent on the project, he is not in a position to make specific recommendations for cancer therapy.

For the record, conventional treatments are described for the layman in *Choices* by Marion Morra and Eve Potts, into its third edition. A more technical exposition of conventional treatments is found in the massive *Cancer: Principles and Practice of Oncology*, edited by M.D.s Vincent T. DeVita, Samuel Hellman, and Steven A. Rosenberg, with 157 contributors.

More perspectives about the present state of affairs are found in the preliminaries of James H. Johnson's *How To Buy Almost Any Drug Legally Without a Prescription.* As a result of the thalidomide tragedies, the Food and Drug Administration (FDA) became supercautious about testing, recognizing that some drugs may have unsuspected long-term consequences. Unfortunately, the knife cuts both ways, and there is no doubt that many safe drugs have been needlessly excluded. An out has been provided, however, by permitting drugs to be purchased from foreign or overseas sources. This relaxation in policy was brought about by pressure from AIDS victims. In effect, the burden of proof is placed upon the patient. It is *caveat emptor*, or let the buyer beware.

Others continue to warm to the subject in a growing array of books and articles, with the Internet furnishing still more information. Along the way, there was *Death by Injection: The Story of the Medical Conspiracy Against America* by Clarence Eustace Mullins, considered sort of an "underground" exposé, not to mention Robert S. Mendelsohn's controversial *Confessions of a Medical Heretic.* There is also Paul Starr's Pulitzer-winning *Social Transformation of American Medicine*, published in 1982.

A Canadian physician, Dr. Guylaine Lanctôt, wrote an exposé titled *The Medical Mafia: How to Get Out of it Alive and Take Back Our Health & Wealth* about the medical situation in both Canada and the United States and has been harassed for his pains. Like Clarence E. Mullins, Robert S. Mendelsohn, and some others, she is skeptical about the widespread use of vaccinations. Earlier, in England, Donald Gould contributed a book with the similar title, *The Medical Mafia: How Doctors Serve and Fail Their Customers.* There seems to be enough dissent to go around, and more remains to be said about this resistance to medical orthodoxy.

Even milk has come under fire, with the assertion that the dairy industry has spent billions to influence the FDA and Congress, as well as the medical and scientific establishments (and price supports have become a fact of life). The exposé

is Robert Cohen's *Milk: The Deadly Poison*, which emphasizes the contaminants that appear in milk: human-engineered growth hormones and pesticides, microorganisms such as those that cause bovine leukemia and bovine tuberculosis (not to mention the routine overuse of antibiotics, passed on to milk as well as meat products). The powerful growth hormone IGF-1 has in fact been implicated in the growth and proliferation of human cancer.

For more purely technical considerations about cancer and alternative therapies, there is John Boik's *Cancer and Natural Medicine: A Textbook of Basic Science and Clinical Research*, first published in 1995. With some 1200 or so references cited, it is a comprehensive and informative examination of the factors involved. This book takes up the initiation and growth of cancer cells, the processes of angiogenesis or vascularization by which a blood vessel network is formed in solid tumors, invasion and metastasis, and the effects of other factors, including the immune system. Beyond this, using conventional treatments as the baseline, Boik goes on to discuss Chinese therapies, the use of botanical agents, the effects of dietary macronutrients and micronutrients, the efficacy of still other agents, natural or synthetic, physical methods and psychological factors, and concludes with a discussion of research under way. The appendices list various substances noted to have antitumor or anti-cancer effects, provides an overview of many of the more common cancers, along with vital statistics, and furnishes other information of potential interest.

None of these references zero in on cures as such, but rather focus on treatments.

Lastly, for a couple of readable semitechnical accounts about cancer, both listed in the References, consider the following: Francis X. Hasselberger's *Uses of Enzymes and Immobilized Enzymes* (1978), and Matthew Suffness and John Pezzuto's chapter titled "Assays Related to Cancer Drug Discovery," in Vol. 6 of *Methods in Plant Biochemistry* (1991). Even if somewhat dated, much of the information nevertheless remains relevant.

THE NUTRITIONAL BROUHAHA

The medical establishment has mostly gone out on a limb to the effect that supplemental nutritional factors play no significant role in our ills, for example, vitamins, minerals, and herbs (and such therapies as laetrile, etc.), as cures, remedies, or preventions. On the whole, osteopathic medicine — and, we may add, chiropractic — appears more receptive to the role of nutrition than does its M.D. counterpart.

Fortunately for all of us there are, and have been, some distinguished mavericks, both in and at the periphery of the medical profession, who have grabbed the initiative in nutritional medicine. Their findings have appeared, for instance, in the nutritional health magazine *Prevention* (founded by J. I. Rodale) and in other conventional and unconventional publications.

Nutritionist Adelle Davis was perhaps the progenitor, with her well-known series of books. (Her influence continues by virtue of The Adelle Davis Foundation, 116 Middle Road, Suite K, Montecito, CA 93108, 805-969-9076.) Among many other things, Adelle Davis was a strong proponent of including brewers' yeast or nutritional yeast in the diet. (Anecdotal evidence suggests that it will smooth out the heartbeat and a person's disposition as well. It also helps to keep off ticks, from both humans

and dogs, and maybe keeps mosquitoes at bay. Another of Adelle Davis's therapies, unexpectedly, is common table salt against glaucoma.)

The ubiquitous Dr. Atkins and his organization came out swinging on the side of nutrition, with books, a newsletter, a line of supplements, and the Atkins Diet. Pediatrician Dr. Lendon Smith is another who promotes the nutritional approach in his books. Dr. Jonathan Wright has served the cause well through the years. Dr. Andrew Weil is a comparative newcomer. So is Dr. Julian Whitaker, a former associate of the famous chemist Linus Pauling. There is also Dr. Abram Hoffer, also a former associate of Linus Pauling. Both Dr. Whitaker and the Linus Pauling Institute have utilized the newsletter approach to disseminate information. The foregoing doctors are all M.D.s, sometimes with a Ph.D. attached, and are a part of a welcome and overdue trend within the medical profession. Some of the more prestigious medical schools now even offer courses in nutrition, reportedly, as many as half of them.

(An announcement by Elaine Zablocki in the January 2005 issue of the *Townsend Letter for Doctors & Patients* indicates that the University of Minnesota now offers holistic complementary and alternative medicine (CAM) education. Cited is Mary Jo Kreitzer, Ph.D., RN, who is an associate professor of nursing, and director of Nursing Practice and Research at the University of Minnesota Hospital and Clinic. Professor Kreitzer notes that the nursing profession has been oriented holistically from the very beginning. "It was Florence Nightingale, the founder of modern nursing, who wrote that the role of the nurse was to help patients attain the best possible condition so that Nature could act and self-healing could occur." It is added that Professor Kreitzer is the principal investigator for a \$1.6 million National Center for Complementary and Alternative Medicine (NCCAM) curriculum grant and a \$2.1 million clinical study funded by the National Institute for Nursing Research to assess "mindfulness mediation" for solid organ transplant victims.

There is the heritage of Linus Pauling, twice winner of the Nobel Prize, who faced off the opposition with his orthomolecular approach to the body's dysfunctions. In particular, he has long been known for his advocacy of megadoses of vitamin C. Then there are the two Drs. Shute, of Canada, who pioneered the intake of vitamin E for the heart, a regimen that is finally coming into vogue.

The subject is merging, along with the art of healing and conventional medical practice, into what is called *holistic* and sometimes *wholistic* medicine or maybe *Gestalt* medicine. (Holism: the whole is more than the mere sum of its parts; also called *synergism*. *Gestalt*: indicating that physical, psychological, and biological phenomena integrate, therefore, it is another applicable word.) Hans Holzer wrote a book titled *Beyond Medicine* about the evidence for unorthodox and psychic healing. The findings can be investigated anew.

In his bouts with illness, Norman Cousins, former publisher of the *Saturday Review* and author of *Anatomy of an Illness*, discovered that "happy people are healthy people," a finding endorsed by J. I. Rodale and others in *Prevention* magazine. (Cousins' successful battle against an incurable illness was supplemented with megadosages of vitamin C. He also mentioned a father who bootlegged vitamin-C-laden ice cream into the hospital for his seriously ill young daughter, who responded by getting well, much to the physicians' consternation.) An update has been provided

from time to time, for example, in the September 1990 issue of the *Saturday Evening Post*.

A physician and surgeon, Bernie Siegel, has written *Love, Medicine and Miracles*, which further documents the powers of self-healing. In *Learned Optimism*, psychologist Martin Seligman compares the health of optimists vs. pessimists, with the former group emerging a clear winner. Not to mention Proverbs 17:22: "A merry heart doeth good like a medicine, but a broken spirit drieth the bones." "Humor rooms" are being placed in hospitals, which show old movies and videotapes and play recordings of the great comedians and comics of past times. There is the emerging field of gelotology, the science of laughter.

Another physician of consequence is Patch Adams, M.D., about whom a movie, *Patch Adams*, was made. His mission is carried out via the *Gesundheit!* Institute, dedicated to revolutionizing health care delivery by replacing greed and competition with generosity, compassion, etc. The particular Web site is www.patchadams.org/home.htm, although there are multiple listings of information on the Internet. The accompanying hospital project, ongoing, is located in Pocahontas County, West Virginia, but with an international impact.

We have, along the way, learned the importance of child–parent bonding, especially, maternal bonding, simple friendship or fellowship, and also the companionship of pets. Omar Khayyam ventured that each day spent fishing adds another day to one's life.

We learn that there is no such thing as completely objective testing. Everything sooner or later, in one way or another, becomes biased. The polygraph (lie detector), which scientifically monitors our nervous impulses, is found to be unreliable. It turns out there is also no such thing as a 100% placebo, although there is a placebo effect, which causes apparently neutral agents or methods to have a biased or beneficial effect, whether sugar pills or merely the fact of being tested (e.g., as observed in biorhythm studies). There is also talk of iatrogenic maladies or symptoms that are inadvertently introduced by the physician or researcher. (Hence the need for "double-blind" studies, in which the subject or patient does not know how he or she is being tested or what he or she is taking, and the doctor or researcher (the "tester") does not know what is being used, or maybe even does not know what the test is about.) Catchall descriptors, such as psychosomatic, and the power of suggestion have long been used to explain the unexplainable. But even if unexplainable, what difference does it make as long as it works? The subject is summarized, with examples, in *Your Emotions and Your Health* by Emrika Padrus and the editors of *Prevention*.

To mention more about the unexplainable, on or about February 22, 1993, on PBS, Bill Moyers reported on the mind–body connection in medicine. The two hour program was titled "The Mystery of Chi/The Mind–Body Connection," and was a segment of the PBS-series *Healing and the Mind*. (Additionally, the series has been made into a book by Bill Moyers, also titled *Healing and the Mind*.) A considerable portion of the program dealt with mysterious or unexplainable medical practices employed in China. Among them is the phenomenon called *Chi*, whereby a person may influence his own self or others, sometimes by the mere manipulation of the hands above the patient, in some respects similar to the laying on of hands. Healing may occur or the external forces may even be counteracted, the force working against

itself. The traditional modes or models used for explanation in the West and the mechanistic interpretations based on cause and effect do not suffice in the mystical East.

This calls to mind the work of Dr. William H. Philpott, coauthor of *Brain Allergies: The Psychonutrient Connection*, who more recently coauthored *Biomagnetic Handbook: A Guide to Medical Magnetics, the Energy Medicine of Tomorrow*. There is, after all, something to magnetic fields and their effect on the body, or, in other words, to “auras,” natural or induced. The inference is to extrapolate to such phenomena as hands-on or hands-off healing, maybe to water witching, and the ability of some persons to stop a clock or watch, etc.

Among other things, a disproportionate number of Chinese inexplicably live to a ripe old age, as do others in different cultures. This brings to mind Deepak Chopra’s *Ageless Body, Timeless Mind*, published in 1993, which hit the best-seller lists.

Yet another report about unconventional medicine was CBS’s *48 Hours*, aired on July 7, 1993. From October 26 to 28, 1993, WTBS-Atlanta contributed a program “The Art of Healing: Remarkable Stories of How We Heal Ourselves.” The subject can be expected to be of ever-increasing interest, in spite of the resistance of the FDA to the use of vitamins, unorthodox medicine, and all that this implies, though the passage of the Dietary Health and Education Act in 1994 serves to counter much of this resistance.

An article in the *American Spectator*, January 1995, had considerably more to say about the FDA and its then commissioner, David Kessler. Written by James Bovard and titled “Double-Crossing to Safety,” the reign of Kessler was characterized in the heading for the article in terms of a “hunger for regulations and addiction to power,” which was just a warm-up. Bovard also mentioned that the wording in the Dietary and Health Education Act is so vague that it may actually give the FDA more power than it already has. The foregoing is only a part of what Bovard takes on in his book *Lost Rights: The Destruction of American Liberty*, published in 1994. Nor does Herbert Burkholz have too many good things to say in *The FDA Follies: An Alarming Look at Our Food and Drug Administration*.

A recurring critic of the FDA is William Faloon of the journal *Life Extension*; for example, he takes the FDA to task in the May 2004 issue for approving deadly drugs while delaying life-saving therapies. There have been several legal judgments made against the FDA, for example, as initiated by Durk Pearson and Sandy Shaw, authors of a prominent book also called *Life Extension* (most of which, interestingly, the FDA ignores.)

Even weather gets into the act. We are once again becoming more conscious of the mood swings that accompany changes in the barometric pressure, in terms of the elements, the emerging wind, rain, and snow. And there is the effect of the seasons, of warmth and cold, of sunlight and cloud, of daylight and darkness, and of moonlight and shadow, the life rhythms of the ancients.

There are such imponderables as why, during wartime, does the general level of health go up? (And why are more boy babies born?) A partial explanation for this in World War I is the use of unbleached flour, as the chlorine gas ordinarily used for bleach was utilized for the war effort. For World War II, perhaps it was “Lucky Strike green goes to war!” (That is, the green chemical compounds —

chromium oxide? — used to color the cigarette packs were needed in the war effort.) Or maybe not. Anyway, the Lucky Strike packs thenceforth stayed white.

Concerns with food additives have surfaced; the preservatives and flavor enhancers such as nitrites and nitrates, sulfites and sulfates, sodium benzoate, monosodium glutamate (MSG), etc., not to mention the synthetic dyes and flavorings. A compilation sometimes includes headache-producing or indigestion-inducing substances, with occasionally worse side effects that are of questionable benefit. (See for instance the January/February 1990 issue of the *Saturday Evening Post*. Also see George Schwartz's book about the effects of MSG, variously disguised as hydrolyzed protein and, presumably, calcium or sodium caseinate. Interestingly, MSG promotes the sense of taste rather than acting upon the food itself; similar to the room deodorizers that numb the sense of smell instead of removing the odor.) To read the list of ingredients on the label is, too often, enough to scare a party back to the drawing board. One wonders what possible purpose there could be for this seemingly senseless and random array of additives? Surely profit is a limp excuse, as more healthful foods are now a selling point.

In addition to additives, there are toxic substances that occur naturally and also during food processing or cooking. An example is the chemical acrylamide that is formed during the heating process for both French fries and potato chips. At higher temperatures, the naturally occurring amino acid asparagine reacts with the sugars and starches present to form acrylamide, which is thought to be a carcinogen. The State of California, for instance, is presumably taking steps to require warning labeling of fries and chips.

On occasion, the inference has been made that Alzheimer's disease, associated with advancing age, may be correlated with the presence of aluminum or its compounds in the body. (Or may not be, but prudence is said to be the soul of discretion For a more general treatment of the subject, there is, for instance, *Aluminum and Health: A Critical Review*, edited by Hillel J. Gitelman and published in 1989.) If this connection is indeed so, the American diet has some unpublicized opportunities for further modification. The aluminum compounds are a constituent of ordinary table salt (to make it pour more freely), of most baking powders, and of pickles (as alum), to name a few. (Unadulterated sea salt, with its trace elements, seems a better bet for the salt shaker. There is also a trend to use salt substitutes, including potassium chloride, instead of the ubiquitous sodium chloride, or common salt.)

The mania for food is another of the ponderables, somehow related to the drive for power, money, wealth, and success. Apparently, food addiction is one of the primary social satisfactions. In this country, it outstripped the needs of hunger, save for the underprivileged, by definition, long ago. The desire to pig up and pork out otherwise defies explanation. At the gatherings of the well fed, for instance, already bulging at the seams but still ritualistically stuffing it down amid the conversation, all are evidently fulfilling some sort of social need and filling in some sort of blank space in their lives, though there may be very little space to fill. Perhaps we are then speaking of an addiction, specifically a food addiction, or call it an eating disorder or a conditioned reflex (from our primitive ancestors, who gorged when the going was good, and the rest of the time did without). The result, whatever, is "weight."

(We seem to have outlived the desire and need for such backups as “steatopygia,” which means the deposition of body fat in the buttocks.)

Obesity, or excess body weight, is therefore a subject of intense fascination. Whereas in earlier times a degree of *avoirdu pois* was necessary for survival and was held in esteem, the opposite view is in vogue now, and we eternally try to shed the pounds. Sugar and fat are seen as the culprits.

Refined sugar, or sucrose, is viewed by some as addictive since its discontinuation produces withdrawal symptoms. In physical appearance, refined sugar looks like heroin, which has caused some talk. Otherwise, the descriptor “empty calories” is employed, apropos of a lack of nutritional value. For reasons not publicized, sugar seems to be part of most cookbook recipes, and it is a surefire way to ruin good cornbread.

William Dufty, in *Sugar Blues*, has dissected the subject exhaustively. Sugar is viewed as more of a “substance” than a food. Dufty also traces the role of sugar and the sugarcane industry in promoting slavery in the New World, with the encouragement of the Old world and its new-found craving for sugar. The African slave trade provided the workers for the sugarcane plantations, and the British and the Americans provided the ships for transport. Sugar has proved diabolical in unsuspected ways, from the very start. Cotton and American slavery came along later.

All of us favor sugar substitutes, now mostly in the form of the chemical aspartame, marketed under the trademarks NutraSweet® and Equal®. But this substitute has come under fire as having some adverse side effects. It is a chemical that in one way or another involves other chemical forms variously as reactants, in chemical bondings, or as decomposition products, notably phenylalanine and methanol, both regarded with suspicion for toxicity, especially the latter. Methanol, commonly referred to as methyl alcohol or wood alcohol, has long been known for its poisonous properties. Methanol has, at the same time, numerous industrial uses, including that of motor fuel. By comparison, ethanol (drinking alcohol or ethyl alcohol or grain alcohol) is reputed to be even more toxic than methanol, ounce for ounce absorbed. Fortunately, ethanol is absorbed into the bloodstream relatively slowly. (Whereas phenylalanine is a protein or amino acid, concentrated proteins are being reconsidered after the trouble with tryptophan.) As the temperature rises, thermal decomposition proceeds; hence the reason for not using aspartame in cooking. Similar effects that might occur in a person’s stomach is further food for thought. A book by H. J. Roberts explores the subject and a citizens’ network was founded, the Aspartame Safety Network, P.O. Box 780634, Dallas TX 75378. Still another book is *Bittersweet Aspartame, a Diet Delusion* by Barbara A. Mullarkey. The Christian Broadcasting Network, or CBN, once kept viewers up to date on its program, the *700 Club*.

Speculations are that there might still be a natural or synthetic sweetener awaiting discovery. Thus, the famous South American explorer Colonel P. H. Fawcett, in traversing the Brazil–Paraguay border, noted a small plant known locally as *Caa-he-eh*, whose leaves were several times sweeter than ordinary sugar. (Could this be the South American herb now called *Stevia*, which is said to be 30 times sweeter than sugar?) Another, called *Ibira-gjukych*, had leaves with a salty taste. Common salt, or sodium chloride, is generally overconsumed, the idea being that maybe we need less sodium and more potassium in our diet, that is, a little more balance.

A recent article about Colonel Fawcett and his explorations, by David Grann, appears in the September 19, 2005, issue of the *New Yorker*. Grann retraced Fawcett's steps after his disappearance back in 1925. Fawcett was looking for a lost civilization in the headwaters of the Xingu River, a south/southwestern tributary of the Amazon, as had been reported by early-day Portuguese explorers. Most authorities thought this far-fetched, but the last few pages of Grann's article are breathtaking. He ran across an archeologist from the University of Florida who had been in the region for some ten years and had discovered the remains of a lost civilization, some twenty and more large sites. A particular site, for instance, might be a mile across, surrounded by a moat and was presumably backed up by a timbered palisade. The wooden buildings had long since decayed, but the sites contained much broken pottery or shards. The archeologist, Michael Heckenberger, and his team had reported on these findings in a few publications, for example, in *Science*, but his findings were not widely disseminated. Those who knew his findings have indicated that there might have been as many as a million inhabitants, though Heckenberger thought this figure was high. He agreed that the inhabitants had largely died off from the diseases introduced by the early white explorers, with only a few survivors remaining. Nevertheless, the layouts and interconnecting roads indicated to Heckenberger that this had been an advanced civilization for its time. Another book of related interest is *The River of Doubt*, by Candice Millard, which recounts former U.S. President Theodore Roosevelt's travails in exploring an unknown region of Amazonia.

In addition to common sugar, or sucrose, derived from sugarcane or sugar beets, already in hand are other naturally occurring sugars, such as glucose and dextrose (corn sugar), fructose and levulose (fruit sugar), lactose (milk sugar), and maltose (malt sugar), of varying sweetness. (The suffix "-ose" denotes a sugar or other carbohydrate.) There is, for example, sorbitol, derived from berries, cherries, and other fruits. The names sorbose, hexose, etc., are encountered. Of interest is xylitol, derived from tree bark, and similar in chemical structure to xylose, or wood sugar. (The prefix "xylo-" means wood.) It is being promoted for use in chewing gum, for instance, as an agent that fights tooth decay.

With regard to corn as the raw material, modern technology yields the product high fructose corn syrup, which is used in soft drinks and foods. The by-product is called *corn gluten meal*, which serves as livestock feed. Significantly, the meal also makes a great organic fertilizer, notably for lawns, where it acts against weeds, requires less watering, and the gluten content is a source for nitrogen-induced greenery.

The subject of intense sweeteners is briefly described in a section in the Hoffman cancer reference, which were noted to be either organic acids or peptides, with high intakes causing disturbances in the gut microflora. But the effect on tumor development was unclear (Hoffman, 1999, pp. 226, 227). Bringing matters up to date is an article by Burkhard Bilger in the May 22, 2006, issue of the *New Yorker* titled "The Search for Sweet." Noting the enormous sugar consumption, especially in the United States and dismissing saccharin, cyclamates, aspartame, and the like, considerable space is given to what became Splenda®, which was first encountered as 1,4,6,6-tetrachloro-1,4,6,6-tetradeoxygalactosucrose. It was discovered after adding highly toxic sulfuryl chloride liquid to a sugar solution, and has been subsequently improved

upon. (The chlorine content discourages some parties from using it, despite the claim that it is made from sugar.) Another entry is called inosine monophosphate (IMP), which is synergistic with MSG. Many more possibilities have been uncovered, with sweetening effects thousands of times that of sugar, but none are as versatile or satisfying as ordinary sugar. The search continues, however.

(There are natural agents that can affect the craving for sugar or the metabolism of sugar intake. The licorice root is commonly mentioned. Another more exotic agent is said to be *Gymnema sylvestre*, or “Gurmar,” herb marketed under the trade name *Sweet Away*.)

With regard to fats, we are developing fat substitutes, using which food will taste as good, but without the calories. And after the criminal prosecution of the authors of a book titled *Calories Don't Count*, it is found that, sometimes, maybe they do not. (More successful at fighting off the establishment was Dr. Andrew Ivy, at the time dean of the Northwestern University School of Medicine, whose endorsement of Krebiozen cancer therapy came under attack in the courts. But Dr. Ivy was acquitted.) Meantime, at Louisiana State University, it is reported that zoologist Albert Meier has made an intriguing discovery: Migrating birds and hibernating animals will build up fat in preparation for flight or hibernation, without any extra food intake. This is a rhythmic process, which in reverse could lead to a spontaneous weight loss in humans, for example, via the drug bromocryptine.

Cows' milk and its cream, or butterfat, and all those gourmet products such as butter and the many cheeses are presumably tough on the body plumbing because of the high fat content. About milk, however, the uniform practice of homogenizing the milk and cream together may lengthen the shelf life but does not do much for digestibility, although pasteurization has a lot going for it, namely, the elimination of milk-transmitted diseases such as tuberculosis. Speaking of indigestion, whereas most vegetable oils are derived from edible seeds or nuts, it is left to wonder about cottonseed oil as it hardly seems edible, though cattle apparently thrive on the leftover cottonseed cake. But we are not cattle. This also brings up the subject of hydrogenated vegetable oils, the semisolids used everywhere as butter substitutes or margarine for cooking and baking, but which are synthetics, that is, not found in nature. These also cause indigestion. The body sure needs a good alimentary canal to withstand this onslaught.

THE PONDERABLES OF BIOCHEMISTRY

Basic to any discussion of life and life processes is the subject of cells, designated as *eukaryotes* and *prokaryotes* (e.g., in Voet and Voet, 1995, p. 2ff). The *eukaryotes* are distinguished by a membrane-enclosed nucleus containing their DNA and may be unicellular or multicellular, whereas *prokaryotes* lack this feature. *Prokaryotes*, by far the most numerous, are the cells of bacteria, whereas *eukaryotes* are the cells presumably of everything else — notably mammals, including humans, but also the cells of plants, which are distinguished by a rigid cell wall. *Eukaryotes* contain intracellular entities called *organelles* that perform various functions, including protein synthesis in mammalian cells. On the other hand, in plant cells, there are organelles called *chloroplasts*, the site of photosynthesis.

Viruses are excluded from this classification, being considered nonliving things, basically containing a strand or strands of DNA or RNA and lacking the metabolic apparatus to reproduce outside of host cells. Technically speaking, “Viruses are infectious particles consisting of a nucleic acid molecule enclosed by a protective capsid (coat) that consists largely or entirely of protein” (Voet and Voet, 1995, p. 841). In turn, there are what are known as *subviruses*, sometimes called *slow viruses*, and which merge into the *prions*, considered the possible cause of such diseases as *Alzheimer’s* and *bovine spongiform encephalitis* (BSE, or mad cow disease) and the latter’s human variant called *Creutzfeldt-Jakob disease* (CJD). The term *prion*, incidentally, stands for “proteinaceous infectious particle.” (The word is that misdiagnosis may occur, in that what is called Alzheimer’s disease may in some instances be Creutzfeldt-Jakob disease. In other words, CJD may be more common than it is thought to be.)

There is another microorganism called a *mycoplasma*, being the smallest microorganism capable of independent replication and growth, and it is sometimes viewed as a cross between a bacterium and a virus. It calls to mind that macro/micro/molecular entities may exist, ranging from fungi and bacteria down through viruses to subviruses and prions, even to various molecular-sized particles, pieces, or segments (say the fundamental particles of matter?). There is also the phenomenon called *polymorphism* or *pleomorphism*, in which an organism or entity can change from one form to another (say, a bacterium to a virus, or vice versa). This is a touchy subject in micro- or molecular biology, although apparently common enough in the macro world — take butterflies and their larvae, for example, or marine flagellates (red tide).

The prefix “myco-” signifies fungus, and appears in such categories as mycoplasma and mycobacteria, with the qualifier that these organisms may be plantlike, animallike, maybe even viruslike, etc., although the fungi or Mycota have their own separate kingdom (Hoffman, 1999, pp. 280–283). A specific example of a mycobacterium is the organism *Mycobacterium leprae*, the cause of leprosy, or Hansen’s disease, in humans. These forms can also occur in certain animals, for example, in the nude mouse, the nine-banded armadillo, and the mangabey monkey: animals that have been utilized in trying to develop a vaccine. Moreover, there are two basic kinds of leprosy called *tuberculoid* and *lepromatous*. The former eventually yields to sulfone drugs, the latter is more intractable to treatment and may return unexpectedly at any time (Hoffman, 1999, p. 305). The traditional treatment of leprosy with chaulmoogra oil has long been proved ineffective, although several modern drugs have been tried, namely, rifampin, dapsone, and clofazimine, although with hepatotoxic side effects. The BCG vaccine has also been tried, with widely disparate results.

An intriguing aspect was supplied by the once-famous roving correspondent Ernie Pyle in his book *Home Country*. A visit to Hawaii’s Molokai leper colony is described in his chapter “The Leper Colony.” There were a few patients who had a “reaction,” in which a high fever occurs and the patient comes out of it “clean” (Pyle, *Home Country*, p. 242). Evidently, the patient’s immune system rose to the occasion and destroyed the organism, in the same way it attacks other diseases. There was talk at the time of developing a machine to artificially induce fever in

leprosy patients, but it was reported that nothing came of it. The subject is, therefore, that of hypothermia, which reportedly works on cancer patients at times.

In humans, there are different cells in each part of the body, which have been given various technical names. Of particular note here are the neurons, the cells of the nervous system, including the brain. They are the basis of the subject of biochemical communication, hormones as biochemical regulators of body processes, and of neurotransmitters for carrying instructions between neurons and from neurons to muscles or glands (Voet and Voet, 1995, p. 1261ff, 1291ff). With regard to neurotransmission, neurons are separated by interfaces or junctions known as *synapses* through which nerve impulses are carried (an electrochemical phenomenon) and have extensions called *axons* that carry impulses. (An impulse can be described as a burst or as a “go or no-go” phenomenon.) Among the more common neurotransmitters are positively charged potassium and sodium ions, and the negatively charged chlorine ion, described as acting through channels. Various neurotoxins block these channels with deadly results, e.g., manifested as a shutdown of respiration. Among these neurotoxins are tetrodotoxin, from the puffer fish (or fugu); saxitoxin, from the plankton known as the *red tide*; batrachotoxin, a steroidal alkaloid from the South American arrow-poison frog, *Phyllobates aurotaenia*; and venom from American scorpions.

Among the most important neurotransmitters are acetylcholine (ACh), amino acids and their derivatives, and certain polypeptides known as *neuropeptides*. In fact, the mammalian nervous system is said to employ over 30 different substances as neurotransmitters. For the record, among the amino acids and their derivatives (called *biogenic amines*) are many that are also hormonally active in the bloodstream, and include the catecholamines dopamine, norepinephrine, and epinephrine, as derived sequentially from tyrosine, whereas γ -aminobutyric acid (GABA), histamine, and serotonin are derived from glutamate, histidine, and tryptophan, respectively. The subject interfaces with the biochemical aspects of psychology, which may also be referred to as the *mind-body connection*, or *psychosomatics*.

Interestingly, the class of biochemically active substances called *alkaloids*, which are often toxic (sometimes extremely so) can act as neurotransmitters. Also relevant is the subject of enzymes and enzyme inhibitors, for alkaloids are also known enzyme inhibitors and may act against cancer cell metabolism. Enzymes are the catalytic agents for the various body processes, and along with catalysis, there are electrochemical phenomena involved — a manifestation somewhat similar to neurotransmission.

In inorganic catalysis, notably involving substances called the *Group VIII transition metals* of the periodic table, such as, nickel, iron, cobalt and their oxides, two states or degrees of oxidation are involved: a lower and a higher state. Thus, a catalyst is activated by a partial reduction with hydrogen or by a partial oxidation with oxygen or its equivalent to produce a heterogeneity throughout the catalyst composition. And a condition of compositional heterogeneity sets up minute or micro electrochemical forces, or emfs, which relates to catalytic activity (on a macro scale, for example, we would be speaking of a battery). Even platinum catalysts, perhaps the most active of metal catalysts, are found to have a coat of the oxide, indicating a condition of compositional and electrochemical heterogeneity.

It is interesting to note that certain platinum compounds or complexes have been found to act as anticancer agents, but also may act as carcinogens or mutagens, and/or toxicants (Chabner et al., in *Goodman and Gilman's Pharmacological Basis of Therapeutics*, 2001, pp. 1269–1271; Goyer, in Amdur et al., 1991, pp. 666, 667; *The Toxicity of Anticancer Drugs*, Powis and Hacker, 1991, p. 82ff.; various entries in Perry and Yarborough, 1994). The forms most studied are called *cisplatin* (or platinol, or DDP), *carboplatin* (CBDCA), and *ipropilatin* (CHIP), as acronyms for their lengthy chemical names. Adverse side effects include kidney damage, hearing loss, and bone marrow suppression. In common with other anticancer agents, the dosage level is the poison.

Colloidal silver, available in health stores and of historical use, is occasionally touted as an anticancer, antifungal, and antibiotic agent. The arguments seesaw back and forth (on the Internet), with the admonition that much of the silver present may be ionic silver which can cause argyria, a graying of the skin. The antibiotic action is sometimes thought of in terms of a disablement of oxygen metabolic enzymes. (Bacterial or prokaryotic metabolism is extremely varied, however.) On the other hand, it could be a catalytic effect, even a consequence of oxidation-reduction reactions between metallic silver and its ions.

An update is furnished in the May 2006 issue of the *Townsend Letter for Doctors & Patients* in an article by Apsley, Holtert, Gordon, Anderson, and Buttar titled “Nanotechnology’s Latest Oncolytic Agent: Silver, Cancer, and Infection Associations.” The agents used were positive silver ion hydrosols composed of nanoclusters and even picoclusters, of the lowest size imaginable. *In vivo* (clinical) tests conducted in Central America produced striking results against female breast cancers. A treatment protocol against pancreatic cancer is also described, which has so far proved successful, with medical orthodoxy concluding that maybe the patient did not have pancreatic cancer after all.

To continue, an electrochemical- or polarity-induced condition of dissociation for the reactants can be inferred, followed by a reassociation into the products. With organic catalysts, such as enzymes, a condition of polarity is indicated in that one part of an organic molecule will appear positive relative to another, with the latter part having a negative connotation. This in turn may be inferred to confer a dissociation of the reactant or reactants, followed by a reassociation into the product or products.

It may also be noted that electrophilic behavior can contribute to mutagenesis and carcinogenesis (Klaasen and Eaton, in Amdur et al., 1991, p. 29). By “electrophilic” is meant a propensity to attract or share electrons to counteract an electron deficiency in the substance. Thus, it is noted that there are many electrophilic sites within the DNA that can readily react with electrophilic chemicals. (That is, the electrophilic sites share electrons with the electrophilic chemicals, a phenomenon also known as *covalent bonding*.) As another example, the amino acid guanine may undergo alkylation, which appears important in the mutagenicity and carcinogenicity of nitrosamines.

The inference is that organic enzymatic catalytic activity and carcinogenicity may share a common electrophilic ancestry. If this indeed has a bearing on anticancer agents, the resolution can be phrased in terms of finding natural or synthetic

chemicals that will selectively counter or block this electrophilic behavior. Perhaps “electrophobic” behavior or an *antioxidant* is involved.

(In materials science, the word *antioxidant* pertains to an additive or agent that lessens the effects of oxidation, thus reducing degradation. Electrochemically, the word *oxidation* signifies the removal of electrons from a chemical entity and their capture by another oxidizing entity. In terms of hydrogen content, it can mean the removal of a hydrogen atom or atoms by, say, oxygen, in this case, to form water. Thus, in this context, antioxidant would denote something that prevents oxidation or, conversely, provides the inverse, called *reduction*. Reduction would, electrochemically, connote the addition of electrons; chemically, it would connote the addition of hydrogen. In any event, the net objective is to selectively inhibit or block a critical enzyme like lactate dehydrogenase, which is involved in cancer cell metabolism. This inhibiting or blocking action, generally could be either by oxidation or reduction, resulting in an electrochemical or chemical change.)

With this brief introduction, it may be inferred that there is a connection between the electrochemistry of the nervous system and the biochemical processes of the body. It is not yet fully understood but has the potential to negate cancer cell formation and metabolism.

Beyond this, however, we are adrift, as the mysteries that are the “spark of life” remain untouched. In other words, what distinguishes a “live” cell from a “dead” one, or a “live” virus from a “killed” virus? Or, more completely, what in the ultimate analysis distinguishes a live human being from a dead one? Can there be, or cannot there be, an inherent bio-physico-magneto-electro-chemical explanation at the most fundamental level? Or are we speaking of another domain, entirely, for example, metaphysics, literally beyond or apart from science?

Medicine continues to take many unexpected turns. There are theories and findings about the role of the body chemicals interferon and the endorphins, and their relation to well-being, both physical and mental. The term *phytochemicals*, which refers to plant, or plant-derived, chemicals, is among the newer buzzwords. There is talk of the interrelation between and among physicochemical and neuropsychological functions in terms of neurotransmitters, with neurologist Antonio R. Damasio’s *Descartes’ Error: Emotion, Reason, and the Human Brain* furnishing insights into this never-never land. (As an aside, there are apparently a few people whose chemical and electromagnetic aura is strong enough to disrupt a watch.) Bacterial strains resistant to the known antibiotics have developed, and are developing, calling for ever-new antibiotics, a situation like having a tiger by the tail. Another example regarding our increased consumption of carbonated soft drinks; there is concern about the phosphate content of these drinks depleting the calcium from our very bones.

(The preceding statement is part of a growing calcium deficiency problem, evidenced as osteoporosis, especially among the elderly, and is apparently reason enough to take calcium supplements along with vitamin D, which is supposed to aid in the body’s calcium fixation. Not only do the elderly have a problem with calcium requirements, but also with the absorption of other nutrients, even if sufficiently abundant in the total diet; this is one of the many reasons geriatrics is such

an inexact science. And magnesium may have as much or more potential than calcium in the future.)

There is also much talk about glucose, serotonin levels, and other chemical imbalances that may occur within the body. In many instances, specific food allergies are the prime suspect, including the use of food additives. There are problems with hormones and steroids (natural and injected or ingested) and with diethylstilbestrol (DES). And there are the environmental factors, weighed by Theron G. Randolph and Ralph W. Moss in *An Alternative Approach to Allergies: The New Field of Clinical Ecology Unravels the Environmental Causes of Mental and Physical Ills*.

Also, there is concern about trace, or "ultratrace," elements and their compounds, and how they may regulate bodily functions. Consider the fact, for example, that magnesium is vital to the functions of the heart, its rhythm, and its beat, and that inborn deficiencies may be responsible for crib deaths and other infant deaths, causes otherwise unknown. Magnesium is thought to quicken memory, whereas a deficiency may trigger Alzheimer's disease. Zinc, as another important example, is crucial for the proper growth of children and the proper healing of wounds. Lithium counteracts manic or depressive behavior and may be a factor in regulating ordinary mood swings, the ups and downs of daily life, to smooth out our coexistence on this earth. (About mood swings, one may consult Ronald R. Fieve's book of the same name.) However, too much of a lithium salt would be counterproductive; for example, lithium can adversely affect the liver and kidneys.

Some of the more recent publications about trace elements, trace minerals, or ultratrace elements or minerals, also described as micronutrients, include *Micronutrients in Health and Disease Prevention*, edited by Adrienne Bendich and C.E. Butterworth; *Trace Elements in Nutrition of Children*, edited by Ranjit Kumar Chandra; and *Trace Elements, Micronutrients and Free Radicals*, edited by Ivor E. Dreosti. The latter reference raises the important question of the undesirable health effects of the chemical agents called *free radicals*, and their control or eradication by such vitamins as E, C, and beta-carotene. There is a history of the health effects of trace elements going back to Henry A. Schroeder, who in the early 1970s wrote *Trace Elements and Man: Some Positive and Negative Aspects* and also *The Poisons Around Us: Toxic Metals in Food, Air, and Water*. Even further back there was Karl H. Schutte's *The Biology of Trace Elements: Their Role in Nutrition*, published in 1964.

The discussion about trace elements or minerals, their role, their optimal concentrations, and of how these may be vital to health and well-being continues. The water fluoridation controversy, of fluoride vs. tooth decay, is related. How much is not enough, and how much is too much? Not only with regard to fluoride addition to public water supplies, but with regard to the intervention of the state. Should the state doctor all municipal water supplies to maintain a uniform and apparently optimal mineral content? When is it and when is it not the state's business?

(Fluoride, in the form of stannous fluoride or tin fluoride, is said to be an enzyme inhibitor that blocks certain critical enzymes in oral bacteria. It is, however, also an inhibitor for other body enzymes, and the organic catalysts that support the myriad biochemical reactions occurring in the body, that is, the bodily functions. The more conventional explanation for fluoride's anticavity action is that it replaces calcium

in the tooth surfaces or enamel with a hard calcaneus layer on the teeth, thereby making these surfaces more resistant to bacteria. But whichever way introduced, whether by the municipal water supplies or other sources, fluoride also has toxic effects or adverse side effects; the severity of the effect depends on the concentration level or dosage and on biochemical individuality. A recent critique is contained in *Our Stolen Future: Are We Threatening Our Fertility, Intelligence, and Survival? — A Scientific Detective Story* by Theo. Colborn, Dianne Dumanoski and John P. Myers. The reminder is of the Romans' use of malleable lead cooking vessels, affordable to the elites, and resulting in insidious lead poisoning among the ruling class, and this was thought to play a major role in the decline and fall of the Roman Empire. More is contained in Christopher Bryson's *The Fluoride Deception*, published in 2004, with a foreword by Dr. Theo. Colborn. The push for fluorides in dentistry is traceable back to the Manhattan Project, where fluorine was used in uranium enrichment, and any kind of adverse criticism was obstructed. Its purported dental benefits can be viewed as another case of "making a silk purse out of a sow's ear." An insert on p. 23 of the November 2005 *Townsend Letter* is titled "Fluoride Linked to Bone Cancer, Again." This specifically refers to osteosarcoma, a rare form of bone cancer.

In broader terms, our concerns are about side effects: the physical, chemical, and biological changes in body and mind that accompany diet and medication. Some of the side effects are benign: others are adverse. And each individual will react differently, in accordance with a part of our distinctive biochemical makeup, a fact emphasized by the noted University of Texas biochemist Roger Williams in *Free and Unequal*.

Aside from more routine methods and sources, hair analyses have been used to diagnose our bodily chemical deficiencies and excesses, and extended even to chart a record of drug intake. We are not only analyzed *post factum*, but we may also be programmed *ante factum*, that is, not only after but before the fact. A transcript of brain wave patterns can indicate personality and mood, and the changes in these patterns that are analyzed by a computer may be used as a lie detector.

TROUBLES OF MIND

Psychiatric medication involves a dichotomy between free will and the use of mind-altering substances, natural or otherwise. Where is the line to be drawn? There is an old saying that everybody is a little crazy; some are just more so than others. When does "more so" become "too much"? The notation is that we are all affected to a degree by obsessive compulsive disorders (OCDs), with some of us severely so, or clearly so. Where, therefore, should the medication start and where should it end?

Or are we all to become zombies, having no personality, no disorders, no genius, no eccentricities, with any and all chemical dysfunctions of the body adjusted by drugs? This, in turn, will produce many other dysfunctions. The "happiness" pills and elixirs are the buzzwords of the moment.

There are those of us, nevertheless, who will for good enough reason settle for being average. On the other hand, there are those who perceive reality as so abhorrent that any sort of change or relief is welcome. What then? What has happened to a

society or civilization where this feeling, this malaise, becomes pervasive? Can in fact the spiritual dimension, where truth is reality, rescue and revivify?

One may judge, therefore, that all is not exactly well with conventional psychotherapy. If there was criticism before, there is more now. Among the earlier critics was Karl Kraus, whose translated writings appear in Thomas Szasz's *Anti-Freud: Karl Kraus's Criticism of Psychoanalysis and Psychiatry* (1990), which is a new edition of Szasz's *Karl Kraus and the Soul Doctors*. For example, Kraus jested that "the psychiatrist unfailingly recognizes the madman by his excited behavior on being incarcerated." Thomas Szasz himself has written extensively on the subject, in *The Myth of Psychiatry: Mental Healing as Religion, Rhetoric, and Repression* (1988a). (It may be noted that the word *mythology* could be substituted for *myth*, the latter being perceived as a truth that can be expressed in no other way.) This volume of Szasz's polemics, along with a few others, is cited in the bibliography. Whether or not Szasz is 100% correct is open to debate, but his outlook certainly provides some alternatives to the way mental illness is viewed. There is, of course, the matter of degree, or as the saying goes, everyone is a bit crazy, and some more than others.

The most common and perhaps least talked about mental problems are depression and anxiety. The panic attack, or anxiety attack, is recognized as a fellow-traveler with depression. It has been called the "common cold" of psychological complaints. A state of misery is apparently the near-normal human condition. Not for nothing did Thoreau write about us leading lives of quiet desperation. This pervasive lifecrippler is slowly yielding to a nutritional and biochemical approach, which cannot be too soon.

A prominent name in nutritional therapy for mental disorders is that of Carl C. Pfeiffer of the Carl Pfeiffer Treatment Center, Naperville, IL, and of the Princeton Bio Center, Skillman, NJ. In addition to his clinical work, he has written, coauthored, or edited a number of books dating back through the years. His later books include the following: *Nutrition and Mental Illness: An Orthomolecular Approach to Balancing Body Chemistry* (1988b); *The Schizophrenias: Ours to Conquer* (1988a); and *The Healing Nutrients Within: Facts, Findings and New Research on Amino Acids* (1987). He had earlier written his *Updated Fact Book on Zinc and Other Micro-Nutrients* (1978) and *Mental and Elemental Nutrients: A Physician's Guide to Nutrition and Health Care* (1975). These books are mainly related to attention deficit disorder (ADD), as occurs in school-age children, and which may yield to a nutritional approach.

About the routine use of Ritalin for hyperactive children, especially in schools, there are some who maintain that this is due to boredom in class. An alternative approach getting good marks is individual schooling, as practiced by the Desiderata School at Longmont, CO. Named after the now-famous poem by Max Ehrman, originally published in 1927, there is a one-to-one correspondence similar to that of the famous educator Johns Hopkins and a student, sitting on opposite ends of a log. The key is individual instruction that reflects and challenges the student's very own interests, flexible scheduling, and informal meeting places. The dropout rate is said to be less than 1%.

Another prominent name in the field of mental problems is Priscilla Slagle, a psychiatrist M.D. who also prescribes the amino acids. Her book *The Way Up from*

Down: A Safe New Program That Relieves Low Moods and Depression with Amino Acids and Vitamin Supplements was first published in 1987. The first chapter is titled "The Horror of Depression." In the subsequent chapters, we find that such amino acids as L-tyrosine, tryptophan, L-phenylalanine, and GABA which are taken along with the B-complex and other essential vitamins and minerals, help relieve depression. There may be some side effects; for example, L-tyrosine and L-phenylalanine can also act as stimulants, something the patient may not necessarily want or need.

(Tryptophan was removed from the U.S. market after a contaminated batch that was manufactured overseas was responsible for disastrous consequences. Tryptophan is also said to have some undesirable side effects, as can about every other medication under the sun, especially at higher dosages. It can still be ordered from foreign sources, however. It is said to be as effective as the drug Prozac. What behind-the-scenes maneuvering may have been involved in the marketing, we do not venture to suggest here.)

Another possibility is the herb St. John's wort, which is increasingly cited as acting against depression, though it also has its detractors. Jean Carper, who writes an "Eat Smart" column for *USA Weekend*, lists and describes the effect of this herb against depression in both her column (i.e., July 11, 1997) and in her book *Miracle Cures: Dramatic New Scientific Discoveries Revealing the Healing Power of Herbs and Vitamins*, also published in 1997. Also prominently mentioned is celery seed extract against gout, feverfew for migraines, and glucosamine for arthritis, to name a few.

A highly regarded series is about *Smart Drugs*, written variously by Ward Dean, John Morgenthaler, and Steven Wm. Fowkes. The subtitle of Volume 2 in the series is partially self-explanatory: *New Drugs and Nutrients to Improve Your Memory and Increase Your Intelligence*. The series, however, covers a great deal more.

In the extreme, on a day-to-day basis in the trenches, there is Stephen B. Seager's *Psychward*, about how life goes on at County General in Los Angeles. It is the hidden world of the mentally ill. We recall here the old saying mentioned earlier that everybody is a little bit crazy, and some are just more crazy than others. There is, in turn, the corollary provided in Seager's book that everybody is a little sane, but some of us, maybe, are just more sane than others.

Depression and anxiety are found to be major biochemical problems, as most likely are other emotional or mental disturbances, even schizophrenia. It is a newly unfolding and exciting field. These disturbances are being found to be related to sleep disorders, which in turn are related to biochemical imbalances. Compounding the difficulty is not getting enough sleep in the first place. So writes Martin C. Moore-Ede of the Harvard Medical School in *The Twenty-Four Hour Society: Understanding Human Limits in a World That Never Stops*.

If biochemical imbalances do in fact occur, there is in turn the problem of first causes: what triggered the imbalance in the first place? (The same problem, of course, as with the occurrence of cancer.) The catchall term *stress*, frequently mentioned, is intertwined with the culture, medicines, allergies, other biochemical abnormalities, the simplicities and complexities of food and drugs, exposure to toxic or even not-so-toxic chemicals, and hereditary factors, that is, the genetic component, etc. As for narcotic drugs, it is being noticed that drugs used for pain control *per se* may

not prove addictive — and that, for some mysterious reason, withdrawal symptoms do not usually occur if the drug is absolutely and unequivocally not available. There is, accordingly, a move to make opiates more routinely available for cancer patients. Not only can illness be made more painfree, but life itself can be extended.

There is, in the preceding text, the notion that biochemical imbalances or abnormalities are caused by many factors and may be counteracted or relieved by factors other than drugs or medicines. This is the premise of traditional psychiatry. It is a gray area, whether or not to use the drugs of biochemical psychiatry, which may be regarded as only an expediency and do not address root causes. There are, of course, the variables of dosage levels and length of medication, coupled with the fact that each individual case is probably unique. There is the question of will, of whether to confront life or run from life, a yes-or-no choice that may appear simple but is not simple at all.

Psychiatrist Peter D. Kramer takes a contemplative view of these issues and phenomena in *Listening to Prozac*. Whereas what Kramer calls “cosmetic psychopharmacology” can cause miraculous changes in personality, there is always the nagging question about the psyche itself, of just who a person is really supposed to be? In short, there is the ethics of the matter, and it may be said that once again science collides with metaphysics, religion, and theology, though this is not an area into which Kramer chooses to carry his explorations. As Kramer states in his introduction, the patient is not so much cured of illness as transformed. Also supplied is the memorable quote: “If the human brain were simple enough for us to understand, we would be too simple to understand it” (Kramer, 1993, p. 134).

Among those who take an even dimmer view of the wonder drug route is Peter R. Breggin, M.D., who has written, among other books on the subject, *Toxic Psychiatry: Why Therapy, Empathy, and Love Must Replace the Drugs, Electroshock, and Biochemical Theories of the “New Psychiatry”*. Breggin sees the medicines themselves as the cause of still other mental dysfunctions, especially over the long term.

There is also the indication that our mental outlook and our nervous system performance can be regulated by diet, and preferably by diet alone, especially by the B-complex vitamins, as found in natural sources such as as brewer’s yeast. Brewer’s or nutritional yeasts have high protein content of good quality and also desirable trace elements and other benefits. There are also the old standbys like onions and garlic to steady the nerves, and there has even been some talk about flower essences for alleviating depression (e.g., in *Natural Health*, May/June 1995, p. 80ff).

There is now the acknowledgment that nutritional factors are indeed being studied for their role in combating mental problems. Thus, for example, a review article in the scientific literature by Kathleen M. Kantak titled “Nutritional Aspects of Drug Action on Behavior,” cited in the Bibliography, is representative. In this instance, the effects of (pure) tryptophan, magnesium/vitamin B₆, and vitamin C were examined, alone or in combination with drugs. There was an interaction even for such mental illnesses as schizophrenia, depression, autism, and hyperactivity.

There are still other factors at work. Thus, we may inquire variously about full-spectrum light for health and its relation to seasonal affective disorder (SAD), the effects of positive and negative ions in the atmospheric air, and the use of native herbs and plant medicines. Taking all these things a step further is Michael J. Norden, in *Beyond Prozac: Brain-Toxic Lifestyles, Natural Antidotes & New Generation Antidepressants*. Among other things, Dr. Norden stresses the importance of melatonin, a neurohormone related to serotonin, which is the principal hormone secreted from the pineal gland. It not only acts against anxiety and depression, and serves as an antiaging agent, but is also being studied in the treatment of cancer.

(Rose-colored glasses may indeed make the world look “rosier,” whereas battery-powered wrist watches may have some unexpected and adverse effects, for example, on the wearer’s memory, not to mention fluorescent lighting and its cyclic intensity; that is, its fluttering with 60-cycle alternating current. For more on this offbeat subject, there is the work of John Ott about the physiological effects of light and radiation.)

Not only does the vitality of the soil affect crop growth but in turn also human health. Even mental illness, which may be caused by nutritional deficiencies, can have apparently miraculous cures produced by diet. Such commonalities as garlic are seen as valuable additions to the mental health spectrum. The list can go onwards and upwards from there, as can be found in most health food stores.

WHAT SEEMS TO WORK

Such ordinary matters as roughage in the diet are afforded a new importance, as is physical exercise. Acupuncture and reflexology have entered the scene, as have cycles, biorhythms, and the (adverse) effects of electromagnetic fields. The problems with electromagnetic fields are highlighted in Paul Brodeur’s argumentative *The Great Power-Line Cover-Up*. Electric blankets have become suspect and are maybe better used only for taking the chill off before bedtime. (About the effect of the phases of the moon, it is better to leave the subject alone, or confine it to home gardening.) Chelation chemistry has been used to remove the fatty cholesterol deposits within our very arteries and veins and may be replaced by or assisted by certain vitamins, though the verdict is still out. The citations seem never-ending.

(The mention of, for example, the role of vitamin C [ascorbic acid] or vitamin E in the body functions and in various therapies is enough to start a discussion. Thus, to say that vitamin C can be used instead of sodium nitrate as a preservative for cured meats or sliced fresh fruit is not to cause alarm, but to admit that vitamin C could act as a chelating agent for removing heavy metals or arterial fatty deposits from the body is inadmissible. Much less acceptable is the suggestion that vitamin C possesses an antibiotic or antiviral action, especially against the common cold, as per Linus Pauling’s work, and also that the body may need large amounts, as humans do not produce vitamin C internally as do most other animals. To state that vitamin E oil can act as an external healing agent for skin scars or burns is not so far out, but to admit that vitamin E taken internally might act against heart problems is a no-no.)

The dust is starting to settle on what does and does not work. The innovations are of a breadth and pace that can only be upsetting to organized medicine, which

must necessarily remain cautious if not conservative, and play the devil's advocate to this "underground unorthodoxy." Particularly vexing to the professional establishment is anecdotal evidence, which by definition has not been subjected to scientific scrutiny, and therefore must be discounted. However, scientific evidence in turn needs verification by anecdotal case-by-case scrutiny.

Overriding all this is the profit motive, the force that drives a capitalistic economy. The yardstick of success for physicians, hospitals, and pharmaceutical companies is a return on investment, the higher the better. The conventional wisdom is that this will all prove beneficial for the patient. There is a gray area, however, which does not necessarily work for the well-being of the patient. In other words, if there are alternatives such as folk remedies, therapies, or cures for which the same physicians, hospitals, and pharmaceutical companies cannot show a profit or even a large enough profit, what then? Will these alternatives be then promoted, discounted, or even ruled against or made against the law? Laws and regulations, incidentally, are in large part written with the active support and acquiescence of the medical establishment.

Thus, in a legal sense, orthodox medicine must protect itself by establishing practices that are recognized by the medical body as the conventional wisdom. The peers protect their peers.

There is also the fact that medical insurance and Medicare will only pay for or pay on orthodox procedures and treatments, as established by the medical establishment. Logically speaking, it is another case of the vicious circle.

All this is especially vexing if medical orthodoxy cannot even come up with successful therapies or cures, for example, in the treatment of cancer. Hence, the emergence of unorthodox or alternative therapies — the *raison d'être* of the medical underground. It is obviously a catch-22 situation, and a time for investigation and reckoning.

SCOURGES IN THE MAKING

Offsetting any reasons for optimism are indications of new scourges. Thus, the increased use of antibiotics is resulting in new strains of microbes or microorganisms that are tolerant or resistant to the same antibiotics which had formerly proved so effective. This situation is examined, for instance, in Jeffrey A. Fisher's *The Plague Makers* and in Stuart B. Levy's *The Antibiotic Paradox: How Miracle Drugs are Destroying the Miracle*. For these and other reasons, new or old diseases may become pandemic infections, affecting entire populations.

There have, for an unusual example, emerged especially deadly strains of "flesh-eating" bacteria causing the tissue-destroying disease *Group A streptococcal infection* (GAS), or *necrotizing fasciitis*. Though rare so far, there is the question of whether this is an old disease, or whether new species or strains have come about.

Influenza-type viruses, notably, have been found to have crossed the species barrier, for example, from ducks and swine to humans (recall the Spanish influenza epidemic of 1918 when 20 million lives were lost). There is, on the evidence, a genetic synthesis of an animal strain of virus with a human strain, producing deadly results sometimes. There are rumors that the rabies vaccine, derived from horses as

the culture medium, will at times result in a delayed reaction, even after a period of years. This in itself can be fatal, but it is thought to be corrected by more modern vaccines. The facts about the production of antibodies and their side effects are not fully known. Reports are surfacing that the “hippie” generation was caused by the adverse bodily reactions of a certain percentage of individuals to a virus found in the rhesus monkeys used in the production of live polio vaccine Bookchin and Schumacher, *The Virus and the Vaccine*, 2004. This again may have resulted from a genetic synthesis between the monkey virus and a human virus. Where most persons overcome the viral infection, others are affected in different ways, to produce lethargy and other recurring or continuing flu-like symptoms. Newer findings indicate that these simian viruses may induce cancer. In fact, this is in line with findings that still other viruses are once again suspect in causing cancer, and the genetic mechanisms have been worked out.

Currently on the scene is the specter of AIDS, the ultimate social disease, which is said also to be derived from monkeys. (On the other hand, it has been advanced that the AIDS virus is the result of combining the bovine leukemia virus with the sheep visna virus, both of which are *retroviruses* capable of changing the genetic makeup of the cells they enter. The resulting virus was presumably introduced overseas in smallpox vaccine, and in the United States. with hepatitis B vaccine.) It therefore seems that the interface between humans and the animal world is fraught with unexpected hazards, some of the consequences of experimenting with viruses. So certain biblical codes may have emerged to keep these or other pestilences at bay. What may be occurring is a recycling of past experiences; it is called by the philosopher and historian Will Durant as the systolic and diastolic cycles of civilization.

For an early, comprehensive, and authoritative look at the AIDS situation, there was Randy Shilt's *And the Band Played On*. In quick order, there is discussed the discovery, the cover-up, the epidemic, and presumably everything else to know about this disease at the time of writing.

A political look is supplied by Michael Fumento in *The Myth of Heterosexual AIDS*. It has been said that AIDS is the first disease with “civil rights.” Stephen Joseph, in *Dragon Within the Gates: The Once and Future AIDS Epidemic*, observes that an epidemic requires not only a microbe but also a social context. And in the case of AIDS, there has been an attempt to “democratize” the disease and to assume that everyone is liable, whereas the outbreaks are only within certain pockets of the population. These are those persons whose social habits put them at risk. At the same time, there is the distinct possibility that the disease can be controlled and eliminated within these population brackets. Their homogeneity, which puts them at risk, also makes it easier to contain the outbreak of the disease. (A counter to this argument is the widespread AIDS epidemic in Africa.)

On the other hand, a reassessment of the role of the AIDS virus (HIV) has been supplied by Peter H. Duesberg and Bryan J. Ellison of the Department of Cell Biology, the University of California, Berkeley. There are apparently reasons to suspect that the virus does not produce the AIDS disease. Instead, malnutrition, alcohol, drugs, and the routine use of antibiotics may cause the collapse of the immune system. (A partial counterargument is that AIDS also occurs among the

affluent.) These conclusions were presented in an article by Duesberg and Ellison that appeared in the Summer 1990 issue of *Policy Review*. It caused a near riot, judging from the letters to the editor. It contained both the pros and cons, parts of which were published in the Fall 1990 issue. To say that a nerve was touched is an understatement. Another source of controversy has been a book by Paul Cameron titled *Exposing the AIDS Scandal*, published in 1988 and 1992.

Adding to the conflagration are statements by Duesberg that the drug zidovudine (AZT), used in the treatment of AIDS, may itself be a contributor to the disease. In other words, the research on AIDS has been misdirected.

Ellison and Duesberg followed up their earlier article with a book called *Why We Will Never Win the War on AIDS*, published in 1995, in which it is pronounced that the HIV virus is not the cause of AIDS, but there are instead simpler reasons. Going further, they describe a simple defense against AIDS. As a result of their unorthodox work and claims, however, they have been more or less banished from the orthodox scientific community and have lost research funding sources.

Within the ranks of medical orthodoxy, perhaps the most authoritative tome on the subject, to date, is *AIDS: What the Government Isn't Telling You: Censored by Lorraine Day, M.D.*, author and surgeon, who has come under fire since. First published more or less privately, it is not what the establishment wants to hear. Nevertheless, Dr. Day has great credibility and the academic credentials to match, being from the University of California, San Francisco. Dr. Day brings up the unpleasant subject that the AIDS virus is a retrovirus and may have been introduced by the government as an agent for germ warfare. Furthermore, it is not a fragile virus, as commonly believed; it may be found even in saliva, and can be transmitted in ways yet unsuspected. For reasons of cost and practicability, blood supplies were not routinely screened for the virus, with the result that hemophiliacs, among others, have become innocent victims. Its virulence in the homosexual community can be traced in part to the incidence of other (social) diseases, which act to suppress the immune system, as was also pointed out by Duesberg and Ellison, of the University of California, Berkeley. Just where does all this leave the average citizen remains to be seen, but there is a sense of impending calamity in the air.

(For instance, the virus has been reported to remain on dental equipment, in and on the drills and other instruments, unless all the parts, inside and out, are systematically and sufficiently sterilized by heat, say, in the form of steam. It may be ventured that a trip to the dentist, if not to the doctor, should then seem more like Russian roulette.)

The AIDS disease has been studied from the standpoint of its etiology or origins, its demography or distribution by populations, and its epidemiology or spread and control. As for the disease itself, it seems the more that is found out, the less that is known. There are, and will continue to be, such books as *Rethinking AIDS Prevention: Cultural Approaches*, edited by Ralph Bolton and Merrill Singer, and *Rethinking AIDS: The Tragic Cost of Premature Consensus*, by Robert S. Root-Bernstein. (Root-Bernstein notes that the overuse of antibiotics will suppress the immune system, and there is an entire underground culture that routinely uses antibiotics excessively. For example, tetracycline is the antibiotic of choice for intravenous drug users. It is sold by the drug dealer along with the drug, as an

antidote for using dirty needles.) The National Research Council and the Atlanta-based Centers for Disease Control and Prevention provide counsel and input and monitor the progression of the disease, though there has been no overt attempt at isolation and containment, as is routinely practiced for other epidemics of highly communicable diseases.

Marcus A. Cohen (2005a), in an article in the *Townsend Letter for Doctors & Patients*, furnishes some more inside information, namely, that not all AIDS cases are fatal, citing the work of Duesburg and others and an interview with Michael Ellner, president of HEAL (Health Education AIDS Liaison). The push for AIDS funding is presented as a reason for calling this disease fatal. (Nevertheless, the reported massive inroads of the disease in African populations should not be forgotten.) This was followed by an article in the October 2005 issue of the *Townsend Letter for Doctors & Patients*, which featured an interview with Roberto Giraldo, M.D., a physician in Colombia (Cohen, 2005b). The findings are much the same, stressing natural recoveries from AIDS and noting that the controversy has become increasingly political. In the November 2005 issue, it was noted that in Africa there are many other deadly, chronic diseases that are prevalent, such as tuberculosis, diabetes, malnutrition, malaria, etc., which are lumped into the category of AIDS because of similar symptoms (Cohen, 2005c). Thus, there are several definitions or criteria used for AIDS, the strictest being in the United States. If these criteria were applied to the host of miserable death-inducing conditions and diseases in poverty-stricken areas of Africa, AIDS would not be nearly as prevalent. The quote, "The AIDS figures out of Africa are pure lies, pure estimates" is eloquent. An article by Cohen (2005d) in the December 2005 issue of the *Townsend Letter for Doctors & Patients* pertains to an interview with Celia Farber, who has written extensively about AIDS in Africa, first-hand. The gist is that there is an epidemic of other sicknesses occurring apart from AIDS. However, AIDS is the buzzword as far as most of the media and public are concerned.

Celia Farber has an article on AIDS in the March 2006 issue of *Harper's Magazine*, where she mentions that a book is under way titled *Serious Adverse Events*, to be published by Melville House. The article, titled "Out of Control: AIDS and the Corruption of Medical Science," starts out reviewing the case of a pregnant lady who tested positive for HIV via a single test, but who was apparently healthy (with the comment supplied that pregnant women sometimes test positive). Although it turned out that she had not signed a consent form, the patient was given a regimen of two drugs for comparison, nelfinavir (trade name Viracept®) and nevirapine (trade name Viramune®), to which two other drugs were added, zidovudine (AZT) and lamivudine (Epivar®). There were increasingly adverse reactions, and the patient eventually died, though the baby was saved. The cause of death was attributed to liver failure due to nevirapine toxicity. The article later mentions Peter Duesberg, who had claimed that AIDS is a chemical syndrome caused by an accumulation of toxins from heavy drug use (and may be related to many other diseases), and is not caused by the HIV retrovirus. Moreover, Duesberg claims that cancer is not caused by retroviruses, but is caused by "aneuploidy," which is a chromosomal malfunction and is different from the "mutant gene" theory (Farber, 2006a, p. 52). For his troubles, Duesberg has long been cut off from government funding sources for his research.

(On p. 48 of the article, there is a footnote that states AZT brings DNA synthesis to a halt. AZT was shelved as a chemotherapy agent on account of this extreme toxicity.) It may be added that Farber's article produced an outpouring of counter-attacks in the letters to the editor. Farber's follow-up book *Serious Adverse Events: An Uncensored History of AIDS*, published in 2006, met with a similar response.

An episode of PBS's *Secrets of the Dead*, on or about August 30, 2005, about Black Death survivors also deserves mention. Backtracking case records into the medieval past of a particular village that was to a degree immune, geneticists found that a mutant gene going by the name *delta 32* (a mutant of the CCR5 gene, referred to as CCR5-delta 32) prevented some victims from dying of the plague, and with a person's double dose of the gene, exposure would not even cause sickness. When AIDS was investigated, it was found that the same delta 32 gene is involved, and exposure would not cause death, or even cause sickness, in the few persons who had inherited the gene.

(Interestingly, this mutant gene is found in the populations of Europe where the bubonic plague had occurred. The gene, however, was found not to occur in African populations, yet some individual Africans have proved resistant to AIDS. Additional information along these lines is furnished in Cohen [2005d]. This and similar articles by Cohen are described elsewhere.)

The controversy continued in a special issue of the *Townsend Letter for Doctors & Patients* for June 2006. In an article by Rebecca V. Culshaw, it was mentioned that AIDS cases increased rapidly starting in the early 1980s, peaked in 1993, and then declined rapidly, with the number of HIV-positive individuals now remaining constant at approximately 1 million. Strangely, HIV now occurs everywhere in the United States in all populations. In the same issue, Marcus A. Cohen recounts the unsettling case of Christine Maggiore, author of *What If Everything You Thought You Knew About AIDS Was Wrong?* whose dissenting views were rebuked by medical orthodoxy, including recriminations about the death of her daughter (Cohen, 2006).

As a final word, there is the premise in some quarters that AIDS and cancer are somehow connected, both being immunologically deficient diseases. There may be even more to consider. The AIDS virus is considered to mutate, to be ever-changing, so that no treatment can pin it down. This, however, is a characteristic known as *pleomorphism*, a phenomenon that has been connected with cancer-causing viruses or microbes, and one about which there is much disagreement (Walters, 1993, p. 16; Moss, 1992, pp. 490–492).

Legionnaires' disease, a form of pneumonia caused by the bacillus *Legionella pneumophila*, was not known until 1976. The microorganisms, or germs, are found in such unsuspected places as air-conditioning ducts and cooling water towers. They have unique properties, different from those of any other bacterium previously encountered. A perplexing question follows: could this be a cross or a mutant? Cannot bacteria display the same sort of interactions as viruses? And other life-forms?

Perhaps the latest on the scene is the Four Corners virus, the cause of a pulmonary disease officially labeled as the adult respiratory distress syndrome (ARDS). The source has been found to be the feces from rodents such as deer mice that exist in the Four Corners area of the United States, where New Mexico, Arizona, Utah, and

Colorado conjoin. (Deer mice, or field mice, not coincidentally, are regarded as an ill omen in the traditions of the Southwestern Indians.) And, moreover, the same rodent species also exist elsewhere, as, apparently, does the disease, because there have been some newly emerging cases. There is a similarity to the hantavirus of Asia, though the Four Corners virus appears to be new. Inasmuch as the federal government was at one time involved in experiments on the hantavirus, there is the inference of some kind of connection between these experiments and all the other government experiments, and cover-ups, as regards nuclear testing and fallout and nerve gas testing and leakages, which occurred in the Four Corners area. Thus, some believe that there may be a connection, even so that viral mutations may have been caused inadvertently. Unexpected side effects are, in fact, a fact of life; the question of credibility, despite government denials and disassociations, therefore persists.

To the everlasting credit of modern medicine and public health measures, the scourge of the ancient world, leprosy, has largely been eliminated or controlled. Its infected hosts are no longer regarded as the unclean and to be cast out from society. (But there remains the question of the armadillo, which is prevalent around the southern United States and toward Argentina. It is implicated to be a carrier of a type of leprosy.)

There are, moreover, other unsuspected scourges on the horizon. Thus, there are emerging viruses from the destruction of the tropical rain forests or from other sources. This subject has been explored, for instance, by Richard Preston in the October 26, 1992, issue of the *New Yorker*, and also by John Langone in the December 1990 issue of *Discover*. The findings are that some of these viruses are lethal, as the human immune system does not respond to them. The subject is covered in *Emerging Viruses*, the title of a monograph contributed to by a number of specialists and edited by Stephen S. Morse of Rockefeller University, and published in 1993 by the Oxford University Press. Moreover, there is talk that the Gulf War, that is, Operation Desert Storm, may have unleashed its own brands of lethal viruses from the sands of the desert.

Preston has followed up his *New Yorker* article with a book titled *The Hot Zone: A Terrifying True Story*. It is mainly about the Ebola virus, which has a 90% fatality rate, and along with the Marburg virus, is another lethal African virus whose sources remain unknown, echoing the problems in tracking down the sources of the AIDS virus.

A book by Laurie Garrett with the title *The Coming Plague: Newly Emerging Diseases in a World Out of Balance* reminds us not only of these newer scourges, but details how the older, known diseases may unwittingly turn into epidemics.

Garrett contributed a section on the Ebola virus in an article by Bernard Le Guenno, published in *Scientific American*, October 1995. As the subtitle of the article proclaimed, the Ebola virus is a hemorrhagic fever virus, considered among the most dangerous biological agents so far known. With new ones discovered yearly, natural and artificial environmental changes further their spread.

Le Guenno explains that hemorrhagic fever viruses mutate rapidly owing to their genetic makeup. Whereas the genes of most living things are composed of DNA, the genes of these viruses consist of RNA, and must be converted by an enzyme called *RNA polymerase* (RNA-directed DNA polymerase, or reverse transcriptase).

Frequent errors occur in the conversion process, resulting in an accumulation of mutations. The commonly used name *retrovirus* denotes this conversion or reversion. These changes or mutations negate the development of a vaccine.

The connection, of course, is with cancer. And it seems that humankind only solves one riddle to be confronted by another.

REMEDIES IN NATURE

We first consider the commonly encountered herb known as *rue* (*Ruta graveolens* of the family Rutaceae). It is a plant loaded with alkaloids and considered excessively toxic. Nevertheless, it surfaces as a herbal remedy for various ailments. Listed in Hartwell's *Plants Used Against Cancer*, it has also been used against rabies, at least according to European folklore, as set forth by John Heinerman in *Healing Animals with Herbs*.

The explorer Carl Lumholtz traveled among the Papago Indians of southwestern Arizona and northwestern Sonora, Mexico during 1909–1910, and furnished a report titled *New Trails in Mexico: An Account of One Year's Exploration in North-Western Sonora, Mexico, and South-Western Arizona 1909-1910* (1912), of which a reproduction is available from the Rio Grande Press, Glorieta, New Mexico. He noted, for instance, that these Indians had a secret cure for rabies (Lumholtz, 1912, pp. 184, 185). Previously, an earlier record of his travels in Mexico was published as *Unknown Mexico: A Record of Five Years' Exploration among the Tribes of the Western Sierra Madre; in the Tierra Caliente of Tepic and Jalisco; and among the Tarascos of Michoacan*, in two volumes (1902), of which a reproduction is also available. Here, he had been specific, writing of a cure using the juice of rue, as well as olive oil, deer rennet, grape vinegar, and lemon juice (Lumholtz, 1902, II, p. 347). It can be presumed that the last four ingredients are superfluous.

Although not of primary interest at this point, John Heinerman devotes considerable space later in his animal book to the cure of rabies using the herb elecampane (Heinerman, 1977, pp. 61–65). Elecampane (*Inula helenium* of the plant family Compositae) is also listed in Hartwell's compendium as an anticancer agent. Still other plant cures such as yarrow are set forth in Heinerman's book, dating back to Gervase Markham's *Cheape and Good Husbandry*, published in London in 1614. (This date is approximately the Elizabethan Age, which produced the great English herbalists John Gerard, John Parkinson, and Nicholas Culpeper.)

Bringing matters somewhat more up to date, it may be mentioned that the Papago Indians of the American Southwest and northwestern Mexico were reported by Joseph G. Lee, M.D., to have a rabies cure. The cure, interestingly, also involved rue. Thus, Dr. Lee, in an article titled "Navajo Medicine Man" in the August 1961 issue of *Arizona Highways*, describes rue as a Navajo remedy for rabies. Another is said to be dog lichen, *Peltigear canina*, which received its name as a folkloric cure for rabies. Nevertheless, most of us would no doubt prefer a modern version of the Pasteur treatment.

Interestingly, in the same August 1961 issue of *Arizona Highways* it is acknowledged by Dr. Lee that the Navajos had long been vaccinating themselves for smallpox, though they refused to say just how long. There was the hint that the vaccination

procedure may have been passed up from Mexico, as the Spaniards carried smallpox into the Americas in the sixteenth century and may have also introduced vaccination.

Primitive remedies for hydrophobia and other illnesses have been set down by Claude Lévi-Strauss in his study *The Savage Mind*, and according to Lévi-Strauss may be examples of totem transference (Lévi-Strauss, 1966, pp. 8, 9). Thus, animals and plants are not first known as the result of their usefulness, but instead are assumed useful because they are first known.

Lumholtz observed as well that a tea made by steeping the twigs and leaves of greasewood, also called the *creosote bush*, serves admirably as an antiseptic for wounds and, taken internally, as an antidote for gastric disturbances (Lumholtz, 1912, p. 222). Caution is in order, however, for the leaves of the Wyoming species of greasewood, *Sarcobatus vermiculatus*, are known to contain oxalates (or oxalic acid, which are poisonous in quantity), as do spinach and rhubarb. At the least, body calcium may be tied up as the oxalate, to be lost from the body system. (Both violet- and yellow-blooming oxalis or wood sorrel, known colloquially as *sheepshowers*, contain oxalic acid, which provides the distinctive taste, even to the wine that can be made from these more-easterly plants.) Furthermore, this species of Wyoming greasewood is also known as a *selenium concentrator*, from the selenium occurring in the soil.

In short, the other species of greasewood are to be distinguished from the Wyoming species. For example, the common evergreen greasewood or creosote bush or chaparral of the American Southwest is an entirely different species, which has been called *Larrea mexicana*, but more usually is called *Larrea tridentata* or *Larrea divaricata*. Yet, other species are also called greasewood.

It has both been rumored and reported that a tea made from greasewood roots (as per the above, also called creosote bush or chaparral, and of the genus *Larrea*) presumably can be taken internally as a cure for arthritis — see, for example, Virginia Madison, in *The Big Bend Country of Texas*, and Charles Francis Saunders, in *Western Wild Flowers and Their Stories* (Madison, 1955, p. 221; Saunders, 1933, p. 287). In fact, it is said that an ointment made from the same greasewood or creosote bush roots can be rubbed on the afflicted joints and serves to remove aches and pains. The South American explorer Colonel P. H. Fawcett cited bloodroot (*Sanguinaria canadensis*) as being a surefire cure for advanced arthritis or rheumatism. (It has also been used in a toothpaste manufactured by the pharmaceutical company Vipont as a means of tartar control.) Colonel Fawcett further commented that there were a hundred remedies for everything he knew of, though the medical profession does not encourage their use (Fawcett, 1953, p. 182). He stated that the cures are often remarkable, and he speaks as one who has successfully used them, mainly as teas.

(Bloodroot is also used sometimes as a cure for cancer, e.g., in a substance called *Compound-X*, and likewise used is chaparral or creosote bush or greasewood, as it is variously called, and which will be detailed subsequently. At the least, a couple of other reported cancer cures hail from South America, namely, pau d'arco and cundurango or condurango, the condor vine, to be further discussed. Still another is called *cat's claw*, or *uña de gato*, also to be discussed.)

The greasewood or creosote bush or chaparral is also called by still other names. Thus, the Mexican people sometimes call it *Yerba hedionda* or “stink bush,” for the leaves have an acrid, disagreeable odor (Madison, 1955, pp. 226–228). Alternatively, it is called *hediondilla*, the “little bad smeller,” or *gobernadora*, the “governess,” for its beneficial medicinal properties (Saunders, 1933, pp. 287, 288).

In her book about the Big Bend region, which is in the Chihuahuan desert, Virginia Madison includes a chapter on the “Botany of the Big Bend” that describes some of the other more interesting plants found here. Presumably, some or all of these unique plants should be further studied for their medicinal properties.

Other common plants have been used variously for teas and liniments: dandelion roots for poison ivy rash, the plantain leaf for insect bites and stings, aloe vera for almost everything, sunflowers for malaria, and the roots also for poison ivy rash, even snakebite. A partial mention is contained in Laura C. Martin’s *Wildflower Folklore*. The doctrine of signatures enters into the folklore, whereby similarities in appearance between parts of a plant and parts of the human anatomy are supposed to suggest a connection, and hence a cure.

Still other information on native plant sources is contained in Michael More’s *Medicinal Plants of the Mountain West* and in Melvin R. Gilmore’s *Uses of Plants by the Indians of the Missouri River Region*.

Virgil J. Vogel has compiled and written *American Indian Medicine*. Kelly Kindscher has in turn authored *Medicinal Wild Plants of the Prairie: An Ethnobotanical Guide*, as well as *Edible Wild Plants of the Prairie: An Ethnobotanical Guide*. Other books include those by Alma R. Hutchens, *Indian Herbage of North America* and *A Handbook of Native American Herbs*, Daniel E. Moerman’s two-volume *Medicinal Plants of Native America*, and *The Swimmer Manuscript of Cherokee Sacred Formulas and Medicinal Prescriptions* by James Vogel, issued by the Smithsonian Institution back in 1932. Further back, there was a rare effort by Dr. O. Phelps Brown titled *The Complete Herbalist*, which was published in 1875.

It is well known that the juice of the grape, or wine, serves as an antiseptic. It has a chemical kinship with phenol, which is alternately known as *carbolic acid*. Honey, in different ways, also serves as an antibiotic or disinfectant. And there is blackberry juice for diarrhea, cherry juice for gout, and more in the long list of native herbal remedies and folk medicines.

(Regarding arthritis and greasewood, the latest wrinkle going around is to spray a little WD-40 on the affected joint. Could this in fact be a totem transference?)

Homesteader J. O. Langford, in *Big Bend*, noted the medicinal properties of the green desert shrub popotillo. It appears that the Indians of Mexico, particularly, possess greater awareness of the value of plant life. Some of the flora of the more desertlike regions even require salt and alkali (sodium chloride and sodium carbonate) to flourish (Berlandier, 1980, II, p. 411). This is of potential value in the usage and desalination of brackish waters via irrigation, as is the growing of kelp and saltwater-active algae in an aqueous medium.

Another unusual plant of the American Southwest and Mexico is the bushlike guayule, which produces a form of natural rubber or latex, as do many other plants, even the dandelion, but not in sufficient quantity. The guayule, however, was employed during WWII when the Malaysian sources of natural rubber were cut off.

The southwestern jojoba plant is a source of high-quality lubricating oil, such as required in the automatic transmissions of automobiles and is a suitable replacement for sperm oil, the oil once obtained from the now-endangered sperm whale. Then there is the candelilla plant, which is used for candle wax, as the name infers.

The mystical regions of Mexico and the great Southwest have not only furnished the dietary staple maize, or corn, but are home to the hot pepper, of the genus *Capsicum*, whose active ingredient is called *capsaicin*. It characterizes the great cuisine collectively known as Mexican food, or "Tex-Mex," and has health-giving properties as well. Richard Schweid has written a book about this interesting plant and its history and uses, featuring the adjunct Louisiana hot sauce. For more books on this plant, Jim Robbins expounds at length in the January 1992 issue of the *Smithsonian*, and provides a Who's Who both in pepper authorities and in authoritative peppers. In the November 1992 issue of *Texas Highways*, Randy Mallory expands on the Jalapeño and other burning issues, and rates peppers in "Scoville heat units." Another book is Jean Andrews' *Peppers: The Domesticated Capsicums*, published by the University of Texas Press. This has been followed up with a cookbook by Andrews titled *Good and Hot: Capsicum Cookery*. At the end of his article in *Texas Highways*, Mallory also provides a few recipes. Amal Naj is the author of *Peppers: Hot, Hotter, Hottest*, part of which was condensed in the July 1993 issue of *Reader's Digest*. Whether there is a definite link to anticancer action or cures remains to be seen.

Back to South America, in the appendix of his book *The Rivers Ran East*, about exploring the headwaters of the Amazon, Leonard Clark lists many native Indian pharmaceuticals known at the time, approximately about 1946. Other descriptions contained in the text, if not specific, are certainly intriguing. Earlier, as has been indicated, Colonel P. H. Fawcett had made a number of entries in his journals, published as *Lost Trails, Lost Cities*. It may be assumed that many more are known today, as studies of the Amazonian rain forest proliferate, before time runs out, in the face of its continued destruction.

A key modern-day figure is ethnobotanist Mark J. Plotkin, who for many years has maintained a frequent visiting residency in Amazonia. His book, *Tales of a Shaman's Apprentice*, details some of the mysterious cures of this twilight world. Plotkin helped found the California-based Shaman Pharmaceuticals in 1987, which has in turn founded The Healing Forest Conservancy, a nonprofit organization. Another prominent name in collecting the mystery substances of the jungle is Mark Chandler, whose company is Inland Laboratories, based at Austin, TX. Chandler was profiled in an article by Toni Mack, which appeared in the May 23, 1994, issue of *Forbes* magazine. Inland's specialty is toxins, viruses, and other proteins, some of which are deadly in the extreme but might lead to new therapies. The news items continue to multiply; see, for instance, the May 1994 issue of *Profiles*, the magazine of Continental Airlines. Here, in an article about Belize, author Ray Scippa mentioned the Belizean Association of Traditional Healers, who are cataloguing the plants in a 6000-acre preserve of old-growth forest and submitting samples to the New York Botanical Gardens, which is in turn working with the National Cancer Institute to determine medicinal properties. Still another name, is David G. Williams [Mountain Home Publishing, P.O. Box 829, Ingram TX 78025, (210)367-4492].

Dr. Williams is no stranger to the jungle and publishes his own newsletter and other in-house publications, including *The Doctor's Worldwide Encyclopedia of Natural Remedies*.

Other Texas sources that sponsor expeditions to Amazonia include the Texas Pharmacy Foundation and the Austin-based American Botanical Council, whose director is Mark Blumenthal. Workshops are also sponsored at the Amazon Center for Environmental Education and Research. It is located in the 250,000-acre Amazon Biosphere Reserve, some 50 miles from the Amazon River port city of Iquitos, Peru. Blumenthal notes that out of the 250,000-plus plant species around the world, only about 5,000 have been investigated in detail for their human health potential. He further comments that each year an area of the rain forest roughly equal to the size of Indiana is being destroyed. He also mentions that somewhere out there in this plant pharmacopoeia may be a cure for cancer and AIDS, if it has not been already destroyed.

But now, in the reaches of the Amazon and in other scarcely known fecundities of plant and animal life, as the new generations of natives who do not know the traditional ways succeed the old, the chain may be irretrievably broken and the knowledge forever lost, along with the forest itself. This is a special concern of Mark Blumenthal. There is the question of whether science and technology are staying one step ahead of nature or one step behind.

Lastly, speaking of medical folklore in general, worldwide, mention should be made of Napralert, the University of Chicago's enormous database of biochemical and ethnomedical references. ("Napra" pertains to a therapeutic system.) A particular application of this database is described by Steven Kotler on p. 46 of the January 2005 issue of *Wired*. A Mayo Clinic researcher named Eric Buenz has been searching old medical textbooks and references for potential pharmaceuticals and treatments. In particular, the *Ambonese Herbal* is cited, a guide to some 1300 plants used against diseases in seventeenth-century Indonesia, as compiled by employees of the Dutch Indonesia Company.

Buenz was interested in plants that were mentioned in the old references but did not have a modern counterpart, as listed in Napralert. His computer search uncovered a few that did not have a match, and the search continues for others via the Kirtas Technologies book scanner, at about 1000 pages per hour.

For the record, the following plant species did not have a match with modern listings: lontar tree (*Licula rumphi*), used against TB and colitis and which may have potential as an anti-infective agent; mealy palm sago tree (*Metroxylon sagu*), for healing wounds and sores, with potential as an antibacterial agent; wild cadju tree (*Semecarpus cassuvium*), used against shingles, with potential as an antiviral, analgesic, and anti-inflammatory agent; anona tree (*Anona reticulata*), used against diarrhea and dysentery, with potential as an opiate; Maldivian coconut (*Lodoicea maldivica*), used against inflammation and fever, with potential as an anti-inflammatory and antipyretic (antifever agent); wild dragon tree (*Dracontomelon sylvestre*), used against gonorrhea, with potential as an antibiotic, anti-infective, and antitreponema agent. (The *Treponema* are a genus of parasites, including those causing syphilis and yaws.) It may be added that the particular genus for each of the plant

species cited in the preceding text may also contain other species with medicinal properties.

Other guides from around the same time period, notably the Elizabethan Age, can be listed as follows: John Gerard's *The Herbal, or General History of Plants* (first published in 1597), which came to be known as *Gerard's Herbal*, John Parkinson's *Theatrum Botanicum* (1640), and *Culpeper's Complete Herbal* (about 1649–1653) by Nicolas Culpeper. The latter guide was translated into modern English by Graeme Tobyn, and titled *Culpeper's Medicine: A Practice of Western Holistic Medicine*. Later on there was George Graves' *Hortus Medicus*, published in 1834 and republished as *Medicinal Plants* in 1990.

Given that plant names, both common and scientific, sometimes change, the potential is viewed as a “pharmacological goldmine.” Further information about anticancer plants is awaited, though Hartwell's *Plants Used Against Cancer* is a good reference point. Additionally, further citations about anticancer plants or herbals are contained throughout of the book you are now reading.

The ultimate question, of course, is whether these plant remedies really work, and if so, what the side effects are. Are they serious? Dosage levels and frequency, methods of administration, and biochemical individuality have to be considered. The bottom line becomes the risk/benefit trade-off.

POISONS IN NATURE

Not that all plants are beneficial, directly or indirectly. Some are poisonous, such as Jimsonweed and the assorted nightshades, not to mention the hemlocks and the delphiniums or larkspurs. Alkaloids are a presence in plants called *locoweeds* or *crazyweeds* and can ruin a good horse. Grazing on larkspurs is a good way to wipe out a dairy herd overnight, although the Texas longhorns are said not to be affected. This anomaly may be due to the longhorns' nonselective grazing habits, which dilute the effects of the poison, or maybe they have a unique digestive and body chemistry.

Poisonous plants, by and large, are the most medically active in controlled doses, that is, in small or minute amounts. Digitalis, used for heart trouble, is obtained from the foxglove. Also there is atropine, derived from belladonna, or deadly nightshade, and used for such purposes as pupil dilation in ophthalmology. This is not necessarily a blanket endorsement, however, for there are poisonous plants that remain poisonous whatever the use.

There has been a succession of books dealing with poisonous plants. To list a few: *Poisonous Plants of the United States* by Walter Conrad Muenscher (1939); *Deadly Harvest: A Guide to Common Poisonous Plants* by John M. Kingsbury (1965), and Kingsbury's more comprehensive *Poisonous Plants of the United States and Canada* (1964); *Human Poisoning from Native and Cultivated Plants* by James W. Hardin and Jay M. Arena (1969, 1974); and *Poisonous Plants: A Color Field Guide* by Lucia Woodward (1985). We find that such medicinal plants as bloodroot, used for arthritis and cancer, have poisonous or toxic properties. With bloodroot (*Sanguinaria canadensis*) for instance, the poisonous component is an alkaloid called *sanguinarine* that can be selectively extracted and also used as a medicinal drug. Yew trees of the family Taxaceae contain the poisonous alkaloid *taxine* (Hardin and