

A HOLISTIC MEDICAL STUDY OF THE ADVERSE HEALTH EFFECTS OF WEARING NONABSORBENT SYNTHETIC CLOTHING.

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ABSTRACT

The synthetic clothing industry, and especially the synthetic clothing outfitters for outdoors people, generally advertise their products as having the ability to “wick away the moisture”, i.e., to get rid of sweat and thereby keep one’s skin dry, which is essential for optimum health and performance. This advertising claim turns out to be false, as easily conducted scientific experiments can demonstrate. In order to “wick away moisture”, it would first be necessary for the clothing to absorb the moisture it supposedly will disperse. Only natural fibers of animal or vegetable cellular origin have the capacity to expand to absorb moisture—and to contract when they are dry. No man-made synthetic fibers can possibly absorb moisture, since they are non-cellular. The clothing recommended for mountaineers and outdoors people has traditionally been mainly wool, with the use of other natural fibers, such as cotton, linen, and silk, also commonly used. Since the early 1960’s, there has been a radical clothing revolution that has embraced nonabsorbent synthetic fibers as actually superior to wool and other natural fibers, which have now been pronounced to be “obsolete” by the standard textbook on mountaineering in its latest editions. Millions of uncritical people have accepted as true the false advertising claim of “wicks away the moisture”. This new dogma about the alleged virtues of wearing petroleum-based garments has taken a huge toll on the public health, which has not begun to be investigated yet. Not only mountaineers, but the gullible public, have suffered disasters to their health and safety that have not yet been explored. The most obvious medical problem that can be linked directly to the wearing of nonabsorbent synthetic clothing is the epidemic of obesity in both children and adults. Since our body weight is mainly water, the wearing of garments that cannot accept water results inevitably in steady weight gain. This physiological observation can easily be confirmed by epidemiological research that correlates obesity with the type of clothing worn. This is a ground-breaking holistic study with far-reaching implications and ramifications for further study, research, and scientific experiments, in order to enlighten the public about the health dangers of wearing nonabsorbent synthetic clothing, especially next to one’s skin, where it is most harmful. This pervasive health problem has never hitherto been researched, either by mainstream medicine or Alternative Holistic Medicine.

KEY WORDS

Synthetic clothing * “wicks away the moisture” * transpiration
Holistic Medicine * Hippocratic medicine * Macrobiotics

Note: This essay was originally conceived for the audience of a mountaineering journal, and was entitled “The Last Hiker in Wool”. However, the medical physiology that applies to mountaineers applies also to every human being—howbeit not so fatally, since only mountaineers put their lives at risk at high altitudes in subzero temperatures. Thus the new title is more accurately descriptive of the general medical problem I address here. My original aim was to help solve the mystery of why so many deaths and limbs lost to frostbite on Mt. Everest in recent years, a problem that is still exercising writers on mountaineering since the famous disaster on Mt. Everest on May 10, 1996, when eight people froze to death, with many more such deaths in subsequent years. The health problems that ensue from wearing nonabsorbent synthetic clothing have never been addressed by mainstream medicine. Inevitably, this subject remains under taboo, off-limits to a medical profession that is itself attired in synthetic garments.

This essay is divided into two parts. Part One addresses the physiology of clothing, with the crucial health differences arising between the wearing of natural absorbent clothing and synthetic nonabsorbent garments. Part Two applies this physiological science toward solving the mystery of the disaster on Mt. Everest on May 10, 1996, and the continuing disasters on Everest and other high mountains. Although Part Two is directed specifically to the problem of wearing synthetic clothing at freezing high altitudes when the weather changes from sunshine and dry air to cloudy, cold, and damp air in the event of a sudden storm, or when the mountaineer happens to get caught at high altitude late in the day when the air so changes, this essay throughout concerns the universal medical physiology principles that apply to clothing for every human being, in any walk of life.

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PART ONE

When out hiking with social groups, I often get the strange feeling that I'm an antiquated survivor from a former era when a now virtually extinct species had prevailed for thousands of years: the last hiker in wool. I find my

singularity quite amazing since wool has been the normal clothing of outdoors people, essential to civilized life in cultures around the world, for as long as recorded history. Wool has been the material of choice not only in cold and temperate climates, but even in tropical climates. The British Empire's civil servants wore tropical woolen uniforms throughout their warm-climate possessions during the nineteenth century and right up to World War II. And the U.S. military supplied its officers with tropical woolen uniforms for summer wear beyond World War II. I have enjoyed the delicious cool comfort in summer of wearing tropical wool smooth-as-silk military shirts for many years, until the moths got them.

Since the new era of synthetic petroleum-based clothing gained ascendancy during the 1960's, the wearing of wool has rapidly diminished in the West, presumably the most "advanced" nations of the world. And the rapidly diminishing use of leather footwear is well underway to boot (excuse the pun).

The question whether the new synthetic garments and footwear are actually superior to the natural materials is not even discussed or debated, neither by members of the medical profession nor by any other supposed experts on this important health question. It is just assumed that the man-made "scientifically" devised synthetics are superior to natural vegetable and animal fibers. This prevalent "scientific" view is heedless of the fact that fabrics made from animal or vegetable fibers are cellular materials, with all the advantages of their capacity to expand and contract in response to atmospheric conditions, a capacity that inorganic materials lack. I shall come back to this point in the sequel.

There used to be a Science of Clothing, with laboratories and journals and books devoted to research on this crucial subject, especially by the military services, for whom adequate clothing for different climates is crucial for their fighting forces. But the Science of Clothing has completely disappeared since the early 1970's, after the unchallenged displacement of natural fibers by unnatural synthetics occurred in the previous decade. With the synthetic fibers having been elevated to the ascendancy, no laboratory testing is deemed necessary to validate what has become an unquestioned dogma.

All uniformed personnel around the world, both military and civilian, have long since had their woolen and cotton uniforms replaced with polyester-blend uniforms since the 1960's. Go into any department store, e.g., J. C. Penney, and look at the expensive men's wool suits: they are extremely lightweight, because they are only 35 per cent wool and 65 per cent polyester, yet cost \$200, and can scarcely keep one warm in winter.

I was fortunate to have my military service in the U.S. Air Force occur half a century ago, in the years 1955-58, when the quality of military clothing was still the superb natural quality it had always been. But not many years after my discharge, during the 1960's, when the Vietnam War heated up, U.S. military clothing was suddenly debased into what can only be called synthetic junk, not fit to wear. Just one physiological consequence of the synthetic military clothing may be seen in the thick-necked condition that is now well-nigh universal among military personnel all the way up the chain of command to the Chairman of the Joint Chiefs of Staff. This bullnecked condition, in which the width of the neck is the same as the space between the ears, is not normal, not healthy, and indicates that the diet is not being fully metabolized and the waste products fully excreted through the pores, due to non-absorbent synthetic clothing. This thick-necked condition is also predominant among the civilian population, and is a cause of a host of diseases stemming from suppressed insensible perspiration, i.e., the prevention of breathing through the skin, which is suppressed by non-cellular synthetic clothing, which cannot draw out and absorb dietary waste products and excess body moisture from the skin. The long-term consequences of this thick-necked condition, signifying that the individual is suffering from hampered digestion and incomplete excretion of dietary waste products, would be degenerative diseases eventually.

Fifty years after my military service, I'm again wearing luxurious blue woolen serge trousers, dated 1951 on the label, Korean War vintage, found at a fleamarket, renewing the comfort and warmth I appreciated in this same fabric as a young man. This quality of cloth, formerly worn in *all* the military services, would now be considered a luxury fabric, and not available commercially at any price.

The last major book-length research study on clothing materials was published thirty-five years ago: E[dward] T[obias] Renbourn, *MATERIALS AND CLOTHING IN HEALTH AND DISEASE: HISTORY, PHYSIOLOGY AND HYGIENE: MEDICAL AND PSYCHOLOGICAL ASPECTS*. With "*The Biophysics of Clothing Materials*", by W.H. Rees (London, 1972). Curiously, Prof. Renbourn gave his unqualified endorsement to the new synthetic fibers, as being as healthy as natural organic fibers, without conducting comparative tests against the traditional natural fabrics. Indeed, it would have been extraordinary if a mainstream academic science researcher had expressed any reservations on the latest technology of clothing, since the new synthetic petroleum-based fabrics had become standard wear by then. Any such criticism would have been regarded as a reactionary impediment to the "progress" of our high-tech civilization.

Before Renbourn's 1972 study, the "classic" on the subject, published a generation earlier and still fascinating reading, was Newburgh, L.H.,M.D., ed., *PHYSIOLOGY OF HEAT REGULATION AND THE SCIENCE OF CLOTHING* (Philadelphia, 1949), a collection of research papers by the most eminent scientific authorities, mainly medical physiologists, of that time. That was the last major study done in the era of natural clothing fibers. Nylon and acetate (rayon) were the only synthetic fibers that had yet come into use. Nylon had been concocted and spun into stockings for women during World War II, in the early 1940's, in order to save cotton for military use.

Notice that the editor of the volume cited above was "M.D." Dr. Newburgh made a substantial research contribution to that book; the Science of Clothing was obviously his medical specialty. When was the last time the reader has known of an M.D. showing any interest in his patients' clothing—or the patient's diet either? With the advent of the new era of synthetic clothing in the 1960's, the Science of Clothing, and the medical concern for the patient's clothing, effectively shut down. No medical researcher has made any contribution to the subject since then, indicating that a total taboo has been tacitly placed on this crucial subject. Indeed, to open up again the study of the Science of Clothing in the age of synthetics would take extraordinary courage by any medical researcher, since he would be opening a Pandora's Box of infinite bad news.

Curiously, a breast cancer epidemic arose among women in the wake of the war, as I remember from when I was age nine then, after many women had unwittingly for some years performed the unprecedented experiment of covering a good part of their anatomy with this new material made of 100 per cent petroleum. Nylon stockings--and soon thereafter nylon underwear came into use--prevent the absorption of dietary wastes that need to come through the pores and be removed from the skin. Only organic fibers made of animal or vegetable cells can perform that function to keep the skin dry. This is called *transpiration*, a crucial physiological function whereby the skin breathes out toxic food residues and excess moisture.

By the mid-1950's, millions of women were covering their body from toes to navels with pantyhose made from petroleum, effectively preventing the discharge of dietary wastes through their skin over a major portion of their body. Where could their dietary waste products then go except upward and be deposited in the breasts as unnoticeable soft mucus deposits which eventually harden into cancerous lumps, since those glands also provided no outlet while being covered with petroleum-based nonabsorbent synthetics?

The history of fashions in modern mountaineering clothing reflects the progressive de-naturalization of clothing materials in our ever increasingly synthetic petroleum-based modern lifestyle. The standard textbook, *MOUNTAINEERING: THE FREEDOM OF THE HILLS*, edited by Steven M. Cox and Kris Fulsass, (7th ed., The Mountaineers Books, Seattle, WA 98134, 2003), p. 20, states candidly: "*Synthetic fibers have largely replaced natural fibers in mountaineering clothing.*" Notice the qualifier "*largely*", since goose down is still indispensable at cold high altitudes. And since all man-made fibers are necessarily non-cellular, and thus nonabsorbent, providing very poor insulation, no synthetic material has ever been, or ever could be, concocted that gives the insulation of animal fibers: wool and down.

That synthetic fibers have replaced natural fibers is true in *all* sports nowadays, where athletes can be seen performing, and laboring, under extreme stress while clothed entirely in non-absorbent and therefore intranspirable synthetic fabrics that cannot insulate their body-heat or absorb the perspiration from their skin. Being unable to keep their skin dry--an essential prerequisite for optimum health and therefore optimum performance in any sport--puts these athletes under extreme debilitating stress and extreme hazard to their health, e.g., weightlifters, tennis players, and others.

As a teacher of holistic health (Macrobiotics) through the natural healing and prevention of diseases and health problems, I find it astonishing that so-called "scientifically educated" people have uncritically accepted the common myth that these synthetic fibers "wick away the moisture". The fact should be obvious--both empirically and logically—that any materials made of petroleum, or even partly so made, cannot function as a wick. They cannot because a wick needs to be made of cellular natural materials that can expand to absorb moisture. A lamp with a polyester wick in it will not burn. I've tried it. Lamps sold with synthetic wicks are merely for decoration and are not functional unless a cotton wick is installed. The truth is you couldn't even mop the floor with any of the synthetic materials. Not being cellular animal or vegetable fibers that can expand to hold moisture, the synthetics cannot lift moisture from any surface.

THE BOOK OF MOUNTAINEERING, 7th edition, 2003, cited above, repeats the standard myth that the synthetics "wick away the moisture", while acknowledging that the man-made fibers are nonabsorbent, which is a *contradiction in terms*. How can anything be dispersed that has not been first absorbed? How can there be outgo without intake? So persuasive is the commercial propaganda, and so weak is independent human judgment, that even so-called educated people show themselves unable to think clearly about this subject.

The first point of diagnosis when I give a holistic health consultation is that the individual's clothing and footwear must be upgraded to all natural materials if he or she is truly serious about solving any health problem. I have turned away people who wanted to learn Macrobiotics but refused to correct their footwear and clothing to natural materials. The quality of our clothing is of supreme import for our health because we digest our food well or poorly according to the quality of our footwear and clothing. In fact, it can be said that we digest our food *into* our clothing, and that is why our clothing becomes soiled on the inside.

In my natural healing work over the years I've visited many modern homes, especially apartments and condominiums, where I discover my diseased clients are living in a swamp of synthetic petroleum materials, polyester wall-to-wall carpeting, furniture covered in synthetics, synthetic drapes and curtains, with the whole living-space devoid of the warmth and absorbency of any natural materials. My advice is always the same: "If you want to recover your health, you must move out of this unhealthy synthetic environment. Either that, or you must completely refurnish this place in natural materials." If they decide to do so, they can make a new healthy life. I've often received gratitude years later for rendering this advice that no medical doctor would think of giving.

I've discovered that changing the quality of one's food, while neglecting the quality of the materials put on one's skin and in one's immediate environment, will avail nothing in the way of natural healing of diseases. Experience has taught me that the quality of our clothing is even more crucial for our overall health than is the exactitude of our food choices. High quality natural clothing, and especially 100 per cent woolen garments, is the best investment for health because these absorbent fabrics give us fairly wide latitude as to what foods we can digest efficiently.

Now what is the physiological implication, and consequence, of engaging in strenuous physical activity while being clothed in non-absorbent synthetic materials? The inevitable results can be seen in every sport if you have eyes to see. For example, in professional tennis as seen on television, one can observe the increasing complaints of fatigue and cramping and inflammation of the joints, due to engaging in very strenuous activity while being drenched in one's own sweat. The fact is you couldn't even mop the floor with those synthetic garments, because not being made of cells they cannot absorb water. Nothing could be more harmful to health than remaining soaked in one's own perspiration while engaging in strenuous muscular exertion, as commonsense should tell us, since

our sweat is a metabolic waste product, very acidic, just like our urine, and equally foul-smelling for the same reason.

Some male tennis players change their synthetic shirt two or three times during the course of a match. For the women players, it is not so easy: they do not have the opportunity to change their clothes unless they get a break after the match is tied at one set each. By that time, they are sometimes soaked in their own perspiration. The physiological inability to discharge one's body wastes in the absence of absorbent clothing inevitably hampers their athletic performance. Complaints about fatigue, losing concentration, and being plagued by aches and pains have become very common in the players' post-match interviews. This is a medical problem that remains unacknowledged by the medical experts who serve as consultants for the athletes, doubtless because they cannot break the taboo that decrees that these synthetic "miracle fabrics" are the very best clothing that money can buy.

Both men and women tennis pros can be seen wearing Spandex tight-fitting under-garments, in addition to their synthetic clothing of so-called "miracle fabrics", in the belief that these tight-fitting rubberized underwear give more support. But what good is "support" when the petroleum-based Spandex cannot absorb and dissipate sweat? If the day is sunny and the air is dry, sweat may be removed by optimum atmospheric conditions by evaporation. But if the day is humid and overcast, transpiration of body-sweat becomes impossible in Spandex or any other synthetic fiber, making the athletic performance often disastrous. Moreover, the adverse physiological consequences of playing repeatedly in one's own sweat are cumulative, and are further aggravated by unfavorable weather conditions.

If the question is asked, "Why then do athletes continue to wear these unhealthy synthetic garments?" the answer is not far to seek. The top athletes are paid big bucks--\$50,000 dollars per year--for wearing the trademarked clothing of the synthetic clothing manufacturers. They have let themselves be bought off as walking clothes-horses for the money, without realizing the harm done to their athletic performances, and thus to their prize-winning ability. Moreover their frequent injuries and chronic fatigue are costly beyond measure, and are scarcely compensated by their clothing payment.

Ironically, the lesser-ranked players, who are not in the pay of the synthetic clothing companies, are better off in their freedom to wear the more comfortable and performance-enhancing natural fibers. Rising stars, who are not yet in the pay of the synthetic clothing industry, ironically have the advantage of their option to wear the natural

clothing of their own choosing. The lower-level players, being unobliged to wear the commercial synthetic clothing, are thereby enabled to play tennis comfortably in natural fabrics, without the handicap of playing in one's own sweat.

To return now to mountaineering, where similar health problems can ensue from wearing nonabsorbent synthetic garments directly in contact with the skin: How many mountaineering accidents and deaths, and fingers and toes lost to frostbite, can be attributed to wearing synthetic clothing? This subject has never been looked at in the mountaineering literature. Reports of mountaineering accidents and deaths never mention what type of clothing and footwear and mittens were worn by the casualties and fatalities, which should be a point of prime interest to mountaineers. It is not mentioned--although the evidence of the type of clothing worn can often be seen in photos--because mountaineers are apparently absolutely convinced by the commercial propaganda of the synthetic clothing industry that these materials are superior to natural materials, especially because they supposedly "wick away the moisture", which is totally false.

Thus, I found it extremely gratifying to come across a rare writer in *APPALACHIA* (Summer/Fall 2007, p. 102) who sees through the myth. Jack Stephenson of Gilford, New Hampshire, the founder of a hiking and camping gear company, "Stephenson Warmlite", points out in a *Letter to the Editor*: "Although Gore-Tex is an excellent vapor BARRIER, Gore had it backward, so millions [spent] in advertising has most people believing the reverse." The "reverse" of a vapor barrier is obviously a *vapor dispersant*, i.e., the "wicks away the moisture" concept. Mr. Stephenson does not mention the concept explicitly, doubtless to save embarrassing most of his readers who have been gulled and have got it "backward" due to their uncritical acceptance of the commercial propaganda by the synthetic clothing industry.

Imagine telling Sir Edmund Hillary and Tenzing Norgay that they would have done much better on their conquest of Mt. Everest in 1953 if they were wearing polypropylene clothing and plastic boots? What would Hillary have replied if asked that question? I think he would have smiled an ironic grin, with a knowing twinkle in his eyes. Would he have been willing to forgo leather and wool for polyester and plastic? Commonsense tells me he would not. Yet Hillary, from the vantage of today's mountaineering fashions, would surely be considered an antiquated old foggy, as would I.

Tenzing's son, Jamling Tenzing Norgay (b.1966), in his memoir of summitting Mt. Everest in 1996, 43 years after his father, *TOUCHING MY FATHER'S SOUL: A SHERPA'S JOURNEY TO THE TOP OF EVEREST* (2001), appears older and unhealthier at age 30 than his father at age 60, in color photos in his book that can easily be compared. How could this be? Compare the quality of their clothing. The father is attired completely in wool. The son is wearing a polyester "fleece" jacket, cotton pants, and cheap American white synthetic jogging shoes. In the 1950's woolen underwear was standard wear for Hillary and Tenzing Sr. In the 1990's, Tenzing's son had adopted the new fashion of polypropylene underwear, i.e., 100 per cent petroleum non-absorbent fiber directly on the skin.

Recently I read *GHOSTS OF EVEREST: THE SEARCH FOR MALLORY AND IRVINE* (1999), by Jochen Hemmleb et al. Mallory's body had lain on the mountain for 75 years, since the two disappeared in 1924, before being found in 1999. Over the years, reports came from climbers who had seen the dead bodies on the mountain and immediately recognized them as being Englishmen of the 1920's era by the quality of their clothing being all natural fibers. The book has beautifully clear photos of Mallory's vintage clothing that had endured 75 years of weathering on the mountain and was still amazingly intact, testifying to its superb quality: "several layers of cotton and silk underwear, a flannel shirt, woolen pullover and trousers, a canvaslike outer garment." (p. 122)

Mallory's hobnailed all-leather boot is pictured also, still well-preserved; and although modern mountaineers believe their rubberized Vibram footwear is superior, their conviction is not based on any experience of ever wearing all-leather boots with thick leather soles that allow the feet to breath from the bottom and stay dry. Even the authors of the standard textbook, *MOUNTAINEERING: THE FREEDOM OF THE HILLS*, 7th ed., (2003) cited above, acknowledge the drawback of modern boots: "Because [modern] boots do not breath appreciably, the sweat generated by the feet collects and builds up until the boots are removed." (p.30)

But mountaineers of the 1920's and 30's--the first two decades of the Everest expeditions--had the luxury of climbing in all-leather boots that breathed and kept their feet dry, thus liberating their energy, strengthening their digestion and stamina, in a way that climbers in the era of synthetics have never known and can never know unless they have the wit and resources to get custom-made all-leather boots. There is a simple test for the healthiness of one's footwear: take off the shoe and pluck on the sole of the sock or stocking. If the fabric is sticking to the sole of your feet, that indicates wetness, an unhealthy condition that saps one's energy as it retards

one's digestion, and can lead to severe health problems, such as colds, flu, pneumonia, dysentery and other ills that have plagued modern mountaineers very commonly, often causing the defeat of their objectives.

Accident Reports in mountaineering journals routinely caution about "the importance of wearing the right gear for conditions". But the writers do not pronounce any judgments as to what *is* "the right gear" for various conditions. Routinely, no mention is made of what kind of clothing was worn by climbers who suffered frostbite. The concepts used by the Accident Report writers are routinely *quantitative* rather than qualitative. Thus "without enough clothing to deal with an unplanned overnight" on the mountain, without shelter, actually begs the question: How much synthetic clothing is "enough" to insulate one's body-heat in order to survive an overnight on a high cold mountain, versus how much wool and windproof cotton would be enough?

I've seen a slide photo of a member of Gary Pfisterer's recent expedition up K2 who is high on the mountain, dressed in what looks like pajamas, but is 100 per cent polypropylene long underwear. I asked Gary, "Why risk one's health and life, dressed in 100 per cent petroleum, should a storm suddenly come up and you can't get back to base camp and have to spend the night on the mountain without the warmth of a tent?" Gary replied that the advantage of wearing the petroleum garments is you are not losing precious body-moisture from perspiration into natural organic clothing.

But is body-moisture really that difficult to replace by ingesting fluids? And isn't there such a common phenomenon as allowing oneself to become an uncritical captive--and sometimes a fatal victim--of the latest technology, merely because it is lightweight? Personally, for example, I much prefer sleeping under a heavy comforter, made of natural fibers, to sleeping under a lightweight electric blanket made of polyester, as many people do.

So let us raise the fundamental question: What is the role of clothing for our health; and why has wool been so important in the history of civilization? Clothing serves the function of fur on the human animal that through millennia of evolution has lost its original hairiness. Fur insulates the animal's body heat and also serves as a prime source for excreting the body wastes and excess moisture through its pores into its fur. Thus we can tell an animal's health by the condition of its fur that is being nourished by its diet; and we can read human health similarly by the condition of the hair. Hence clothing must perform those two basic functions: insulation of body heat and absorption of dietary waste products from the skin. *No fiber performs these crucial physiological*

functions nearly as effectively as wool, which explains why wool has been universally prized as the fiber of choice for millennia.

Wool is the only fiber that continues to insulate body-heat when wet. If wool did not have this ability, sheep would freeze to death. Sheep can be, and are, kept outdoors without any shelter year-round, because their fleece provides them adequate protection against any kind of weather. Moreover, since the sheep's diet of grass consists of about 95 per cent water, how could the sheep continue to graze if it could not discharge that moisture expeditiously enough to keep from getting bloated with excess water and have to stop grazing? But sheep do not have to stop grazing precisely because of their ability to "wick away the moisture" from the grass practically as fast as they ingest it, through their wool.

To gain a holistic understanding of the importance of wool, we need to see the physiological function of *transpiration* (breathing through our skin) in combination with several other factors. First of all, we need to consider the *porosity* of the body. The human body is reputed to contain about seven million pores. That is seven million microscopic openings through which the body takes in oxygen and breathes out (transpires) our dietary wastes.

This is why people go jogging and to gyms, in order to break a sweat and thereby excrete through their pores the dietary wastes from the food they have ingested but not yet metabolized completely. And this is why people sometimes lose their appetite after vigorous exercise, because they have mobilized accumulated food that has been hitherto stagnating and not digesting efficiently, and thus yielding poor energy.

A simple test of *porosity* can be made by inserting one hand into a plastic bag and holding it tightly closed at the wrist with the other hand. See how long you can endure the discomfort of your skin not being able to get air. This experiment will tell you how well your skin is breathing, according to how long you can endure it. Sensitive skin that is breathing freely through unclogged pores will feel discomfort rather quickly. Another simple test: stand barefoot on polyester carpeting and see how long you can endure having your feet unable to breath into absorbent material. It will be probably not more than for a minute or two for most people. And consider: dogs and cats kept indoors on polyester carpeting are being denied the important physiological function of being able to breath through their feet, which is crucial for animals (including the human animal); and thus their health suffers.

I've mentioned above the physiological concept of *transpiration*, which has fallen out of medical usage since the end of the nineteenth century, dismissed as "obsolete" by modern medicine. But how can "breathing through the skin" ever become obsolete if it is, in fact, a crucial physiological function? The history of Western medicine affords some fascinating insight if we follow the concept of *transpiration* for well over 2,000 years of classical Hippocratic medicine, during those two millennia when it was deemed central to the understanding of health and sickness. It was not until the "paradigm shift" that occurred with the advent of Pasteur's germ theory of disease in the late nineteenth century that the physiological understanding of disease was replaced by the bacteriological theory of disease--which no longer regarded *transpiration* as important. *Bacteriology had supplanted physiology, putting the cart before the horse in modern biomedicine.* It should be obvious that we cannot understand either the harmfulness or harmlessness of the many micro-organisms to be found in nature if we do not understand how the body functions, which is the study of physiology.

The *locus classicus* on "*transpiration*" is in the Hippocratic treatise on "Nutriment", written in the 5th century B.C., where it is stated that *porosity* of the skin is crucial to health, since the skin is our largest organ, with millions of pores for excreting the residues from our food and drink. The treatise is written in a condensed aphoristic style, so I shall supply in brackets the implied words:

"XXVIII. Porousness of a body for transpiration [is] healthy for those from whom more [excretion] is taken [out of the skin]; denseness of body for transpiration [is] unhealthy for those from whom less [excretion] is taken. Those who transpire [diapnoe is the Greek word] freely are weaker, [but] healthier, and recover easily; those who transpire hardly are stronger before they are sick, but on falling sick they make difficult recovery. These [considerations apply] for both whole and part [of the body]." (*HIPPOCRATES*, vol. I, tr. by WHS Jones, Loeb Classical Library, Harvard, 1923, p. 353)

There is much food for thought in that passage, which points out both the advantages and disadvantages of being an easy sweater. Especially for those who tend to overeat, having looser pores that perspire easily is an asset, since by perspiring we are metabolizing our food more rapidly and throwing off the dietary waste products through our skin. For such easy sweaters, wearing wool facilitates the discharge of food residues through our pores. Those who feel itchiness on their skin from wearing wool should be glad that the wool is conducting their toxic waste products out of their skin. By correcting the diet, the itchiness--which indicates that much toxic fluid is being wicked away through the wool--can be relieved.

On the other hand, if we break a sweat too easily after the slightest physical exertion, *that* indicates we are eating too much high-calorie food and salt, accelerating our metabolism unduly; and does not necessarily indicate loose pores. Through excessive perspiration, we are losing our precious body minerals, not only salt, when we sweat too readily. Excessive perspiration is a depleting process that makes us weaker.

An ancient school of medicine known as the Methodists used their diagnosis of either the tightness (*strictus*) or looseness (*laxus*) of the patient's pores as their guide to understanding and treating illness. These physicians utilized a great variety of techniques to draw out through the patient's skin the morbid food residues that had accumulated in the body and caused the illness. Some of those ancient natural healing methods have recently been rediscovered and have come back into medical use, e.g., the use of leeches to suck out bad blood. Also steam bath, sauna bath, massage, and sunbathing are all methods of discharging unmetabolized food residues through the skin.

A foremost scholar and translator of Hippocratic medical writings, Prof. Paul Potter of Ontario, Canada, has summed up the teaching of classical Hippocratic medicine in the treatise entitled "Diseases IV" in this succinct formulation:

"As long as the cycle of ingestion, digestion and excretion remains in balance, there is health; when, however, an excess [of ingestion] develops, there is either immediate illness or a propensity to illness, which unfavorable weather or an injury then brings to pass." (*SHORT HANDBOOK OF HIPPOCRATIC MEDICINE*, Quebec, 1988, p. 25)

In other words, as commonsense would dictate, balanced health requires that we be continually excreting as much food and liquid as we ingest. And since our skin is our largest excretory organ, which can discharge during a given time period even more than our stools and urine combined, it behooves us to always maximize the excretory capacity of our skin by wearing wool or other absorbent natural fibers for optimum health.

Most readers will be surprised by my statement above, that our skin can rid our body of more dietary wastes than our urine and stools combined. This discovery was first proven early in the 17th century by an Italian physician named Sanctorius, of Padua, who published his work on "Insensible Perspiration" in 1614. What Sanctorius did

was to construct a large scale on one side of which hung a cage into which he sat, with counterbalancing weights on the other side of the scale. The food and drink that was given to Sanctorius in his cage for a given time period was weighed. His excreted matter in stools and urine was collected and also weighed. He was given 13 .lbs of food and drink during a given time period. His collected urine and stools for that time period weighed 5 .lbs. Therefore his body had lost 8 .lbs of weight during that time period--more than the combined weight of his sensible excretions in urine and stools--through what he called "insensible perspiration" through his skin. Of course it was understood that the amount of invisible moisture vapor breathed out by the skin would vary according to several factors, such as temperature, humidity, level of activity, type of clothing worn, etc.

The further study of this well-known physiological phenomenon that our skin breathes out constantly, which however had never been precisely measured before Sanctorius's scientific experiments, was undertaken by hundreds of medical men for centuries, where in its last stage it was known simply as the study of "Respiration". E.T. Renbourn, an Englishman, the same scholar who produced the 1972 book cited above, on *MATERIALS AND CLOTHING IN HEALTH AND DISEASE*, wrote in the British journal *MEDICAL HISTORY*, 4 (1960) 135-52, (published by the Wellcome Institute for the History of Medicine, in London) a fascinating scholarly contribution entitled: "*THE NATURAL HISTORY OF INSENSIBLE PERSPIRATION: A FORGOTTEN DOCTRINE OF HEALTH AND DISEASE*".

Renbourn here researched in great detail: "A doctrine, long forgotten but of considerable moment in the history of medicine, is that of suppressed or obstructed insensible perspiration." (p. 136) And even though he quite obviously does not himself believe in the truth of the medical conclusions reached by a vast number of researchers during the era of classical Hippocratic medicine, from the 5th century B.C. and well into the 20th century, Prof. Renbourn invites us to use our own intelligence in the end when he states in his conclusion in his penultimate paragraph: "...but the last word on the matter has perhaps, not yet been said." (p. 150)

Renbourn's bibliography consists of 76 items from the history of medicine. Several are from the classical Hippocratic medicine of ancient Greece and Rome; but the bulk of the books and treatises listed were written in the 17th, 18th, and 19th centuries, with a few scientific papers on experiments with "insensible perspiration" published in the 20th century, with the most recent scientific research report on "Diffusion of Water and Water Vapour through the Human Skin", published by K. Buettner in 1953 in the *Journal of Applied Physiology*, evidence

that the ancient commonsense physiological topic was still being researched as recently as seven years before Renbourn published his historical article announcing that the topic was dead and "forgotten".

In addition to the ancient medical texts, Renbourn lists modern medical books in Latin, French, German, and English, including medical dictionaries and standard medical textbooks, all of which contained discussions on this central medical concept designated "insensible perspiration" and its importance for understanding human health and disease in relation to the materials that serve as the immediate environment of the human body.

Here's a citation of scientific experiments on the physiological effects of various fabrics on the skin, published in the French Journal of Physiology in 1858 by Prof. Coulier: "*Experiences sur les Etoffes*." That was in the era when the Science of Clothing was regarded as of prime importance as indispensable medical knowledge for human welfare.

The passages that Renbourn quotes from the history of Western medicine are illuminating, in spite of his own skepticism as to their truth. Just to show how easily his perverse bias in favor of modern biomedicine (which blinds him to ancient holistic medicine) can be refuted, take this passage:

"Sanctorius [in 1614] noted that retained 'perspirable matter' could produce not only miasms [internal pollution] but 'ticks, lice and the like', an idea perfectly acceptable at the time." (p. 140)

I would add to "perfectly acceptable at the time", perfectly acceptable today also to anyone who has eyes to see.

Here is an illustration of a potentially fatal health problem caused by the inability of an animal to perspire insensibly through its feet. I walk into a pet store and see a large cage of finches. The birds are standing on a plastic perch. These birds are obviously in poor health: their feathers are falling out, they are sleepy and inactive, and their eyes are not alert. I ask the pet store clerk: "What is wrong with the birds, they don't look healthy?" He answers: "Oh, those birds have mites and will have to be destroyed." I exclaim: "No wonder! You have them standing on a plastic perch, which prevents them from respiring through their feet! How would you like to stand on plastic continuously in your bare feet? What would quickly happen to your health?"

In the case of the finches perched on plastic, their inability to respire their excess body moisture through their feet has caused them to become phlegmatic; their skin then becomes damp, thus giving off an odor that attracts mites. Damp skin is much easier than dry skin for the mites to penetrate. That is why we see sparrows and other birds taking sand baths, their way of keeping their skin dry in humid weather.

My question bemused the pet store clerk, but he was not intelligent enough to think about it seriously--and that can be said about supposedly "scientifically educated" professionals unable to grasp the ancient Hippocratic teachings, which are what is today being called "Holistic Medicine".

This illustration of the finches becoming diseased through inability to respire through their feet, while on a plastic perch, makes a perfect paradigm (model) for understanding the worldwide AIDS pandemic. Many years of observations of photos of people with AIDS has illustrated convincingly that they all show unmistakable symptoms of a phlegmatic (watery) condition due to being unable to discharge their excess body moisture into natural clothing, bedding, home furnishings, etc. The materials in their immediate surroundings have been changed into debased junk materials that cannot absorb body moisture and keep their skin dry.

Could Sanctorius possibly have imagined that in 350 years a petroleum-based synthetic global civilization would arise, originating in the West, in which *suppressed or obstructed insensible perspiration*, due to the presence of non-absorbent synthetic materials in the human environment, would give rise to a host of diseases, including an epidemic of obesity, that have completely baffled the medical profession to this day? In my own family, I perceived that a sister's obesity had developed from years of wearing polyester slacks. I informed her; she corrected her clothing back to natural fibers, and brought her weight back down effortlessly. Since our body-weight is mainly water, by wearing nonabsorbent synthetics, we fail to discharge water through our pores, causing the steady accumulation of weight.

In people with AIDS, the first symptom to look for is a swollen nose, where the sides of the nose are not concave and the nostril lines are not clear and deep, as in healthy persons. Another clear symptom is the thick-necked condition wherein the width of the neck is the same as the space between the ears. Another symptom is the whites showing in their eyes beneath the iris. AIDS is a disease unique to our modern synthetic civilization in which people are clothed and housed in unnatural petroleum-based materials that do not permit their body to breathe out their excess moisture and dietary waste products into natural absorbent materials. The curious reader

interested in my unique physiological understanding of AIDS should read my two articles, "*Solving AIDS in Africa*", a lengthy 4-part essay, and "*Curing AIDS Naturally*", a short essay that sums up the findings of my lengthy research, both posted at www.MacroDiet.com Click on "Contributors" to find the Index of my medical writings posted there since the year 2000.

To return to Renbourn: He did his research blinded by the simplistic doctrine of modern biomedicine, namely that disease is caused by germs, period. Beyond germs, he could not understand commonsense physiological doctrines of Hippocratic medicine that have been thoughtlessly discarded by modern medicine in order to make place for germs, viruses, and other micro-organisms. His very first sentence classifies the ancient doctrine of "insensible perspiration" as belonging among "Mystical and religious beliefs... [that] may be the origin of the early conviction that not only the lungs but the whole body breathed in and out." Renbourn regards that conviction as "a dogma" that modern medicine, in his own person, does not accept. (p. 135)

And yet, shouldn't it be easy to test the truth that every part of the body needs air to breathe, simply by denying the access of air to any part of the body, as with a plastic bag to close it off? In fact, any number of experiments can easily be conceived and performed in order to test "the early conviction that not only the lungs but the whole body breaths in and out". Go into any pet store and you will see small animals being kept in clear plastic cages with a wire rack above them, on which is placed their food and water. How can animals survive in a plastic environment? Very easy: the animals are supplied with organic materials made of cells, either wood shavings or straw. The small animals burrow into these natural absorbent materials, covering their body with them, and thereby survive just fine in their nests of organic cellular materials. But try this experiment: replace the straw or wood shavings with any kind of synthetic cloths and see how rapidly the health of the animals deteriorates and they die. Experiments have been done by placing a cage of mice directly on polyester carpeting. The mice die within a few hours, for lack of natural material that would permit their feet to respire. No animal can long survive in a nonabsorbent synthetic environment made ultimately from petroleum, since such an environment is toxic poison.

Here's another definitive experiment to demonstrate that animal bodies need to be in contact with natural absorbent materials that enable their body to breath. Shave the fur off a dog, for example, and then clothe the dog in wool. The animal will survive with no difficulty while its fur grows back. But clothe the shaved dog in any man-made synthetic material and you will see its health rapidly decline unto death, because transpiration is impossible into synthetics.

These basic physiological facts of life had been known for thousands of years before the rise of modern biomedicine in the 20th century, centered on drugs and surgery. And this awareness of the crucial importance of the porosity of animal bodies guided medical practice since the 5th century B.C. up until the 20th century inaugurated the Age of Synthetics. Just to give an idea of how radically classical Hippocratic (holistic) medicine differed from the modern biomedicine of our time, with its focus on germs and molecules, here is the full title on the title page of a conventional medical book by an English physician, published in London in the mid-nineteenth century, before the advent of Pasteur's germ theory of disease:

HYGIENE or HEALTH, AS DEPENDING UPON THE CONDITIONS OF THE ATMOSPHERE, FOODS AND DRINKS, MOTION AND REST, SLEEP AND WAKEFULNESS, SECRETIONS, EXCRETIONS, AND RETENTIONS, MENTAL EMOTIONS, CLOTHING, BATHING, & ETC.

by James H. Pickford, M.D.

(London, John Churchill, 1858)

These “conditions” upon which our health depends were known in Hippocratic medicine as “the seven non-naturals”, i.e., the seven conditions that are not predetermined by nature, but depend upon human choice.

Notice that a Western-trained physician in former times--before Pasteur--took notice of the quality of his patient's clothing, among other things, and indeed of the patient's whole way of life. The Hippocratic medicine practiced by Dr. Pickford did not treat the disease the way modern biomedicine does—with drugs, and in disregard of the context of the person's whole way of life. Instead, Dr. Pickford *treated the person* in order to identify and correct the mistakes in living that had given rise to the particular health problem or disease. What physician in our time would deign to take notice of his patient's poor quality clothing? Or his fast food diet, for that matter?

Incidentally, “junk food” has been in our modern dictionaries for some time. But what about “junk clothing”, “junk bedding”, and “junk home furnishings”? Shouldn't these terms also be in the dictionary as materials recognized for what they are, as a threat to human health?

Well, I could go on and on, citing fascinating passages from the history of medicine, that Renbourn quotes; and show how he fails to understand the subject of his own research, which he has apparently devoted many years to. He cannot understand this ancient commonsense physiological doctrine simply because he feels he is required to toe the line of modern biomedicine. He does not know he is not a free man. A freethinker does not feel obliged to see only what his professional colleagues deem it right to see.

Finally, the reader may be wondering: "Well, you have wandered a long way from your original topic?" My answer is: Not really. What has been at issue in this essay is simply the fundamental physiological question: What is the best fiber to put on our skin for optimum health? Not only while hiking or mountaineering, but at any time? And why do I claim that wool is still the fiber of choice?

So let me present a couple illustrative anecdotes that bring home the gravity of the problem. About three decades ago, I was at the local town beach when a young woman, carrying her new baby in a plastic hamper, and with a friend, arrived to swim. After swimming for a while, the young mother came ashore to nurse her baby. As she was about to set the baby back into the hamper on the polyester pad, I was watching her and said to myself: "Now this baby is going to scream."

Sure enough, the baby screamed. The mother picked up her baby again, cuddled it for a while, to quiet the infant, and then again set the baby in the hamper a second time, whereupon the infant screamed again violently. After this had happened three times, and the mother obviously was completely mystified as to what her baby was screaming about, I decided to come forward with the solution. I picked up the woman's cotton blouse, folded it and set it in the hamper, and said: "Now set your baby on that." She did, and the baby went to sleep immediately.

That day I asked myself: "How many babies, children, adults and elderly people, all around the Westernized world are being tormented every day, and suffering illnesses untold, which the medical profession cannot understand, due to having their skin in contact with petroleum-based synthetic materials that do not permit the body to breath through the pores into material that can keep their skin dry?"

Next time you see a baby being carried in a plastic hamper, try to get a peek at the baby's face. If the baby is smiling and animated—which I rarely see—that is because the infant is digesting its food easily and is comfortable due to being dressed and covered in natural absorbent fabrics. If, however, you see no animation on the baby's

face, no smile, no movement, but only a grim and tense facial expression, you can be sure that infant's body is under an enormous strain, trying to digest its food without any assistance from the synthetic non-absorbent fabrics touching its skin. That baby's life is a living torture, while the parents are totally oblivious of the harm they are doing.

I've seen friends of the parents look into the hamper and make funny-faces at the baby, trying to elicit a smile. The funny-faces never succeed. And the parents and their friends never catch on as to why no amount of funny faces can make the baby smile. As the child grows older and turns out to be autistic, these careless parents wonder why. Then their physicians ease their consciences by assuring them "the child was born that way".

The late Rene DuBos published his book, *MAN ADAPTING* (1965), just when the petroleum-based lifestyle had recently gained ascendancy, in which the renowned medical scientist asked this question: "Can man continue to adapt to a rapidly changing environment from technological innovations and still maintain his health?" DuBos did not answer the question—because he could not. He could not say "No", because that would have sounded pessimistic about the future of humanity. And he could not say "Yes", because he knew modern technology was already creating serious threats to health, and that there would inevitably be many more grave threats to human well-being in a rapidly changing technological environment.

But if DuBos had broached his question concretely, instead of abstractly, and asked: "Can man adapt to a synthetic petroleum-based environment that does not enable his body to breathe?" DuBos would have had to answer "No". He would have had to concede that the future of humanity surrounded by intranspirable petroleum-based materials is no more promising than the life of a baby swaddled and dressed in polyester.

The January/February 2008 *AMC OUTDOORS* magazine of the Appalachian Mountain Club contains an article entitled "*Cold War*" by freelance writer Dirk Van Susteren, in which he reports on his visit to the U.S. Army Soldier Systems Center in Natick, Massachusetts. There he is informed by an Army research technician: "We are looking again at wool." Van Susteren exclaims, facetiously: "Wool? That old standby...the material that 25 years ago lost serious ground to the synthetic fibers that dry and pack so easily? A wool counterattack?"

The technician apologetically, in behalf of the U.S. government, then concedes: "Wool has always been a fine fabric in cold.... It's similar to a wetsuit effect", he says, assuring his listener that the technocrat understands wool

from what he considers the normal perspective of its seeming to imitate the technology of synthetics. But he fails completely to understand the function of wool, since he is not interested in looking at the natural fiber from the perspective of wool's physiological function in the life of sheep.

After the technician then brings out for proud display an array of cold-weather military apparel made of synthetics, Van Susteren--apparently gaping in awe--rhapsodizes about these ersatz fabrics, mouthing the standard cliché that he doesn't have the faintest suspicion is false: "It's all the stuff I took on my last adventure...the inner synthetic layers managed to 'wick away' the moisture just as their labels promised." (p. 45)

What would be the effect on the outdoors people if the following simple scientific demonstration was allowed to be performed before the top brass of an annual meeting of the Appalachian Mountain Club, for example? I bring a glass oil lamp and two wicks: a polyester wick and a cotton wick. I install first the synthetic wick, give it some time to soak up the oil, and then hand out a box of matches for anyone in the audience to come forth and light the wick. (Since I've tried this experiment, I know the synthetic wick will not burn. And in any case, sheer logic tells us, on an *a priori* basis, prior to any experiment, that man-made materials, being non-cellular, cannot absorb moisture and function as a wick.) No one is able to ignite the polyester wick. I then remove the synthetic wick and install the cotton wick. After allowing the cotton to absorb the oil and wick the fuel upwards by capillary attraction, I pass out again the box of matches and invite anyone to come forward and light the wick. Lo and behold, the cotton wick ignites easily and bursts into flame, to the amazement of the gathered mountaineering experts.

Now what would be the effect on the true believers whose faith in the superiority of the synthetics would be shaken? With this irrefutable scientific demonstration that the "wicks away the moisture" claim is false, what kind of inner crisis would ensue amongst the fashionable outdoors people and athletes? Would their world collapse? And what about the manufacturers' claim, on the label, that this garment "wicks away the moisture"? Would not the synthetic clothing industry be liable to lawsuits for false advertising that potentially led to accidents and deaths? Could the false "progress" of our synthetic modern lifestyle, in which many millions of urban populations live daily mired in a swamp of petroleum materials, to the vast detriment of their health, be possibly reversed?

I close with a charming literary passage, from a classic, Plato's, *SYMPOSIUM*, 175d-e, which contains this interesting reference to the "wicking" theme, both physical and intellectual wicking, from the translation of Michael Joyce (1935):

"My dear Agathon", Socrates replied as he took his seat beside him, "I only wish that wisdom were the kind of thing that one could share by sitting next to someone--if it flowed, for instance, from the one that was full to the one that was empty, like the water in two cups finding its level through a piece of worsted wool. If that were how it worked, I'm sure I'd congratulate myself on sitting next to you, for you'd soon have me brimming over with the most exquisite kind of wisdom."

In physics, this natural phenomenon is known as "capillary action" or "capillary attraction", whereby liquids can be lifted against the force of gravity via a cellular conduit known as a wick. Perhaps this writer may be excused if he hopes that these thoughts and observations may succeed in conveying precious practical knowledge from the writer's mind to the reader's by intellectual "capillary action" that can be salubrious and even possibly life-saving. But for that, my readers would need to discover the comfort and health advantages of wearing wool. After all, mountaineers are often putting their lives at risk in dangerous conditions. Shouldn't they at least know the real physical properties and capacities of the materials in which they clothe themselves?

As a coda to these thoughts, let me cite an old custom that was still being practiced in my youth. In the old days, when you were about to set off on a journey, what did your mother usually say to you? "Have a good time"? No, she said something, and did something, far more meaningful and caring. She pressed into your hand a pair of woolen socks she had knitted, with the loving admonition: "Keep your feet dry!"

My eight-year older sister knitted beautiful argyle woolen socks for me during the 1940's, and also wool socks she knitted and mailed to our cousin who was in the U.S. Infantry fighting in World War II. It was a standard custom for women to knit woolen socks or stockings for their loved ones away at war or traveling. People had always known the crucial importance of dry feet for health, which they no longer do in this era of synthetic footwear and clothing.

Wet feet, due to wearing synthetic footwear, is one of the most easily avoidable causes of the dramatic rise of epidemic diseases in our time; and a very important one, since being in wet feet significantly impedes the effectiveness of our digestion. Whereas wearing 100% wool or cotton socks at all seasons of the year is one of the best safeguards of health and a lot cheaper and more effective than health insurance.

* * * * *

PART TWO

HAS SYNTHETIC CLOTHING MADE WOOL OBSOLETE IN MOUNTAINERING?

A PHYSIOLOGICAL DIAGNOSIS OF THE MT. EVEREST DISASTER OF MAY 10, 1996.

“It is this instinct of *enquiry* linked with competitiveness which has accounted for much of man’s progress. ...Any venture can turn sour very quickly if the basic planning [e.g., mountain clothing] is faulty... In the climbing sense, each generation blunders forward using resources and concepts it has at its disposal.”

Chris Bonington, *EVEREST THE HARD WAY* (1976), 28, 29

This Part Two represents a concrete application of the physiological science expounded in Part One of this essay, with regard to the importance of natural clothing; and of how in the absence of natural absorbent clothing, the physiology of heat regulation in a mountaineer at high altitude collapses, leading eventually and naturally to sickness, to accidents, to possible disasters and deaths, if the air on the mountain suddenly changes from dry to damp, and the climber becomes trapped on the mountain at freezing high altitude.

The story of the infamous disaster on Mt. Everest on May 10, 1996 has been told most famously in Jon Krakauer’s book, *INTO THIN AIR: A PERSONAL ACCOUNT OF THE MOUNT EVEREST DISASTER* (1997), which instantly became a bestseller, and has since become a classic of mountaineering literature. I had read about that black day on Mt. Everest, on which eleven people on different expeditions died, in various other accounts also, by other

mountaineers who were there on the mountain that day. The most recent account, by Ed Viesturs, in his book, *NO SHORTCUTS TO THE TOP: CLIMBING THE WORLD'S 14 HIGHEST PEAKS* (New York, 2006), has supplied me with some fascinating clues by which I can offer a physiological explanation that applies not only to this disaster, but to other similar disasters which have baffled the mountaineering community, and to others yet which are waiting to happen whenever any mountaineer gets caught high on a mountain late in the day when the air turns from dry to damp, or by an unexpected storm, and is unable to get down to a heated tent before nightfall.

In Chapter 5, entitled “Time to Say Good-bye”, Viesturs gives his eye-witness account of how two of his dearest “great partners” on mountaineering expeditions—Rob Hall and Scott Fischer—froze to death, along with several others, on Everest that day. Viesturs was at Everest during that month of May 1996, with the IMAX filming expedition, led by David Breashears, whose mission was to make a special motion picture film about climbing Everest. All my quotations are from his account in chapter five of his book, unless specified otherwise. In fact, the IMAX expedition had been scheduled to climb to the summit on May 9; but the team changed their plan after they had already climbed part of the way up, due to the feeling that “unsettled weather” was lurking.

Noted Viesturs, “That spring there were more climbers on the south side of Everest than ever before in history.” There were several expeditions all trying to attain the summit on May 10, creating a veritable traffic jam of climbers whose ascents and descents were delayed by a “bottleneck” at the famous Hillary Step, which takes some time to negotiate, whether moving up or down. “Rounding out the throng were two large expeditions of guided clients led by my good friends and erstwhile Himalayan partners Scott Fischer and Rob Hall. Scott’s Mountain Madness team numbered twenty-three; Rob’s Adventure Consultants entourage, twenty-six.”

At the Base Camp, Viesturs had a chance to “hang out” with his old climbing buddies, Rob Hall and Scott Fischer, whom he writes “were friends, but they were also rivals. So once Rob decided on May 10, Scott also opted for the same date. In fact, they decided to join forces for their summit attempt.” But unknown to those two expedition leaders, a Taiwanese expedition chose to ascend that day also, which meant that on May 10 there was over forty climbers going for the summit from the highest camp on the South Col, and needing to pass each other either ascending or descending, with the danger of long delays at the Hillary Step.

“So on May 8, instead of pushing up to the South Col, we descended the fixed ropes. Before long, we ran into Scott’s and Rob’s teams heading up. Both trip leaders asked me, ‘What are you guys doing?’ I answered, ‘Going

down. It just doesn't feel right.'...There on the Lhotse Face, as we crossed paths on the fixed ropes, I shook hands with Robb and Scott, gave them each a big hug, and said, 'Have a great trip. Be safe.' After hugging me, Rob said, 'I'll see you at the bottom, mate.'"

Viesturs' narrative acknowledges Krakauer's fine book, which told the story in great detail. Yet Viesturs is not satisfied completely with Krakauer's account: "Yet for all his assiduous reporting, there will always be mysteries about exactly what happened that day." Viesturs in fact ends his account of the Everest disaster in his chapter five by describing his visit to Scott Fischer's corpse: "I glanced around, then looked again at the body of my friend, frozen into the slope. I spoke out loud. 'Hey, Scott', I said, how are you doing?' Only the sound of the wind answered me. 'What happened, man?'"

That is the question to which I offer a physiological explanation.

Viesturs has remained perplexed and baffled by the horrendous loss of life on Everest that day. The worldwide mountaineering community, likewise, has no clear answers, based on solid evidence, by which to draw the lessons that disaster teaches, in order to prevent another such recurrence. (And indeed, recurrences have already happened!) After all, it has never been uncommon for mountaineers to get caught on a mountain by the sudden outbreak of a storm, and have to spend the night in their clothing, which should be adequate for such an eventuality. My purpose here is to inject some physiological understanding of the role in the disaster of the climbers' synthetic clothing.

May 10 dawned a fine day, so Viesturs' team assumed that Rob's and Scott's teams would have set out from the South Col around midnight to go to the summit. Viesturs' team had a telescope with which to monitor the progress of the two teams ascending the mountain. "It got to be one p.m. Then around two, through the telescope we could make out climbers scattered along the high ridge...waiting their turns to climb the Hillary Step. It was alarming how much of the time those specks were standing still, not moving. The traffic jam had indeed started to work its mischief."

Staring through the telescope, Viesturs felt the urgent need to shout at them, though he had no direct radio contact: "Guys—you left at midnight. It's two o'clock! It's going to be three or four before you get to the summit." Then, as he watched the stalled procession, Viesturs' mood darkened. "Dudes, what are you doing? Wake up! Guys, turn

around, turn around”, he moaned out loud, as if he were trying to send them a telepathic message, which of course never reached them.

Then clouds rolled in unexpectedly and the summit of the mountain disappeared, cutting off his visibility, so that he could no longer know what progress, if any, the two climbing parties were making, whether up or down. “All the while, things were falling apart up high. Radio batteries started to die. There was little word as to just what was going on.” It wasn’t until ten p.m. that Viesturs got word, via his wife Paula at Base Camp, who had direct radio contact with the expeditions: “Only half the people who left the South Col this morning have made it back.” Viesturs and the group with him “cursed out loud”, trying to imagine the nightmare that must be happening up there. “It’s windy, it’s dark, it’s freezing cold, and we knew that everybody must be out of bottled oxygen by now.”

It was not until around five a.m. the next morning that Viesturs heard, in a nearby tent, the first radio transmission from up high. It was from his friend Rob Hall. “And what Rob said was both deeply troubling and utterly puzzling. In a tired, weak voice, he said, ‘I’m all fucked up. I’m on the South Summit. I sat out all night. Doug [Hansen] is gone.’”

This vulgar expression is “utterly puzzling” because it indicates that Rob Hall had no grasp of just what his problem was. To me it is an important clue that Rob Hall—and the other climbers also who were forced to bivouac overnight on the mountain by the unexpected storm—was suffering a physiological incapacity to move. Was that incapacity merely due to having run out of supplementary oxygen, as commonly supposed? That does not sound logical to me, considering that Ed Viesturs himself climbed to the summit of Everest without supplementary oxygen about two weeks later, on May 23.

The next radio message from Rob Hall was an urgent plea: “I’m stuck here. My hands are fucked. When is somebody coming up to help me?” But even if Hall’s hands were frostbitten, that was no logical explanation why he could not move his feet and descend from the mountain. “Meanwhile, we were encouraged to hear from Rob [via radio] that he’d found the two full oxygen bottles on the South Summit... he was breathing gas once more.” So Rob Hall’s hands could not have been the real problem, since he managed to find the oxygen bottles and connect them to his breathing mask and make all the necessary adjustments to the apparatus, which certainly required a degree of manual dexterity.

And now just when Viesturs and his team had caught a gleam of hope, having sent up in the storm two Sherpas, Ang Dorje and Lhakpa, in a truly heroic rescue attempt, and having cajoled Rob Hall for hours to get moving downwards, when Viesturs asked over the radio, “Rob, how’s it going?” he received the answer: “I haven’t moved.” Hearing that three-word reply was devastating. “All of us listening to the radio were totally shocked and demoralized by this news. We knew now that the only hope for Rob was if the two Sherpas could get to him and help him down.”

At that point the members of Viesturs’ IMAX expedition mobilized themselves to form a five-person rescue party and informed Rob Hall by radio that they were heading up the mountain. A couple hours later, David Breashears received word from Base Camp on his handheld radio that the two Sherpas were back on the South Col and had reported: “They simply couldn’t climb up in those conditions.” At this point a mountaineering sentence that is destined to endure was uttered by Breashears to Viesturs, both of whom had been long-standing professional climbing buddies with Rob Hall. “David took a deep breath, then said to me, ‘I think it’s time to say good-bye to Rob.’” Nothing more could be done to rescue their friend while the storm was still raging. “That’s when I lost it,” writes Viesturs. “I just hung on my jumars, sobbing. David was weeping, too.” And thus the poignant title—“Time to say good-bye”—that Viesturs has given to this chapter five of his book.

But Viesturs was subsequently greatly surprised to discover, “Amazingly despite having been out for some thirty-six hours, most of it without bottled oxygen and above 28,000 feet, Rob was still alive and coherent by nightfall on May 11.” Viesturs’ team was preparing to undertake another rescue attempt the next day, assuming the storm would have subsided by then. At 6:20 p.m. on the 11th, a satellite phone connection was established by Base Camp, putting Rob Hall, on Everest’s South Summit where he was stranded, in connection with Jan Arnold in New Zealand, who was seven months pregnant with their child. “Rob’s and Jan’s farewell exchange has become part of the Everest legend,” since it was overheard by many others with radios on Mt. Everest that day.

“Jan knew there was little hope—she’d been on top of Everest herself. And Rob must have known, too. But in their parting words, they kept up the poignant fiction of a coming reunion.... Rob closed with ‘I love you. Sleep well, my sweetheart. Please don’t worry too much.’ Those were the last words Rob ever spoke—or if he said anything more, there was no one there to hear it,” writes Viesturs.

The question among the mountaineers who listened in on Rob Hall's last conversation with the woman he loved, the last conversation of his life, from his situation in extremis, presented itself: Was this an affected pretense of confidence that Rob would be rescued in time and everything would turn out right? Or was this real bravery to maintain a stiff upper lip by both the man and the woman, in the spirit of good sportsmanship, in the face of impending death? Wasn't this one of those rarely sublime moments in life and literature where, with just one small turn of the screw, the beholder could see it either way?

Meanwhile, nothing had been heard, by radio or by word of mouth, of the other expedition leader, Scott Fischer of the Mountain Madness team; it was not known whether he was still alive on the mountain, or dead. According to his sirdar (or head Sherpa), Lopsang Jangbu, who was waiting for him on the summit, Scott had arrived at the top of the mountain at three-forty p.m. on 10 May, which was also well after than his own prescribed turn-around time. He lingered on the summit for only fifteen or twenty minutes, during which he complained to his head Sherpa about his condition. In Lopsang's paraphrase, what he said was: "I am too tired. I am sick, also, need medicine for stomach." Alarmed, Lopsang urged, "Scott, please, we go fast down."

Clearly, Scott Fischer, a professional mountaineer who had spent many years leading commercial expeditions as well as many high-altitude climbs in the Himalayas with Rob Hall, David Breashears, and Ed Viesturs, was experiencing a severe digestive problem, which had dangerously weakened him during his ascent, while the day was still clear, before the sudden storm later descended on the mountain. So the obvious question arises: Why was Scott Fischer suffering crippling indigestion? No commentator, so far as I know, has addressed this question, which I shall take up presently, after additional clues have been noted.

"Scott was so out of it that he couldn't handle the short, normally easy rappels over the rock steps high on the ridge." At six p.m., Lopsang, who had stayed behind to aid others in trouble on the descent, caught up with Scott. "Seeing that Scott had taken off his mask, Lopsang put it back on his face and made sure he was breathing oxygen. But the words Scott uttered were further proof of his deterioration. According to Lopsang: 'He says "I am very sick, too sick to go down. I am going to jump."' He is saying [this] many times, acting like crazy man, so I tie him on rope, quickly, otherwise he is jumping down [the mountain] into Tibet.'

Very curiously indeed, at eight p.m., another straggler appeared out of the darkness, Makalu Gau, the leader of the third expedition, namely the Taiwanese group, that had summited that day; and he also sits down on the

same ledge, unable to go further, and there releases the two Sherpas on his team, who had accompanied him, to descend without him. Subsequently, the Taiwanese expedition leader was assisted safely down the mountain by two other Sherpas who came up for him. *It should be noted that the professional expedition leaders of all three teams found themselves ill, physically disabled, by the time they reached the summit.* Strange fate that the reputed mountaineering experts would be the first ones whose health broke down, and not by any cause attributable to the storm that arose hours later, making them the prime victims of their own commercial expeditions. But why should Mother Nature attack the very professionals who should be best prepared to do their jobs? What mistake had they committed that caused them to become incapacitated from descending the mountain?

There is no need to recapitulate the many incidents of the disaster in detail, since the story is available in several accounts by eyewitnesses, most famously in Jon Krakauer, *INTO THIN AIR* (1997). My purpose here is to get at the heart of the problem: What caused the three expedition leaders to become ill by the time they reached the summit? What caused them to become “sick”, as Scott Fischer confessed himself to be? They surprisingly found themselves unable to descend the mountain unassisted, and desperately called for help, which was not able to reach them in two out of three cases due to the sudden outbreak of a storm on the mountain. Apparently, the changing quality of the mountain air from dry to damp, with the gradual fall in barometric pressure, as the storm approached, left these mountaineers—to the extent they lacked the ability to transpire (breath through their skin) into absorbent natural clothing—unable to function physiologically, especially to digest their food. Then the outbreak of the storm prevented two of the three expedition leaders from being rescued.

The first thing a medical detective would look for is this: What symptoms did each of them have? And what is the possible common denominator among their various symptoms? From Scott Fischer's irrational behavior in wanting to “jump down the mountain”, Ed Viesturs states the medical inference: “What most of us believe today is that Scott was in the grip of cerebral edema. The hallucination that he could jump back to the camp is a typical manifestation of that ailment.” Cerebral edema means literally swelling of the brain through the entry of water into the brain cells. This ailment is generally regarded by mountaineers to be a routine ailment due to being at high altitude without sufficient oxygen. In any case, what this ailment represents physiologically is that water is rising *upwards* in the body, instead of *downwards* through the kidney function, and *outwards* through the pores of the skin.

The obvious question then is: What physiological problem is causing water to rise upwards in the body, instead of downwards and outwards? In the case of the kidneys, it could be due to a deficiency of salt in the diet, since salt is requisite to activate the kidneys. This assertion can easily be tested by taking salt and noticing how soon thereafter comes the need to urinate. Moreover, the failure to discharge water normally through the kidney function would in turn impede and block altogether the functioning of the bowels, as most everyone knows who has had the peculiar experience of not being able to defecate until one has first urinated, thereby reducing the water content in the lower intestine to the requisite 14 per cent before stools can be formed. Another likely indication of salt-deficiency in Scott Fischer would be his inability to drink when offered liquid. The solution for that problem would be to put a few grains of salt in the liquid—whether it be water, tea, soup, or whatever—which would be sufficient to induce thirst by making the liquid appetizing.

In my considered physiological judgment, the disabling medical problems of both Rob Hall and Scott Fischer had to do with the same underlying root cause: their inability to excrete water downwards and outwards from their body. Scott Fischer's characterization of his medical problem on the summit, according to the Sherpa Lopsang who was with him, may be reiterated: "I am too tired. I am sick, also, need medicine for stomach." This is clearly the acknowledgment of a severe digestive disorder, producing crippling fatigue, which had incapacitated Fischer from moving down the mountain. If Fischer was also suffering from cerebral edema, as Ed Viesturs and most mountaineers believe, there would be no incompatibility between the two ailments, since both have the same underlying cause: the physiological inability to discharge moisture from the intestines expeditiously enough for the digestive process to proceed normally and for the brain cells to be unencumbered with water.

One of Rob Hall's medical problems seems to have been that he was unable to maintain normal temperature in his hands, and that would indicate inferior quality mittens, made of intranspirable synthetic fabric, rather than the traditional Austrian Dachstein closely-woven grey woolen mittens worn with an outer leather shell, traditionally favored by mountaineers. His first despairing radio call came at five a.m. on the morning of May 11th, after he had spent the night on the South Summit. States Viesturs: "Somehow he had survived the night, without even a bivouac sack for protection." Hall's words were: "I'm all fucked up. I'm stuck here. My hands are fucked. When is somebody coming up to help me?" Another account clarifies Rob Hall's response by putting it in less vulgar language: "You know, I haven't even moved—my hands are so badly frostbitten that I can't deal with the ropes."

[1]

It is very revealing that both Rob Hall and Beck Weathers were discovered with their down parkas unzipped, bare-chested, and with bare hands. Both were trying to warm their frostbitten hands by opening their parka to place their hands inside. Hall froze to death and Weathers had to have both of his severely frostbitten hands amputated. But if they had been wearing the traditional woolen mittens of mountaineers, with an outer canvas or leather shell over them, they would not have experienced frostbitten hands and would not have had to unzip their parka in the vain attempt to warm their hands that way, and would not have suffered the tragic fates they both endured. By uncritically accepting false advertisement claims that the new expedition-style synthetic mittens are superior to wool, they both paid a severe price.

At this time, Rob Hall reported that his client and friend, Doug Hansen, whose lateness in arriving at the summit had delayed Rob Hall's time of departure, had disappeared during the night. Doug Hansen's body has never been found.

Robb Hall subsequently did move a short distance down the mountain to find two full oxygen tanks to which he had been directed by radio, assembled the tanks onto his breathing apparatus, and was breathing the oxygen needed to help him descend the mountain. Yet he failed to descend, and finally divulged over his radio four or five hours later: "I haven't moved." Clearly, he was too ill, lacking the energy to descend the mountain without the assistance that he called for.

The medical problem that incapacitated Rob Hall from moving down the mountain cannot be explained simply as his frostbitten hands, since such an explanation merely begs the question: Why? He survived one overnight on the mountain, but did not survive the second overnight without shelter, and was found frozen stiff by his hired guide Anatoli Boukreev around 8 p.m. on May 12th.

It is time to investigate the root cause of the problems that both Rob Hall and Scott Fischer experienced namely the inability to excrete water downwards and outwards through their kidney function and the pores of their skin. Having looked into the contemporary mountaineering clothing fashions of the mid-1990s, as shown in many photos of Everesters in their books, and by the clothing recommendations purveyed in the standard textbook, MOUNTAINEERING: THE FREEDOM OF THE HILLS, in its mid-1990's edition, here are the clues I have found, which go a long way to explain the problem of the inability to excrete moisture through the skin, due to the wearing of nonabsorbent synthetic clothing.

I begin with Ed Viesturs' description of his own clothing and gear, given in earlier pages (pp. 122-24) of his book from which I have been quoting hitherto from chapter five exclusively:

“First of all, what do you wear on a typical climbing day above 24,000 feet? On your feet, double boots—a plastic outer shell and an insulated insert made of Alveolite, a kind of noncompressable foam. Inside the boots, I wear two pairs of heavy socks, made of a blend of wool and spandex... On top of your boots, you wear insulated overboots made of foam covered by a layer of Gore-Tex... On your torso you wear long johns, top and bottom. Synthetic fabric is preferable to wool—wool tends to be itchy. You don't want cotton, because it soaks up your sweat and does not retain heat as well as wet synthetics do. Over the long johns, a one-piece sleeveless [synthetic] fleece suit... If it's really cold, I'd wear a separate [synthetic] fleece jacket on top of the [synthetic] fleece suit. Then a one-piece down suit on top of everything, with a hood attached... Protecting your hands is absolutely critical. On the summit push, even the thickest gloves don't cut it—you need mittens. I favor a [synthetic] double-fleece inner mitt, with an outer made of leather on the palm side...and down-filled nylon on the back of the hand....Under my down hood, I wear a heavy wool knitted cap. Also a face-and-neck garter—a kind of wool-blend sleeve that you slide over your head...”

It has been necessary to insert the qualifier “synthetic” in brackets because the word “fleece” no longer means wool in our modern vocabulary. Through a commercial tour de force, a transvaluation of values has been achieved by the synthetic clothing industry, whereby “fleece” now means the opposite of wool fleece: it now means polyester pile. Moreover, it is not easy to determine at just what date this inversion of meaning was achieved, which is essential in order to read the mountaineering literature accurately. One man's “fleece” has become another man's synthetic garment.

A traditionalist like myself finds Ed Viesturs' clothing description nothing short of mind-boggling for its near-total rejection of natural fabrics. No cotton is used, and only a very small amount of wool. But note that this outstanding professional mountaineer wears two pairs of heavy wool socks that are reinforced with spandex elastic to give a very snug fit and thereby the optimum of transpiration for discharging moisture from his feet. His undergarments, as well as the outer garments, are completely nonabsorbent petroleum-based synthetics. The astonishing claim is made here that being in “wet synthetics”, which cannot absorb one's perspiration, is actually better than being in cotton. What we have here, in short, is a complete reversal of the traditional wearing of

natural clothing, replaced by a revolutionary philosophy that actually believes it is better and healthier and more comfortable to place synthetic petroleum-based nonabsorbent garments directly on one's skin, rather than the traditional absorbent natural clothing that keeps one's skin dry.

It should be noted, however, that what saves Viesturs from the potential adverse effects of nonabsorbent synthetics is that he does achieve sufficient transpiration through his skin by wearing wool on his extremities, his head and feet—which is not exactly what is recommended by the standard textbook of mountaineering in its latest editions, as we shall see.

And when we look into the standard textbook, MOUNTAINEERING: THE FREEDOM OF THE HILLS, and note the changing clothing recommendations, from the 1st edition in 1960, to the 7th edition in 2007, we find that Ed Viesturs is indeed *au courant* in 2006 with the latest mountaineering clothing fashions—which is not at all to certify that the latest is invariably the best, since fashions in clothing, as in everything else, have a way of going out of fashion again, and indeed of revolving back upon themselves.

The 3^d edition (1974) of the textbook is the oldest I've been able to locate; and look what it recommends. "Wool socks are the only kind worth wearing." (p. 10) "Climbing trousers: Wool is much preferred in a cool, wet climate." (p.13) "Long john underwear of wool or wool-and-cotton layers is desirable for winter... Wool or part-wool undergarments are preferable." (p.14) "Shirts and sweaters should be entirely wool, slow to get wet and even then retaining much of their insulating value. Though two layers above underwear—wool shirt and sweater—are sufficient in most climbing." (p.15) "A pair of heavy wool mittens, worn inside wind- and water-repellent overmitts when the situation demands, suffices for most climbing." (p.17) Those mittens referred to were doubtless the famous heavy closely-woven grey Austrian Dachstein mittens that were standard wear in mountaineering for centuries, and are still widely in use today in 2008, including by this writer.

Looking back from our current vantage in this latest era when synthetics have completely ousted the use of natural fibers in the latest edition of this standard textbook, it is amazing to note that the philosophy of natural clothing lasted as recently as a generation ago: the mid-1970's. From the inception of the sport of mountaineering in the mid-nineteenth century, for well over a hundred years, the wearing of wool had been traditional and unquestioned. Then the Synthetics Revolution gathered steam in the 1960's, invading steadily every area of life. Yet still, curiously, it was well into the middle of the following decade before synthetic inroads were made into mountaineering. And now today the wearing of petroleum-based nonabsorbent ersatz clothing, even in severe

mountaineering weather is—strangely—deemed as natural and as salubrious as the traditional wearing of wool was formerly taken for granted! Thus anyone who has engaged in mountaineering for over thirty years, going back to the era when wool was *de rigueur*, would find himself completely out of fashion today!

The 5th edition (1992) of the standard textbook on *MOUNTAINEERING* initiated a far-reaching revolutionary philosophy of clothing that turned the traditional wisdom of natural clothing upside down. As though with a magician's sleight of hand, the new writers on "Clothing and Equipment" suddenly espouse a strange vision of the desirability of synthetic clothing. This radically new vision acknowledges no continuity with the past, and no embarrassment that the past few thousand years of civilized natural clothing now appear to them as nothing but one long dark night of ignorance.

The 1992 edition amazingly claims that "synthetic materials can perform all those functions", including to "absorb perspiration", that wool performs. This is astonishing ignorance to claim that petroleum-based synthetics can absorb perspiration. If this was true, a synthetic wick placed in an oil lamp would absorb oil and burn just as easily as a cotton wick. But this is not so: no wick made of synthetic material will burn in an oil lamp, for the simple reason that not being made of cells, the wick cannot expand to absorb moisture. And neither can any synthetic materials expand to absorb moisture. Thus, what we find with this new championing of synthetic materials over natural materials is an appalling ignorance about the most basic physical property of synthetic clothing (its nonabsorbency), coupled with an equally ignorant understanding of one of the most basic physiological facts of life, namely the need to breath through one's skin, which is facilitated by natural absorbent clothing, and prevented by unnatural synthetic clothing.

The *contradictions* inherent in this new vaunting of synthetic materials are patently absurd howlers, and yet are put forth as though the reader is assumed to be a non-thinker who will uncritically believe whatever he is told. For example, while synthetic socks are falsely claimed to absorb perspiration, "Synthetic insoles are non-absorbent". (p. 20)

And while the importance of keeping one's feet dry was always traditional wisdom, especially when performing strenuous activity, rather than be standing in your own sweat, now this astonishing new claim is made regarding socks: "Vapor-barrier liners keep moisture next to your foot... They also keep your feet warmer by inhibiting the evaporation of sweat." This bizarre statement announces, in effect, "The Philosophy of Sweaty Feet"—until the

afterthought dawns: “but over time the moisture that is kept inside can result in trench foot—a serious problem.” Oh my! In this new upside-down philosophy of clothes, being in sweaty feet is a great advantage provided you know just how far, and how long, you should do it, although no rule of thumb is given. It is just astonishing the total absence of any awareness of the many hazards to health from being in wet feet, including the skin rotting, blisters, unbearable stink, and the poisoning of the body from being mired in one’s own waste products. But the palpable self-contradictions and violations of commonsense into which these new apologists for synthetic clothes inevitably fall into, prove no deterrent, and no embarrassment either. It must take a great deal of courage to be so shameless.

It should be noted that the new synthetic garments are generally made close-fitting and in very dark colors, especially black, in order to absorb the rays of the sun, because petroleum-based fabrics are inherently cooling against the skin. And since these synthetics have no natural insulating value, it becomes a problem, especially for high-altitude mountaineers, how to dress during the midday heat of the sun. Thus the textbook recommends: “During the warmer parts of the day, many climbers wear just their long underwear and a pair of shorts”, it being understood that the long underwear are now synthetic.

The claim is made that “Wool is far less absorbent than cotton, since it holds less water when wet,” (p.22) which contradicts my reason and experience. This proposition can easily be tested: submerge similar garments of cotton and wool into a bucket of water, and see which garment is heavier with absorbed water when you lift it out. The woolen garment will feel heavier because wool absorbs more moisture than cotton, which is precisely what gives wool more insulating value than cotton. It should be expected that anyone who embraces a false philosophy of unnatural clothing will find it necessary to defend his position by a false mode of reasoning that is riddled with egregious errors.

The defense of “synthetic pile”—which subsequently has become popularly known as “fleece”—is that apparently unlike their false claims about other synthetics, it “does not absorb any water.” The suggestion is made that synthetic pile is thus a superior material for insulating body heat, since “it traps more dead air than natural fibers like wool. All these features contribute to make [synthetic] pile a versatile and effective insulating material”. (p.22) Anyone can check the truth of these preposterous claims by simply donning a “fleece” jacket, and then a Harris Tweed woolen jacket; and compare the warmth and comfort of the two. There is no comparison.

The motive behind these false claims in behalf of synthetics is clearly the necessity of making a virtue out of a drawback. Thus, since synthetics are indisputably nonabsorbent, being made out of petroleum, it became essential for the advertisers to claim that the wearing of nonabsorbent clothing is actually more salubrious than wearing natural absorbent clothing made of organic fibers—a complete inversion of commonsense. And since the manufacturing of synthetic clothing is much cheaper than the processing of wool and cotton, business interests have coined these new false slogans to create “The Big Sell”. The public has been largely duped, with professional mountaineers no exception to the naive gullibility, except among cultured people who have grown up in natural clothing and are not easily deceived to chuck their wool and cotton clothes, and don synthetics.

Returning now to the 5th edition (1992) of the standard textbook on MOUNTAINEERING: THE FREEDOM OF THE HILLS, we find that polyester, acrylic, and polypropylene garments have been newly installed in the mountaineer’s wardrobe, following upon their now common use in everyday clothing. The text states that these synthetics “are used for a variety of long underwear and insulating garments. The synthetic filaments of some are also very good at transporting perspiration away from the body, making them well suited for use next to the skin. More and more fabrics are being designed to do this, and these fabrics have largely replaced wool, cotton, and silk for use in long underwear.” (p.22)

The obvious question that must be asked here—and this goes to the very heart of the advertising and mountaineering textbook claims in behalf of synthetics—is: *How can nonabsorbent synthetic garments be claimed to be “very good at transporting perspiration away from the body”, especially when the textbook freely states in places that synthetic garments are nonabsorbent, and that their nonabsorbency is their very virtue?* How can any fabric “transport” what it cannot absorb, cannot get hold of? This is a patently fallacious claim that the textbook writers have apparently taken directly from the advertisements put out by the synthetic clothing manufacturers, without using any independent judgment, and without subjecting this false claim to the test of reason or scientific experiment.

Thus the final assertion of this 5th edition of the textbook (1992) reiterates this false claim in the strongest fashion: “Synthetics like polypropylene and polyester are currently the best fabrics for this [long underwear] purpose. They are soft, stretchy, ventilate well, and wick moisture away from the skin.” (p.23) The question how nonabsorbent garments can function as a wick has yet to be demonstrated by any scientific experiment utilizing a synthetic wick, and explained rationally by any physicist. I have found that when a physicist is questioned on this issue of synthetic garments “wicking away the moisture”, the answer given comprises only obfuscating arguments that address anything but the phenomena of “wicking”. There is the further question of how garments made of

petroleum, which feel cold to the touch, can have any significant value as “insulating garments,” and not rather just the opposite?

Finally, the 6th edition (1997) brings the clothing revolution in mountaineering to a complete reversal of what it had been as recently as 1974—less than a quarter century earlier--when the 3rd edition espoused the millennia long tradition of recommending woolen garments predominantly for mountaineering use. Here is the astonishing announcement that turns the tables on thousands of years of human civilization: “In the early days of mountaineering, natural fiber clothes were worn exclusively. Natural fibers share the characteristic of readily absorbing water. They are becoming obsolete for the same reason.” (p.19) I must say my mind boggled when I first encountered that statement, indicating that the traditional clothing world of commonsense has been turned upside down.

What these naïve neophyte disciples of the synthetic clothing manufacturers fail to understand is basic physiological knowledge that the human body is constructed like a sieve, with millions of pores designed for the breathing out of moisture, whether as visible perspiration or as invisible vapor. And unless this essential physiological function known as transpiration is facilitated by the wearing of absorbent natural fibers directly on the skin, which can accept the discharged body-moisture, there is bound to be a functional disturbance eventually in the body, especially when the atmospheric conditions suddenly change from dry and warm to cold and wet.

The 6th edition repeats and recapitulates the accumulated egregious fallacies regarding the supposed virtues of synthetic clothing, and then proceeds to make a clean sweep of any remaining natural clothing from out of the mountaineer’s wardrobe. “Cotton...has virtually no business being worn in most mountain climates. Wool is far less absorbent than cotton.” This latter blatant fallacy—which I’ve already exposed above--ironically makes wool less dangerous and more acceptable than cotton; and by this perverse reasoning a small place seems to be permitted to wool: “But even the best wool is too absorbent (and too scratchy) to wear against the skin.” Thus wool pants and shirts are rejected. And yet again, the basic slogan regarding synthetics is reiterated like the mantra it has become, however false, namely that “Polyester and polypropylene fabrics are good at wicking perspiration, so they are well suited for use next to the skin.” (p.20)

To complete this review of clothing recommendations in the various editions of the standard textbook on *MOUNTAINEERING*, it only remains to note that the 7th and latest edition (2007) closes the door firmly on natural

clothing, with its authoritative assertion, already cited above in my main essay, but reiterated here for completeness: "Synthetic fibers have largely replaced natural fibers in mountaineer's clothing." (p. 20)

What are we to make of this complete reversal of clothing recommendations between the 3rd edition in 1974, when wool was still traditional and highly recommended throughout the mountaineer's wardrobe, and the 6th edition in 1997, less than a quarter century later, when wool and all other "natural fibers" were declared "obsolete"? How did this rapid clothing revolution come about? How and why this transvaluation of values, whereby natural clothing is declared the enemy of the mountaineer? Based on what criteria from the Science of Clothing? Was any scientific testing of the new synthetic materials ever conducted by any mountaineering organization? What evidence was ever found that nonabsorbent synthetic materials are capable supposedly of "wicking away the moisture"? No such tests are indicated in the various editions of the textbook; and moreover all these alleged claims for synthetics belie ocular evidence and commonsense. One cannot even mop the floor with any of the synthetic fabrics, or dry one's hands with them, since they are all nonabsorbent.

Thus it would appear that this revolution in mountaineering clothing, in which natural fibers were rejected in favor of petroleum-based synthetics, was achieved by the synthetic clothing outfitters, who radically altered the mountaineering clothing market in order to foster their commercial interests. Thus the new ideology in the textbook recommendations merely reflects the changed market in mountaineering clothing. In other words, the new synthetic clothing advertisements were falsely descriptive of the new materials that had recently come onto the market and had been uncritically adopted by mountaineers, without any scientific scrutiny of the new advertising claims. Yet in the textbook these new recommendations are presented as prescriptive, i.e., as what *ought* to be worn.

So within just a few years the international mountaineering community has allowed itself to be converted and re-dressed in synthetic garments, without ever raising any critical questions: How has wool been displaced from mountaineering clothing and supplanted by petroleum-based nonabsorbent synthetics? How has wool suddenly become a bad word among mountaineers? Were professional mountaineers ever canvassed or consulted as to which type of clothing they found more comfortable, natural or synthetic fibers?

One has only to look into some of the better illustrated books on mountaineering, with color photographs, especially *EVEREST: MOUNTAIN WITHOUT MERCY*, by Broughton Coburn (National Geographic Society, 1997)

and compare the beautiful and colorful knitted wool snug-fitting hat with ear coverings and a string to tie it under the chin, worn by Ed Viesturs, who has subsequently climbed the world's 14 highest peaks, in contrast to the cheap polyester pile hat worn by Beck Weathers, who suffered frostbite so severe on Everest that both hands had to be amputated. (Incidentally, Beck Weathers was wearing a synthetic pile jacket that day he almost froze to death, and was left for dead.) My point is that the most successful of the professional mountaineers, even though they have made themselves into walking billboards displaying the advertisements of the synthetic clothing outfitters with whom they have lucrative contracts, nevertheless know how to avoid frostbite by not dressing themselves strictly according to the book: they do not eschew natural fibers completely. Indeed, as can be seen in the case of Ed Viesturs, he wears wool precisely where it is most crucial to wear natural fibers, namely on his extremities, his head and feet.

Another interesting example is the renowned Austrian mountaineer Reinhold Messner, who has summited the world's 14 highest peaks without using supplemental oxygen, some years before the American Viesturs accomplished a similar feat. In his book, *EVEREST: EXPEDITION TO THE ULTIMATE*, tr. By Audrey Salkeld (London, 1979), Messner and his teammates are shown in photos wearing tight-fitting thick black synthetic suits that look very similar to a diver's sponge rubber wetsuit, with a close-fitting zippered front, as his basic garment. One wonders how anyone could endure the heat of the sun's rays, reflected by the snowy mountain, which would be absorbed by any such close-fitting black garment? And indeed, Messner's diary on Everest for May 6, 1978, states: "The heat is unbearable. [Yet] The sun is hidden behind whirling clouds." (p.165)

Nevertheless, close-fitting black and other dark-colored synthetic garments continue to be worn by mountaineers. Why? The answer is simple: They have no choice if synthetics are to be worn at all. When natural fibers, especially wool, with its high insulation value, are rejected, how else can extra heat value be obtained from synthetic garments except by making them in very dark colors, and very close-fitting, precisely so that they will absorb maximally the heat of the sun? Only in this fashion can the synthetic clothing outfitters make it appear that theirs is warm clothing, when it is actually cold clothing to the touch, as all petroleum products are cold to the touch, and thus actually robs the body of precious heat.

Not only does Messner feel himself being cooked by the absorbed rays of the sun in his black synthetic suit--even with the sun behind clouds--but when he puts his down suit over the synthetic black suit in order to go to high altitude, he feels just as uncomfortable in the opposite extreme. And thus he confesses: "I am chilled to the

marrow although I am wearing a complete down suit.” (p.123) On the day Reinhold Messner reaches the summit of Mt. Everest, May 8, 1978, he has found a way of solving the problem of having nonabsorbent cold synthetic fabric directly on his skin: “I am wearing silk underwear, then a [synthetic] fleecy pile undersuit, and over that a complete down suit.” (p.175) Surely Messner did not find that solution--wearing silk underwear--in any American textbook on mountaineering.

It is time now to address the root of the confusion that has enabled the false advertising to be accepted as true, that synthetic garments “wick away the moisture”. I have addressed this issue with a number of athletes and others who claim that they do feel their skin dry when wearing synthetics. When I've asked them: “But is the dryness you feel coming from the synthetics, which are nonabsorbent, or from the dryness of the air?” they are always stumped. When I ask them, “Could you mop the floor with that synthetic garment; will it pick up water?” then they usually hang their head in embarrassment that they have uncritically accepted false advertisement as true. The deception to which they have succumbed is due to a common fallacy known in logic as post hoc, ergo propter hoc: B follows A, therefore B was caused by A. But it is not necessarily so.

Feeling that one's skin is dry after wearing synthetics does not mean that the nonabsorbent garment caused the dryness. Rather, it is the dryness of the air that caused the dryness of the skin. In other words, the physical process at work is evaporation, not wicking. And this fact is further borne out by the question: How does your skin feel in humid weather when wearing synthetics? The answer invariably is: damp and uncomfortable.

The importance of this physical distinction between evaporation and wicking should not be difficult to see. As long as the atmosphere remains sunny and dry on the mountains—and the higher the mountain the drier the cold air—climbers wearing synthetic garments next to their skin can function adequately because of the physiological process of intense evaporation of moisture off their skin. Under favorable atmospheric conditions of dry air and sunshine, the mountaineer will be able thus to discharge sufficient moisture from his intestines to keep his digestive system functioning satisfactorily by evaporation alone, without any need of wearing absorbent natural fibers capable of wicking away body moisture. But that is merely a fortuitous situation; the quality of the air may change at anytime and catch the mountaineer totally unprepared for altered climatic conditions that no longer permit evaporation from the skin.

What happens to the mountaineer's physiological functioning if the atmosphere suddenly changes from sunny and dry air to cloudy moist air? He now no longer has evaporation working for him. And thus being unable to excrete body moisture off his skin, especially from within his intestines, his body temperature will plummet and his digestion will come to a halt. His goose has been cooked, to put it mildly, if he is not wearing sufficient natural fibers that can insulate his body heat and facilitate the excretion of moisture into an absorbent garment. These are the stark physiological options, the facts about how our body functions, namely that we must always be discharging sufficient body moisture to keep our digestion functioning, and keep moisture from rising upwards in our body and become deposited in lungs, sinuses, or in the skull in the case of cerebral edema.

There is another and equally unhealthy and dangerous way of dressing that some mountaineers have adopted in this new era of synthetics: the shiny plasticized and virtually impermeable Vapor Barrier garments, which do not permit the evaporation of perspiration from the body. Beck Weathers, in his autobiographical account, *LEFT FOR DEAD* (2000), about how he survived the Mt. Everest disaster of May 10, 1996, tells of an earlier expedition to Mt. McKinley in May 1989, during which he experimented with this hermetically sealed clothing that does not allow the body to breathe. The manufacturers of this vapor barrier clothing claim, bizarrely, that this disability to breathe is its very virtue.

In his book (pp. 219-222), Beck Weathers gives a list of 77 items of gear that he took with him on his visit to Antarctica in January 1993, to climb the 16,860-foot Vinson Massif. Not one of his clothing items is indicated as made of natural fibers, either cotton or wool. He lists four pairs of polypropylene socks, two heavy and two lightweight; and four pair of polypropylene underwear, again two light and two expedition-weight. Dr. Weathers, in other words, covered his entire skin surface with petroleum garments, from head to toe, including polypropylene gloves for his hands, and polyester pile hat for his head. Is it any wonder he got frostbitten on his fingers on that expedition?

The miracle is his frostbitten finger-tips was the worst harm he had suffered in several years of high-altitude mountaineering dressed entirely in synthetic materials—until he attempted to ascend Mt. Everest three years later, and came to a sudden freezing stop only a short distance after departing the South Col in his aborted summit bid, which cost him the amputation of both hands due to frostbite. My conclusion is that mountaineers are every bit as captive to prevalent fashions of dress—however benighted and harmful they may be--as are Hollywood celebrities

captives of Madison Avenue. Their unquestioning religious faith in the “progress” of technologized clothing and gear is total.

Writes Beck Weathers: “Under very cold conditions, mountaineers not uncommonly pull on so-called vapor barrier socks—basically fancy trash-can liners—to keep their feet warm. Well, I had found an entire vapor barrier suit, which I had saved for the summit. When it was clear we were headed down, ... I put on the suit—which made me resemble nothing so much as a human in a handy [plastic trash] bag. But it certainly did keep me warm. As we descended..., I began to tire rapidly. It was all I could do to stand up....I was losing it... I did fall over... This was a thoroughly shameful episode. Everyone but me was pulling his load... I was mortified, and fell two or three more times before we got down to Med Camp.”

There at the camp, Beck Weathers was taken to the medical tent operated by Dr. Peter Hacket, a renowned high-altitude physiologist. “Inside, I unzipped my suit to discover I was completely drenched in sweat, chin to toes. I’d created a portable steam cabinet, cooking myself like a Chinese dumpling. ‘Why in the world are you wearing that thing?’ asked Hacket, who measured my resting pulse at 160. A couple glasses of tea revived me somewhat, followed by some soup and a lot more tea, more than two liters of it. The strangest part of the experience was that though I was obviously dehydrated, I hadn’t once been thirsty, just weakened. I don’t understand the physiology of it....I didn’t feel good. When I pulled off my boots, I discovered they were sloshing in sweat. I was like those fishermen in the cartoons who pour fish out of their boots. As I got into my [sleeping] bag, I smelled myself for the first time, an overpowering odor of ammonia. I’d been burning muscle like crazy.” (p.179-80)

The physiological situation apparently was that Weathers had lost so much salt from his profuse sweating that he could feel no thirst until he first restored his salt balance. That could be achieved any number of ways—e.g., salty food, crackers, salt tablets--or the soup he took with salt in it. The lesson of the dreadful effects on his health, his energy, and his inability to descend the mountain unassisted, caused by wearing ill-conceived vapor barrier clothing, was certainly learned by Beck Weathers even if he did not figure out exactly how it worked physiologically. Yet this particular type of synthetic clothing known as “vapor barrier” is, appallingly, recommended in the 5th edition (1992) of the standard textbook, *MOUNTAINEERING; THE FREEDOM OF THE HILLS*, in the section on “Socks”: “Vapor-barrier liners keep moisture next to your foot and prevent perspiration from wetting your thick [outer] socks. They also keep your feet warmer by inhibiting the evaporation of sweat.” (p.20) Then, finally, comes the belated

warning about the danger of “trench foot—a serious problem”; yet nothing is said about a multitude of other health problems that can arise from being in wet feet, the more serious the longer one remains mired in one’s own sweat.

On this problem, see a very interesting photo on page 221 in *LAST CLIMB*, by David Breashears and Audrey Salkeld (National Geographic, Washington, D.C., 1999). George Mallory II in 1995 is standing on the summit of Mt. Everest, perfectly relaxed and calm in his blue down suit. Beside him is an unnamed Sherpa in a shiny plasticized orange down suit, who is grimacing painfully, obviously in much discomfort. Whence his agonized expression but from his being saturated in his own sweat due to wearing the impermeable vapor barrier suit that does not allow the body to breath?

Clearly, there are some mortally serious health problems being caused to mountaineers from the various fashions of synthetic clothing. And as Beck Weathers’ encounter with the renowned high-altitude medical physiologist, Dr. Peter Hackett, attests, there is some medical awareness of the dangers to health of the impermeable (intranspirable) plasticized garments that do not permit the body to breath. Yet, have the medical experts issued any warnings in the mountaineering journals about these problems? Can the professional mountaineers who are reaping lucrative contracts with the synthetic clothing outfitters be expected to divulge any serious problems experienced by wearing these petroleum-based garments? Is not a discussion of these life-and-death matters of safe clothing long overdue in mountaineering and other journals, especially medical journals?

The 6th edition (1997) of the standard textbook on *MOUNTAINEERING: THE FREEDOM OF THE HILLS* has on the back of the title-page “A Note About Safety”, in which the publisher attempts to disclaim responsibility for the accuracy and truthfulness and safety of the recommendations made regarding “equipment and techniques in this book”. But if the textbook’s clothing recommendations can be shown to be the mere endorsement of false advertisements by the synthetic clothing outfitters—namely the claim that the synthetics “wick away the moisture” and provide “insulation”—then I am confident that the publisher could be held liable for imperiling the health and safety of mountaineers. Very easily performed experiments with small animals will show unequivocally that synthetic fabrics can not sustain the life of small animals offered as bedding in plastic cages. Nor will synthetic fabrics tied on a dog or cat that has been shorn of its fur sustain that animal’s life. But a wool sweater put on a shorn animal will sustain its life until its fur grows back. The textbook’s bold claim that natural fibers have become “obsolete” in mountaineering can be thus shown scientifically to be an enormous blunder that has no scientific validity and has needlessly put countless lives at risk.

A brief review of the traditional clothing worn by the expeditions to Mt. Everest since 1953, when the summit was first achieved by Hillary and Tenzing, may be useful here. In 1953, woolen underwear was still standard. The only synthetic used in that expedition was in the closely-woven outer windbreaker garment that had cotton threads running one way and nylon threads running the other way. Wool was the traditional clothing of choice, as the well-known photos of that expedition testify, e.g., Hillary's blue plaid shirt that he wore to the summit appears to be a high quality Pendleton, and likewise the wool shirt worn by expedition leader John Hunt.

Ten years later, in the American expedition that put the first Americans on Everest in 1963, the highest quality natural clothing can be seen in the many photos of the team in *AMERICANS ON EVEREST*, by James Ramsey Ullman et al. (New York, 1964). Chapter 6, "Clothing and Equipment", by James W. Whittaker, states: "For underclothing we had two-layer cotton-wool underwear, fishnet cotton underwear, and finally down underwear. Wool pants came in both knicker and ski pants styles, with large cargo pockets. Our heavy wool jacket shirts were worn over cotton turtle-neck T-shirts... Along with the usual heavy wool mitts and shells... Over these were worn down mittens with leather-faced palm." (p. 331)

The photo of the team being received at the White House by President John F. Kennedy upon their return from their successful conquest of the world's highest peak shows them in vigorous strong health and the radiant complexion accruing from natural clothing. The early 1960's represented the tail end of the millennia-long era of natural clothing. At that very moment, an epoch-making shift from natural clothing to synthetic clothing was gathering momentum. The official beginning date of this clothing revolution can be determined precisely by researching when the new U. S. Military Specifications for synthetic clothing were issued to the military clothing contractors in the early 1960's.

Having enjoyed the superb comfort of the high-quality natural clothing issued to me by the U.S. Air Force in 1955, I could only commiserate with the Vietnam veterans for the vastly inferior quality synthetic-blend clothing they were issued. And of course, along with inferior clothing inevitably comes inferior health. Thus the American veterans of every war since the advent of synthetic military clothing in the 1960's have suffered grave medical problems that have baffled the military medical profession unable to diagnose and solve them.

Fast forward another decade and by the mid-1970's the clothing being worn by mountaineers increasingly reflected the clothing revolution that had recently permeated modern society. In my judgment, and in the vigor shown in the photos of the professional mountaineers, it has been downhill all the way since the high-point in the mid-twentieth century, with only rare exceptions since then in the cases of extraordinarily strong mountaineers capable of climbing the world's highest peaks without the assistance of supplementary oxygen, such as Reinhold Messner, Ed Viesturs, and a few others. Moreover--and this is the crucial point to notice--these exceptional mountaineers were invariably physically gifted with unusual lung capacity, and also intellectually gifted to go their own way in improvising upon the current clothing fashions with their independent superior judgment in incorporating natural fibers--especially wool and silk--in the most crucial places, their extremities, contrary to the recommendations of the standard textbook.

One unmistakable symptom of superior health is a heavy shock of hair that is being well-nourished by a good diet that is being well-metabolized with the aid of natural clothing, so that the protein and fat and minerals in the diet are being assimilated into the body as shown by the condition of the well-nourished strong hair. Compare the strong hair of Reinhold Messner and Ed Viesturs with the dry, brittle, straw-like hair of Scott Fischer. Fischer could have had a very strong head of hair in his long pony-tail had he been eating natural foods and wearing natural fibers. But he lacked the good judgment to do so. In fact, as the symptom of his acidic blood condition shows in his dry brittle hair, Fischer's health was already deteriorating markedly before his climb on Everest the day of the disaster.

In his posthumously published diaries, translated from the Russian as *ABOVE THE CLOUDS*, (New York, 2001), Anatoli Boukreev, one of Scott Fisher's hired guides—who himself died in an avalanche on Annapurna about a year and a half later on Christmas Day 1997--wrote that Fischer was having health problems already at the beginning of May: "Later, I learned that Scott had developed an illness in those days and began taking antibiotics. Also I found out that he used a medication called Diamox to improve his acclimatization. While this is a commonly accepted practice among American climbers, I do not climb and take medicine. I think it is better to know exactly how your body is responding; even a slight illness can be exacerbated quickly by high altitude with disastrous results." (p.147)

There is further evidence that Scott Fischer's deteriorating health had become a matter of great concern to his own team doctor, Ingrid Hunt, before the summit attempt was made. Dr. Hunt had resorted to a fallback drug in anticipation of an emergency for her client. On the afternoon of May 11, 1996, as time was running out for Fischer, still stranded high on the South Summit, frantic radio communications from Base Camp to Fischer's would-be rescuer, Anatoli Boukreev on the South Col, were underway. "At Base Camp, Paula [Viesturs] was trying to console Ingrid Hunt, Fischer's team doctor, who was sobbing hysterically, pleading [on the radio] for Boukreev to try to reach Fischer. Haltingly, Hunt described for Boukreev where a syringe of Dexamethasone, a steroid that is beneficial for cerebral edema and believed to temporarily increase strength, had been stitched into Fischer's jacket. He should jab Scott in the leg with it." [2]. It appears then that the health of the American expedition leader had become as drug-dependent as the health of Americans in general who subscribe to drug-dependent medicine rather than adopt a natural lifestyle based on natural food and natural clothing. Incidentally, Fischer's deteriorating health has been commented on by other writers as well.

A physiological diagnosis of the collapse of health of two professional expedition leaders—Scott Fischer and Rob Hall—on the summit of Everest must take into account the following major factors as contributing factors impinging upon their physiological functioning at the time their crippling illnesses became apparent to themselves:

1. Any sudden change in the weather: Even if the expedition leaders had got everything else rightly timed for their ascent, "we would still be dependent upon the weather. Against this, we had no insurance. No one of us could protect against the dangers of high winds or other dramatic shifts in the weather." [3]. As is well-known, a storm did descend on Everest, gathering momentum after 2 p.m., when Ed Viesturs could no longer see the climbers through his telescope due to lowering clouds, when hitherto the sky had been clear and sunny. Physiologically, the importance of the change of the weather from sunshine and dry air to cloudy and moist air, it must be reiterated, is that evaporation of moisture from the skin ceases, and in the absence of natural clothing, both heat insulation and transpiration (wicking into natural fibers) of body moisture is no longer possible. In this situation, body temperature will plummet; and with body moisture no longer being excreted through the skin, the digestion will cease and body moisture will rise upwards to be deposited in the upper cavities of the body and/or into the skull, producing cerebral edema, when body moisture can no longer be excreted downwards and outwards from the skin, due to being dressed completely in nonabsorbent synthetic clothing.

This is my physiological explanation of the Mt. Everest disaster of May 10, 1996; and it applies not only to the two expedition leaders who found themselves crippled with illness on the summit, and were unable to be rescued due to the storm. This explanation applies also to the deaths of Doug Hanson and Andy Harris, who both disappeared high on the mountain, physically incapable of making their descent, and presumably falling off the mountain, their bodies never found. And it applies to Yasuko Namba, who froze to death on the South Col. By the end of May there were 15 deaths on Everest. They were all caught suddenly, late in the day, in freezing cold and damp air against which their synthetic clothing could not protect them.

2. The quality of the clothing of the climbers: On this point I have already written quite extensively that their mainly synthetic clothing would have been an enormous handicap if the weather suddenly changed, or even if the weather change was imperceptibly gradual, with clouds rising up or descending upon the mountain, following a change in the barometric pressure. With the obscuring, and then the setting of the sun, with climbers still at high altitude due to a bottleneck on the Hillary Step, both on the way up and on the way down, the process of the evaporation of moisture from off their skin would diminish markedly and then cease altogether by nightfall. At this point what would be crucial would be the amount of transpiration (excretion) of moisture possible through their pores into absorbent natural fibers capable of insulating body heat, by the wearing of a minimum of natural clothing: cotton, silk, or wool. Although this point cannot be determined with factual accuracy in the case of each climber who froze to death on the mountain, the current mountaineering clothing fashion stressed the supposed superiority of synthetics and seems to have been adhered to by all, with the overwhelming predominance of synthetic nonabsorbent clothing being worn by all.

3. The diet consumed by the climbers in the previous 24 hours: The easy digestibility and energy available from high-carbohydrate foods would be crucial. Of the food at Base Camp, noted Boukreev (*THE CLIMB*, p. 59): “The meals were often rich, things like pizzas and stews. I much preferred the Sherpas’ food [tsampa, i.e., roasted barley flour made into dumplings]—maybe more boring, but easier to digest and more appropriate I thought for high altitude.” Beck Weathers states that Base Camp was “a big market for provisioners. As a result, we enjoyed eggs every morning.” (p.14) It is stated in *THE CLIMB*, by Anatoli Boukreev and G. Weston DeWalt, 1997, p.122, about Sandy Pittman on May 9, 1996, the day before the day of disaster: “After a macaroni and cheese dinner with Fischer and Beidleman, she phoned in her dispatch to NBC.”

The new biography of Scott Fischer just out by his close friend Robert Birkby, *MOUNTAIN MADNESS: SCOTT FISCHER, MOUNT EVEREST & A LIFE LIVED ON HIGH* (Citadel Press, N.Y., 2008), discloses how battered Fischer's body was by 1995, the year before the Everest disaster, after more than two decades of rough mountaineering treatment and high living, with many falls in his mountaineering career, and many surgeries to keep his body going. "He would sometimes awaken in the night as if from the effects of malaria." Moreover, Fischer suffered chronically from "A nagging intestinal ailment [that]...persistently evaded cure" (pp.278-79).

Most significant for the physiological diagnosis of Fischer's condition is what Birkby states about Scott Fischer's dietary habits: "The camp staff served big meals...and Tillamook cheese Scott had shipped in from Seattle" (p.299).

Tillamook is a hard cheddar cheese that is listed in "A Typical Day's Menu" for the Approach March of the 1963 American Expedition to Everest, thirty-three years earlier. Very interestingly, the official history of that expedition, *AMERICANS ON EVEREST* (1964), states that the hard cheese was restricted to use on the approach march only, for this reason: "Some men become intolerant of fatty foods" at high altitudes (pp.325-27). In other words, earlier expeditions had realized there are dietary limitations as to what food items a climber can effectively metabolize at high altitude. And consider: all those earlier expeditions utilized wool extensively in their clothing; which put them at much greater advantage than Scott Fisher--who was devoid of absorbent natural clothing on his skin--for digesting fatty foods.

It should be common knowledge that the digestion of fat requires much more oxygen than the digestion of protein and carbohydrate. And since oxygen is scarce at high altitude where supplementary oxygen is required, the oxygen required for the metabolism of fat will deprive the climber's muscles of much needed oxygen for energy. This is why the Sherpas enjoy superior stamina at high altitude: because their high-carbohydrate diet of wholegrain barley flour is very easily digestible, requiring only minimal oxygen to digest.

Western climbers, however, fail to learn from the Sherpas' wholegrain diet, and continue to rely on a Western high-protein diet for their energy. Yet high-protein is second only to high-fat in its demand on the climber's oxygen. For example, the "Summit Assault" rations for the 1963 American Expedition included "1 12-oz. can mixed nuts" (p.329). Digesting the saturated fat in nuts on the summit of Everest would not be easy unless the climber has plenty of oxygen at his disposal.

My conclusion, from Scott Fischer's own complaints about his chronic fatigue and his stomach needing medicine, is that he was eating fatally beyond his metabolic capacity. Our metabolic capacity under any specific environmental conditions is determined principally by the quality of our clothing, combined with our diet and the quality of the surrounding air, e.g., the amount of sunshine we are exposed to. It is also limited by a person's level of activity or exercise; but this obviously would not be a decisive factor for an active mountaineer. My thesis is that Scott Fischer, attired as he was, completely in synthetic garments, devoid of natural absorbent fibers--either cotton, silk, linen, or wool--would have been physically disabled from metabolizing effectively the hard cheese in his diet, and also incapable of excreting the dietary food residues of the fatty cheese through his pores into absorbent natural clothing that he lacked. In other words, the combined forces of nature that were impinging on him would produce a fatal outcome when the atmospheric conditions—in addition to his already unfavorable factors of fatty diet and synthetic clothing—turned against him.

This hypothesis can readily be tested by experimental research on the metabolic capacity of rats or mice, for example. Give the caged rodents a diet of hard cheese for ten days or longer while supplying them with woolen cloth or straw or wood shavings for their bedding. The animals will have no difficulty metabolizing the cheese while they are able to transpire (breath through their skin) into absorbent natural materials. Their health will remain stable. Then withdraw the natural absorbent material and give the animals polyester cloth or any other synthetic fabric--such as the synthetic material that Scott Fischer wore in his long underwear. Very soon it will be noticed that the health of the animals goes into rapid decline when they are deprived of physical contact with natural absorbent material. No animal can maintain its health while being thus deprived of absorbent bedding material. It can be shown that not even a flea can survive if kept in an environment of nonabsorbent synthetic material of any kind.

Thus the contention of the standard textbook, *MOUNTAINEERING; THE FREEDOM OF THE HILLS*, 6th ed., 1997, that "Natural fibers...are becoming obsolete" (p.19) is an enormous howler, a stupendous blunder, that seeks to overturn thousands of years of civilization based on natural fibers. Indeed, it may be said without exaggeration, that this call to reject natural fibers is a call to suicidal barbarism, such as has never been heard before. (But even all barbarian peoples hitherto have dressed in natural fibers.) The publisher of this harmful benighted advice, based on no scientific evidence and echoing merely the false claims of advertisers, can be held liable for the untold harm this recommendation would inevitably cause--in needless deaths and injuries and frostbites suffered by mountaineers who have accepted this textbook advice as scientifically valid.

A crucial physiological question here is: Could the completely synthetic clothes of the Mt. Everest casualties be capable of producing an efficient digestion of the heavy fats and protein in eggs and cheese and meat? Or would unmetabolized food residues accumulate in the climbers' organs and cause the tiredness that Scott Fisher complained of on the summit, indicating an overburdened heart? These questions can easily be answered by simple animal experiments such as I have already indicated. Physiologically, the interaction of these three prime factors—climate, clothing, and diet—contains potential problems that are beyond the usual sensitivity and awareness of both the medical profession and the general public, including mountaineers. Yet these three prime factors were central to the practice of holistic Hippocratic medicine for well over 2,000 years, and also central in Oriental Macrobiotic holistic medicine. Also important is the quantity and quality of salt taken by each climber, since we burn our food by means of salt, which also governs muscle tone, appetite for food and drink, and the overall metabolic rate that produces body heat. The use of proper fermented foods to aid digestion would also be very significant. Alcohol, well-known to have been consumed at Base Camp, along with Coca Cola and wine and much gourmet-style eating, would not be a helpful fermented food high on the mountain.

Anatoli Boukreev concluded his letter of July 31, 1996, to Mark Bryant, Editor of *OUTSIDE MAGAZINE*, with these words: "What we can do now is contribute to a clearer understanding of what happened that day on Everest in the hope that the lessons to be learned will reduce the risk for others who, like us, take on the challenge of the mountains."

Yet David Breashears predicted that within two or three years, the tragedy of May 10, 1996 would be forgotten. His assessment that people will continue to take the same risks, and will inevitably make the same mistakes, has been proven correct: On a single day in the spring of the following year (1997), five climbers—all on nonguided expeditions—died on the mountain: most of them were climbing late in the day, when the air turns from dry and sunny to damp and freezing cold—deadly atmospheric conditions for those attired completely in nonabsorbent synthetic garments.

Hitherto, the mountaineering literature, in discussing "the lessons to be learned" and the risks to be avoided, have not touched on the peril of wearing completely nonabsorbent synthetic clothing, with its negative insulation value, and no ability to accomplish the universally believed but falsely advertised claim of "wicks away the moisture". In my judgment—and any number of easily conducted scientific experiments with animals, such as I've mentioned

above, that can demonstrate this conclusion—the uncritical acceptance of advertisers' false slogans is what led to those deaths on May 10, 1996, and will continue to lead to many more deaths, until the international mountaineering community decides to undertake scientific tests of the advertised merits of wearing petroleum-based synthetic clothing. Meanwhile, in my judgment, the perpetrators of the false advertisements can be held liable for fatally misleading many mountaineers into needless disasters.

Also, in my judgment, the early expeditions to Everest in the 1920's and 30's were far more comfortably and warmly dressed, in their woolen tweeds, their silk and cotton underwear, their leather boots and heavy woolen stockings, than are modern mountaineers in their synthetic clothing. Most modern mountaineers, sad to say, have never known the fabulous comfort of luxuriating in wool, especially high quality woolen tweeds, such as the early mountaineers routinely wore. The only advantage that the moderns have acquired is their down suits for high altitude. But goose down is a natural fiber that is eminently no invention of modern technology. Moreover, the duvet quilted jacket of eider down was known already in the 1920's but was not in widespread use, doubtless because wool was felt to be adequate for all practical purposes. I realize full well that my judgments about the superior quality of the traditional natural woolen clothing and all-leather boots worn in former times, compared to the synthetic clothing and gear used today, puts me 100 per cent at odds, opposed to the dangerously unhealthy mountaineering fashions of the 21st century, which merely reflect the dominant synthetic lifestyle of modern society.

As long as modern mountaineers believe uncritically in the alleged superiority of man-made fibers over natural fibers, this myth will inevitably take an increasing toll of lives. While expeditions to Everest and other high mountains were fortuitously ascended and descended in favorable weather conditions of sunshine and clear dry air, without any untoward delay--such as a bottleneck of climbers going up or down the mountain--their synthetic clothing appeared to be adequate. But here's the rub: their completely synthetic clothing had never really been tested in adverse weather conditions. When the time eventually came—as it was bound to come—for that unnatural clothing to be put to the test in damp air weather conditions, as should have been expected, it failed the test. Now what remains is for the international mountaineering community to realize that the test has been made, with the disastrous results eloquently calling for a reappraisal of the falsely advertised merits of dressing in petroleum garments.

If not even a mouse can survive if given only synthetic cloth for its bedding in its cage, while trying to digest fatty cheese, what is the clear lesson for the human animal? And if mountaineers—and the general public—knew that the advertisers' claims are false that synthetic garments “wick away the moisture”—and can be fatally false for mountaineers—would they continue to imperil their health by wearing them?

In conclusion, my extensive research in the mountaineering literature on Everest has found no evidence of any expedition or single individual who has successfully summited the mountain attired entirely in synthetic clothing, with no reliance on natural fibers, wool, silk, and cotton, in various combinations. On the contrary, the histories of the many Everest expeditions that I've researched all evince a reliance on natural fibers, especially wool, cotton, and silk.

Those individuals who have attempted a synthetic summit either did not attain it, or if they reached it, did not return alive. Thus all the empirical evidence corroborates the science of physiology in the conclusion that an entirely synthetic summit cannot be achieved and is folly to even consider. The standard mountaineering textbook's claim that natural fibers have become “obsolete” is thus irresponsible advice, for which the publisher can be held liable, because that advice is nothing less than an invitation to suicide.

I began this essay by citing Ed Viesturs account of the May 10, 1996 disaster in *NO SHORTCUTS TO THE TOP* (2006), stating that I had found significant clues in his book, which I've drawn upon, as to the physiological factors involved in the disaster. Not least among the clues that I have already cited from Viesturs is his description of his own mountaineering clothing, with his reliance on two pairs of Smartwool socks and his distinctive wool knit hat with close-fitting ear coverings. Not for a million dollars could this eminent climber be induced to forgo his wool, wear all synthetics, and risk his life by following the standard textbook advice on how to attire himself for mountaineering. Just as I've enjoyed the superior energy of continuing to hike in wool while my contemporaries are overwhelmingly attired in the fashionable synthetic clothing that leaves them pooping out just when I'm getting my second wind, the most eminent high-altitude climber of our time continues to rely on wool.

References:

Most of the bibliographical references are cited in the text, with the exception of the three listed below.

There is no extant modern medical literature on this subject to be cited, as far as I've been able to determine.

Thus this essay breaks entirely new ground even among practitioners of so-called “Holistic medicine”.

1. Coburn, Broughton, *EVEREST: MOUNTAIN WITHOUT MERCY*, National Geographic Society, 1997, p.170.
2. Ibid. p.176.
3. Boukreev, Anatoli, *THE CLIMB*, 1997, p.174.

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