

Anatomy of Resistance to the Emergent Paradigm: Orthomolecular Medicine

Helen G. First, Ph.D.¹

The Problem: Cultural indicators of a growing concern with nutrition and resistance to that concern.

Public views of doctors include, self-evidently, the way doctors themselves view their colleagues, specifically their colleagues who practice Orthomolecular medicine or Orthomolecular psychiatry. Resistance to the Orthomolecular concept, that form of health care whose core principle is the maintenance of health by means of "providing the cells with the right molecules in optimum amounts" (Pauling, 1968) persists even though cultural indicators confirm that the climate of opinion is changing. Everywhere there is an exploding new interest in diet. The Director of The National Cancer Institute agrees that "On the basis of currently available evidence the adoption of nutritional guidelines is warranted" (N.Y. Times). The President and Director of The Sloan-Kettering Institute acknowledges the relationship of nutrition to immunity and cancer in a review of the subject (Good, 1979). A U.S.

Clinical Assoc. Prof. of Psychiatry and Human Behavior (Retired) Jefferson Medical College, Thomas Jefferson University

Presented at the Conference Public Views of Doctors and Lawyers, The Annenberg School of

Communications, University of Pennsylvania, October 18, 1979.

Senate Investigating Committee report is published on Diet Related To Killer Diseases (U.S. Govt., 1977). The New England Journal of Medicine maintains an ongoing concern with nutrition. The Sciences, Journal of The New York Academy of Sciences, sums up an article, "Food for Thought", with "Findings show that diet does indeed play a direct role in brain function."

In the light of this expanding awareness of the nutrition-brain/mind axis, the persistence of the medical establishment's resistance to the Orthomolecular concept calls for a comprehensive examination and explication, which is precisely what this paper aims to do. First, I will indicate the dynamics of resistance with examples from present and past history of medicine. Second, I will demonstrate how medical paradigms are evolved out of the repetitive struggle between tradition and innovation, with the tension between them being a measure of the resistance which only time can resolve. Third, I will show how the present resistance is informed by the specific etiology paradigm, now becoming obsolescent, and, finally, looking to the future, I shall suggest what the Orthomolecular paradigm has to offer for research and for true preventive medicine.

The term Orthomolecular is defined as "designating the normal constituents of the

body including substances formed endogenously and those acquired through diet." The "normal constituents of the body" used therapeutically include vitamins, metals and trace minerals, amino acids, and enzymes. In addition, every effort is made to rid the body of toxins, allergens, contaminants from within or without and to prevent recontamination.

In its resistance to this commonsense approach to health care the medical establishment has shown every reaction from mild disinterest to the vindictive and irresponsible deception of the authors of the APA Task Force on Vitamin Therapy in Psychiatry (Megavitamin, 1973). To comprehend such deportment on the part of people who as scientists are expected to act in a manner that is honorable, unbiased, and above all intelligent, it is useful to review what communication research indicates are some of the problems involved in introducing new ideas and changing public opinion (Fishbein, 1967; McCuire, 1967; Pool, 1973; Rhine, 1967). Then we can begin to identify by their performances how and why objectors to the Orthomolecular concept act out their predictable scripts

Dynamics of influence according to communication theory and resistances to the process.

The first requisite for an exchange of opinion according to communication theory is an audience, but many of the channels by which a message can be conveyed are studiously and cunningly blocked by the opposition. One out of countless examples of this maneuver is the attempt to delimit the audience for the **Journal of Orthomolecular Psychiatry** by having it omitted from the **Index Medicus**. This restraint on the dissemination of scientific information was engineered by a government bureaucrat who also served on the APA Task Force. The Journal flourishes, nonetheless, with the creditable record of having a hundred library subscribers, and a reader circulation that compares favorably with the top psychiatric journals. Also, it is included in **Current Content**, another service index for medical literature. The transparent

reason given for excluding the Journal was that the Index, which abstracts about 2300 (note bene) journals, was not geared to include one more.

Another determining factor in effective influence is the attractiveness of the source of the message but efforts to discredit the source have ranged from mindless devaluations to outright libel. Even the charismatic Linus Pauling is not immune to such efforts to denigrate the source. Physicians and others who have never been exposed in person to Dr. Pauling's incisive thinking and lucid extempore dialectics have been known, with an air of conspiratorial mockery, to make snide inferences about his mental status on the basis of his age, thus denigrating Orthomolecular medicine by dishonoring the originator of the term itself.

Besides an open channel and the acknowledged expertise of the communicator, other factors which determine the effectiveness of a communication involve the receiver of the message. For the receiver to accept the message he must feel his self-esteem to be enhanced by it. But a new idea like Orthomolecular nutritional medicine is a criticism and an embarrassment to the average physician who had no training in nutrition in medical school. And for the psychiatrist the idea is especially difficult because of his commitment to the psychogenic etiology of mental disorders. Also, the psychotherapy he offers provides him with compelling, interesting work for which he has in-depth training and in which he has a great investment. Then, too, doctors whose income would be threatened if patients turned elsewhere for a different treatment modality are not likely to feel their self-esteem enhanced by the Orthomolecular approach. The receiver to accept a message must also find that it provides some significant compensation, like money, a tangible but apparently insufficiently compelling reward. As one internist expressed his disinterest in Orthomolecular practice: "I don't have time to learn anything new or out of my field and besides I know enough to make a living. Period."

Acceptance of the message is influenced also by the discrepancy between the message and what the receiver believes. The

policy of Orthomolecular healing, to support the body's constructive mechanisms, runs counter to current medical practice with its emphasis on suppressing the body's defenses, that is, the symptoms which too often are labeled as the disease. Discomfort in the presence of such discrepancy leads to avoidance by means of dismissing the disturbing influence with put downs like "anecdotal," "unscientific," "no double-blind studies." Avoidance can also be partial, in the form of selective perception. This selective perception was especially apparent in the APA Task Force report as documented by Hoffer and Osmond (1976) who pointed out that the committee reviewed only niacin-B3 studies but not those studies which reflected the full range of treatment modalities. Also in their review of the studies which it did cover, the Task Force selected findings so as to be able to claim results that were misleading and false. While asserting that they had "carefully examined the literature produced by megavitamin proponents," they selectively avoided reviewing the major research and literature, particularly the significant textbook, **Orthomolecular Psychiatry** (Hawkins and Pauling, 1973).

The final hurdle to open communication to be noted here, is what is called immunization. If one holds a critical or disrespectful view of a concept on the basis of little knowledge, he is less likely to be persuaded favorably even when the knowledge base is broadened; or if one makes a public statement or commitment against a viewpoint, he is less likely to be converted to the viewpoint he publicly disavowed. M.A. Lipton, Chairman of The Task Force Report Committee, who, inter alia, by his selection of committee members violated all the rules of fair inquiry set forth by the National Academy of Sciences in regard to the avoidance of bias in the formation of committees, had, long before such time as the committee was formed, presented a paper in Los Angeles, California, in which he opposed Orthomolecular psychiatry unambiguously, an act which made him immune to opinion change. An editor of a collection of papers on child abuse justified his rejection of a paper dealing with the Orthomolecular approach to

this problem by protesting: "How could I explain its inclusion to my colleagues when I have made public statements (as a government agent) against Orthomolecular psychiatry?" The blinders of immunization allow the wearer to employ any ruse to maintain tunnel vision. A typical ruse employed by avoidant editors is to hide behind the convention of peer review done by unnamed readers whose self-immunizing bias goes unchallenged, a practice readily recognized for the Kafka-esque pretence that it is (Chalmers, 1977; Cole, 1977).

There is yet one other form of immunity to new ideas, immunity which stems from attachment or anchoring to admired figures, teachers, department heads, colleagues. This is referred to in some quarters as the "Old Boy Syndrome." Fear of being thrown out of "the Club" rigidifies "right" thinking and vaccinates against deviance. "The Old Boy" syndrome is exemplified by the aforementioned child abuse editor who is based at Yale University, "A hotbed of antagonism to the Orthomolecular position" according to a Cesell Institute informant. Clubbiness can supercede scientific neutrality. Orthomolecular proponents have borne the brunt of countless ostrich maneuvers knowing full well they were blatant deceptions. An allergist with impeccable credentials approached local affiliates of national organizations for crippling diseases with an offer to research a problem that would benefit victims of these diseases, at no expense, discomfort or inconvenience to them. From one organization there was no response. The other informed him that the matter had been submitted to a Review Board. After a decent interval he inquired regarding the "Review Board's" decision and learned, inadvertently, that the "Review Board" was a figment of someone's imagination. None existed (Mandell). Linus Pauling (1979) can claim a record of having had six out of seven grant applications for studies on the use of ascorbic acid with cancer patients turned down. At least one grant application was on the basis that the vitamin increased interferon, a finding amply supported by research (Siegel, 1974; Siegel, 1975; Povolotsky, 1979) and that interferon augments the immune response, a widely accepted fact. So why not

use vitamin C to increase the cancer patients' interferon-mediated immune response? Too simple. The American Cancer Society is instead spending \$2,000,000 to purchase animal interferon from Finland with which it will be able to treat, at the cost of \$20,000 per patient, a handful of beneficiaries, when at the cost of about \$9.00 a kilo that readily available ascorbic acid could perform the same task for thousands. This maneuver has all the rationality and directness of Tom Sawyer's plan to release himself when tied to his bed not by lifting the corner bedpost but by sawing off its leg and swallowing the sawdust so as to conceal his mode of escape.

Resistances to medical innovation in the past.

Modern resistances to innovative ideas have their counterpart throughout medical history. Gregor Mendel's basic principles of heredity were ignored for thirty-five years. Theodore Schwann's finding that yeast was a living organism was forgotten for twenty years because others couldn't replicate his study. Semmelweis's preachment that puerperal fever could be prevented met with hostility and derision, and his reports were commented on in the medical journals only in the columns devoted to medical humor. Pasteur's early discoveries had to wait twenty years for acceptance and he had to resort to showmanship and sensational public demonstrations in order to beat down skepticism and mockery and to win acceptance for his theory of infection and the value of vaccines to combat them. Anesthesia as a means of lessening the pain of childbirth was opposed by the Scottish clergy on the grounds that pain was ordained by The Maker and only when it was argued that God himself placed Adam in a deep slumber for his phenomenal costectomy did anesthesia for women win acceptance. Florence Nightingale's efforts to establish nursing as a respectable profession for gentlewomen met with resistance. Joseph Goldberger, the U.S. Public Health Service physician, who in the line of duty risked his life with yellow fever, dengue and typhus, was harassed throughout his pursuit of the cause of

pellagra. A year after he established that pellagra was a nutritional deficiency disease, an achievement characterized as "one of the greatest..of modern science," a research commission, a prototype for the APA Task Force, reported that there was no connection of any kind between diet and pellagra, that it was an infectious disease traceable to the stable fly. Only through the inordinately courageous gesture by Goldberger and his assistants of injecting into their own bodies the excrement, mucus and scales of the diseased, with no loss of health, was the opposition silenced (Hospital Practice, 1978).

Of time and paradigms.

By arranging in perspective these historical examples of resistance to innovative ideas in medicine, one can observe a dimension in attitude change not emphasized by the communication theorists, namely the effect of time, a dimension which operates similarly in other fields, for instance, art. Impressionist paintings, ridiculed at the Paris Exhibition of 1874, today are the world's treasures. Why are ideas so vehemently rejected at the beginning, warmly embraced after twenty, thirty, forty years? The one word answer is prematurity (Stent, 1972). They are ideas that are ahead of their time. When the climate of opinion changes with the passage of time the new idea, no longer discrepant, becomes the very paradigm around which thought is organized anew. Paradigm metamorphosis is the intellectual task of every period (Kuhn, 1970).

In the forward march of civilization each age formulates a world view that enunciates its comprehension of what is reality, of what is man, his essential nature, how it can be expressed, enhanced, modified, healed. On the basis of this world view special interest groups, artists, philosophers, scientists, and physicians in particular create a paradigm, a model that serves them as a framework for their professional directive. As knowledge expands it calls for periodic reorganization of new data into manageable concepts. Each new paradigm is the contraction of that expanding knowledge.

This paradigm or model of reality has great economic value. It centers attention under-

standably toward consensually understood goals. As an example, again from art history, when Copernicus and Columbus altered man's view of his world from flat to round, artists developed a new awareness of depth perspective so that modeling and chiaroscuro were perfected, replacing flat, two-dimensional representation. Again, when the new dimension of the Freudian unconscious became common coin, Picasso was able to restore primitive flat painting- with the bizarre elaborations and distortions which stem from the unconscious.

Now in medicine the paradigms which determine the physicians' driving concern and give explicit direction to the research by which medical knowledge is advanced, these paradigms are informed by new explorations, new advances in biology, physics, chemistry, mathematics, war, industry, technology. It's been a highspeed highway from the stethoscope to computerized axial tomography, and a long one from Moses, the first agent for large scale public health and sanitation, through Hippocrates, the natural healer, to today's climate of magical expectations for specific cures for specific diseases. That rigid concept, that each disease has its specific cause and cure, which Dixon calls the theory of specific etiology, is the paradigm that has promoted the most exciting body of research and discovery that medical science has ever known, but which now stands in the way of a progressive transition toward new insights and a new paradigm (Dixon, 1978).

The specific etiology paradigm: Its growth and decline.

Many factors contributed to the growth of the specific etiology concept: the notion of contagion in the Bible with its rules for ritual cleansing after contact with the "unclean"; the idea of quarantine with the forty-day separation of those who had had contact with the bubonic plague; a preoccupation with nosology, i.e. the systematization of diseases according to their symptoms; the start of experimental medicine with the artificial creation of disease in animals to determine what goes wrong in pathological conditions. When Pasteur demonstrated unam-

biguously the connection between specific microorganisms and their specific effects and Koch established his rules for researching these effects, the truth of specific etiology was accepted beyond all reasonable doubt. Causative agents for at least 22 infections were discovered before 1900 and the dream of specific treatments for the indicted microbes grew. When the theory that bacilli secreted toxins was vindicated an antitoxin for diphtheria was developed, and mathematically exact guidelines for standardizing bacterial toxins and antitoxins were set forth by George Ehrlich who conceived of vaccines as magic bullets which could steer straight to their targets: tuberculosis, cholera, typhoid. Ehrlich also introduced chemotherapy through his research with chemical dyes to combat malaria and his success with an arsenical No. 606, Salvarsan, against syphilis. The arsenal of specific antidotes to specific diseases grew. The notion of specific etiology was supported further when, with the gradual discovery of vitamins, specific deficiency diseases could be linked with specific vitamin or mineral deficiencies as in rickets, tetany, night blindness, scurvy, polyneuritis, pellagra, dermatitis and megaloblastic anemia. Specific etiology remained a fruitful paradigm for research into genetic defects, hormone function, sickle cell anemia and the localization of function in the brain.

Now, however, the fruitfulness of the notion of specificity is withering as new data appear which cannot be subsumed under its aegis and therefore demand a new paradigm. Antibiotics, through reckless overuse, are no longer specific for mutant, resistant strains of microorganisms and this resistance is contagious among other microorganisms. It also appears that other factors besides the presence of microbes determine the outbreak of disease, i.e. the body's nutritional status, its ecological environment, genetic constitution, age, stress, fatigue, mental attitude, the virulence of the pathogen, the competence of the body's immune reaction, the notion of biological individuality, popularized by Roger Williams (1956) and now exquisitely vindicated by the new knowledge of human leucocyte antigens, HLA (Bylinsky, 1978). The now common

knowledge that all microorganisms are not destructive, like those in the gut which supply our B vitamins, weakens reliance on a "magic bullet" and favors a policy of peaceful coexistence with our microbe tenants.

What truly demolished the usefulness of specific etiology is that it does not account for the major diseases of our time, the degenerative diseases, heart disease, diabetes, arthritis, rheumatism, allergies, cancer, mental illness.

Research into these diseases as governed by the specific etiology paradigm merely leads up blind alleys and turns health care into a science-fiction parts-repair workshop operated by a corps of medical traffic cops, each watching his own corner, — brain, eyes, nose-ear-throat, heart, gut, ovary, rectum, bones, skin. No one bothers to notice the whole person. The "mind" cop, a sort of workshop receptionist, may exchange a few words as the patients come and go to be checked up by the parts policemen but he has no idea what parts are getting tested, measured, patched up.

A life history of a not so mythical patient, M.P., would run like this. M.P. feels pain in his big toe. Sees his Internist. Diagnosis: gout. Rx: medication, low purine diet. M.P. experiences abdominal distress. Sees his gastroenterologist. Diagnosis: colitis. Rx: sedatives, low residue diet. M.P. aware of joint pains, tries an orthopedist who refers him to a rheumatologist. Diagnosis: arthritis. By now he may be grasping at any notion offering relief and may begin to avoid what he considers acidic foods but succeeds only in lowering his ascorbic acid intake. Tired and worried about his health, he opts to see a cardiologist. Diagnosis: high blood pressure and dysrhythmia. Rx: ease up, forego strenuous exercise, plus low fat, low cholesterol and no eggs and dairy products. Also he's given a heart stimulant and a diuretic destined to deplete potassium and other mineral stores. He feels weaker and more listless and discouraged. Leaving the parts repair workshop, he stops to talk with the receptionist mind cop. Diagnosis: masked depression, psychosomatic somatizations (the official stamp of recognition that the mind can

destroy but not that body metabolism influences thinking and feeling.) Rx: more talk and a musical chairs game of happy pills. After some time on the psychotropic medication M.P. notes he has a tremor. He sees the neurologist cop. Here he really gets tagged. Diagnosis: Parkinsonism. Rx: L-dopa. Before the L-dopa can lose its effectiveness M.P. saves face for his neuro cop by having a stroke which now turns him into a baby-care-package to be delivered to the terminal care nursing home where his diet of sodawater and crackers will rapidly let him be done in, mercifully, by cancer.

The red thread running through this science-fiction nightmare is the nutritional ignorance of the parts patrolmen. M.P.'s gout could be attributed less to a high purine diet than to a lack of the enzymes and coenzymes, vitamins and minerals, needed for its metabolism. Of these pyri-doxine which is known to participate in more than 50 metabolic pathways is not only essential for protein metabolism but appears to be of great relevance for all of M.P.'s complaints. Lack of it is associated with kidney stones (Sebrell, 1964; Gershoff, 1959). The same vitamin has also been linked to cardiovascular disease by reason that a deficiency leads to high levels of unconverted homocysteine which directly aggravates plaque formation (McCully, 1975). In this light it becomes apparent that M.P. was iatrogenically programmed for the crescendo of his degenerative ailments.

This kindom-for-a-horse parable is not meant to imply any one-to-one relationship between a particular essential vitamin (as is thought to exist in specific vitamin deficiency diseases) and M.P.'s multifactorial diseases but rather to decry the blinders that constrict the establishment's vision to seeing only the symptoms as target rather than the whole person-patient whose body needs a nutritional support system more than further attack and destruction. This is the cardinal sin committed in the name of the specific etiology paradigm which has lost its utility.

Orthomolecular Nutrition, the Emergent Paradigm.

The paradigm that is replacing it is, of

course, Orthomolecular medicine because it fulfills the essential functions a paradigm should by gathering, like butterflies in a net, all the bits and pieces of widely diversified research and human endeavor, and crystal-izing them into a new image of man. In addition, it gives direction, a more purposeful direction to further research.

Let me point out the signposts that show this is taking place and perhaps dare to envision the direction that it will go with just a pause to remind ourselves what this new image of man is.

Man is more than a machine to be sliced up like a sandwich into cat scan slivers and then screwed together. Man is, as Bertalanffy (1977), the general-systems theorist said, "an organized system" (Weiss, 1977). The wholeness of the system is lost when attention to mere linear causality blocks a systems-approach. A systems-approach enhances our understanding of subcellular and cellular relationships to their inner environment: the food and liquid ingested for sustenance of the cellular structures, the air breathed bringing life-sustaining oxygen or mood-altering ionized particles (Soyka, 1978), or even potentially lethal toxic molecules, the light that penetrating the eyes, strikes the pineal gland to affect the brain chemistry (Binkley, 1979; Wurtman, 1977b), the world beyond the senses (Smith, 1976) and rhythms that relate all of these together.

The cultural signposts are, like Gaul, tripartite: first, the psychological phenomena, second, the biological-healing phenomena, and third, the research phenomena. The notion of expanded consciousness is the hallmark of the psychological phenomena. Contributing to it were Joseph Rhine's research in ESP, the spread of Eastern psychology to the West after the Communist destruction of Tibetan religion, the mind-altering drugs of the drug culture, the popularization of alternative healing methods, and the establishment of centers for their practice, the importation of Kirlian photography from Russia, acupuncture from China, psychic healing from the Philippines, books like **The Tao of Psychology** (Bolen, 1979) and most significantly **The Tao of Physics** (Capra, 1975) which uses the model of the most advanced concepts in physics today to argue the identity not only between man and his universe but with

consciousness itself. "The universal interwovenness always includes the human observer and his or her consciousness, and this is also true in atomic physics," says Capra. There is a movement away from an objective monistic or dualistic view of reality to one which encompasses the perceiver and also allows for the same "reality" to be perceived as different according to time and conditions in the same way as an electron may be both a particle and a wave. The Indian poet Tagore anticipated the modern mind-set more than half a century ago: "One in the sense of Eastern mention, gold and the bracelet, water and the wave."

The biological phenomena, like the psychological, started in the early fifties with the birth of two opposing but related forms of therapy for mental illness. Both acknowledged the illness as a brain disease that could be managed by altering brain chemistry. The first of these in time was Orthomolecular psychiatry, then called megavita-

min therapy by its founders, Dr. Abram Hoffman and Dr. Humphry Osmond. By one of those quirks of medical history, the orthomolecular approach was soon overshadowed by the advent of the second biological psychiatry method, psychotropic drugs. At last the mind was joined to its body, a union that spurred research developments in brain chemistry and in neurotransmitter theory.

Orthomolecular Research and Prospects.

Research today therefore reflects this conjunction of brain, body and the total environment. The medical geography studies, a new design in research, show the relationship between diet and health and behavioral factors in various discrete geographical areas of the world, between wheat and schizophrenia in Sweden (Dohan, 1966), between corn consumption and homicide in high-corn consuming areas (Mawson, 1978), between a low protein, high carbohydrate diet and aggressiveness among the Qolla (Bolton, 1978), between high selenium areas and freedom from cancer (Shamberger, 1976; Schrauzer, 1977), between soft water, depleted soils and heart disease (Punsar,

1978). Geographical pockets of longevity are also reported on.

A most stimulating field of research which is not only a pointed indicator of where we are but telegraphs the future is that which deals with the modulating effect of specific dietary factors on neurotransmitter levels and thus their influence on certain brain diseases. A simple illustration of this type of investigation is a study that shows that ascorbic acid enhances the release of acetylcholine and noradrenaline from synaptic vesicles (Kuo, 1979). But the leading researchers in this field are those working with Richard Wurtman in the Laboratory of Neuroendocrine Regulation, Department of Nutrition and Food Science at M.I.T. (Wurtman, 1977a). They have shown that oral choline can raise brain acetylcholine (Hirsch, 1978a, 1978b), a technique that has therapeutic value for patients with tardive dyskinesia (Growden, 1977a; Wurtman, 1978a), with Huntington's disease (Growden, 1977b; Wurtman, 1978b), or with premature memory loss (Davis, 1979; Sitaram, 1978). This last connection makes the loss of memory that accompanies tobacco withdrawal understandable since nicotine pathways are identical with acetylcholine pathways. By manipulating protein, fat and carbohydrate intake, these researchers have shown that brain serotonin levels can be shifted (Growden, 1977c; Fernstrom, 1971). Contrariwise, by altering brain serotonin levels by means of drugs, they were able to demonstrate a change in appetite for a preferential choice of protein or carbohydrate (Wurtman, 1979).

These limited references to current developments in the burgeoning research alliance between nutritional factors and the neurochemistry of mental functioning portends the future and brings psychiatry full circle away from an abortive interest in toxi-molecular pharmacological agents and back to the supportive measures of the ortho-molecular approach pioneered by Hoffer and Osmond. This research direction, despite the complexity of the problems to be solved, holds great promise and infinite excitement. Consider some projects for the future: one, mapping out interrelationships

of all nutritional building blocks, of enzymes and their cofactors with neurotransmitters and secondary transmitters known and as yet unknown to broaden the base for orthomolecular psychiatric practice; two, mapping out profile patterns for HLA antigens to identify persons genetically predisposed to particular degenerative or infectious diseases; three, fulfilling Linus Pauling's vision of developing blood and urine profiles for a hundred diseases to facilitate instant matching by computer with patient's samples. With such knowledge and screening devices medical practice will be primarily preventive and Orthomolecular nutritional measures will be the means of providing for specific individual needs before the advent of disease.

What will be doctors' views of orthomolecular medicine then? Will there be any opponents left? Loren Mosher, one of the members of the APA Task Force once said that if every psychiatrist in the U.S.A. believed that megavitamin therapy helped schizophrenic patients, he would not believe it. His inflexibly rigid outlook reminds one of the character who visited an insane asylum and was bothered that the inmates looked so undistinguishable from the people outside. "How do you judge who is insane and who should be sent home?" he asked an attendant. "Oh, that's easy, replied the attendant. "Periodically we fill up that trough with water and give all the inmates a bucket and instruct them to empty the trough." "But how does that help you separate who stays and who goes home?" "Simple," retorted the attendant, "The first guy who turns off the faucet goes home." "Gosh, " exclaimed the visitor, "I never thought of that."

A broadened vision is an asset also in recognizing Orthomolecular medicine as the emergent medical paradigm.

Summary.

The medical establishment's resistance to Orthomolecular psychiatry follows predictable patterns common throughout medical history: ridiculing and denigrating the source of the new idea, refusing to examine the data, or doing so on a selective basis and

making false representations about it, then defending one's avowed position by closing ranks in an "Old Boys' Club."

This was the same way in which the medical establishment dealt with Mendel, Schwann, Semmelweis, Pasteur, Florence Nightingale, Joseph Goldberger.

An idea that comes ahead of its time in medicine has to wait for the climate of opinion to change so that a new paradigm, or model of reality, is constructed. This paradigm gives direction to all forms of creativity and to scientific research.

Specific etiology is the paradigm that has held sway during a long period of productive research which achieved control over most of our contagious diseases, but the model no longer answers the needs of today's degenerative diseases, cancer, diabetes, heart disease, arthritis, rheumatism, allergies, mental illness. Actually, it misguides research.

The Orthomolecular paradigm with its emphasis on optimum nutrition for the whole person takes a general systems approach that fits the developing climate of opinion which sees man as a unity within himself and within his ecology.

It is predictable that research stimulated by this emergent paradigm will concern itself with studies on nutrition, such as worldwide dietary patterns and their effects upon health and behavior, on HLA studies furthering our knowledge of genetically determined biological individuality, on Pauling's research into profiles of disease derived from body excretions, and particularly on studies relating specific nutritional factors to brain neurotransmitter effects. This approach will provide the basis for a true program for identifying disease and preventing it before it occurs, a real preventive medicine.

References

BERTALANFFY, L.V.: The Role of Systems Theory in Present-Day Science, Technology and Philosophy. In: K.E. Schaefer, H. Hansel, R. Brady (Eds.): *Toward a Man-Centered Medical Science*. Mt. Kisco, New York, Futura Publ. Co., 1977.

BINKLEY, S.: The Time Keeping Enzyme in the Pineal Gland. *Scientific American*, 66-71, April, 1979.

BOLEN, J.S.: *The Tao of Psychology: Synchronicity and the Self*. New York, Harper and Row, 1979.

BOLTON, R.: *Aggression in Qolla Society*. Champaign, Ill., Garland Press, 1978.

BYLINSKY, G.: A New Power to Predict - and Prevent - Disease. *Fortune*, 108-115, Sept. 25, 1978.

CAPRA, F.: *The Tao of Physics*. Boulder, Co., Shambhala Publications, 1975.

CHALMERS, T.C.: Peer Review of Manuscripts. *Letter, New England Journal of Medicine* 297,5, p. 285, Aug., 1977.

COLE, S., RUBIN, L., and COLE, J.: Peer Review and the Support of Science. *Scientific American* 237,4,34[^]*1, Oct., 1977.

DAVIS, K. and YAMAMURA, H.I.: Cholinergic Underactivity in Human Memory Disorders. *Life Sciences* 23,1729-1734, 1979.

DIXON, B.: *Beyond the Magic Bullet*, New York, Harper and Row, 1978.

DOHAN, F.C.: Cereals and Schizophrenia: Data and Hypothesis. *Acta Psy-chiatr. Scand.* 42,125-152, 1966.

FERNSTROM, J.D. and WURTMAN, R.J.: Brain Serotonin Content: Increase Following Ingestion of Carbohydrate Diet. *Science* 174, 1023-1025, 1971.

FISHBEIN, M.: Attitude and the Prediction of Behavior. In: Martin Fishbein (Ed.): *Readings in Attitude Theory and Measurement*. New York, John Wiley and Sons, 1967.

GERSHOFF, S.N. and FARAGALLA, F.F.: *Journal of Biol. Chem.* 234, 2391-2393, 1959.

GOOD, R.A.: Nutrition, Immunity and Cancer — A Review. *Clinical Bulletin* 9,1, 8-11, 1979.

GROWDEN, J.H., COHEN, E.L., and WURTMAN, R.J.: Effects of Oral Choline Administration on Serum and CSF Choline Levels in Patients with Huntington's Disease. *J. Neurochem.* 28,229-231, 1979b.

GROWDEN, J.H., COHEN, E.L., and WURTMAN, R.J.: Treatment of Brain Disease and Dietary Precursors of Neurotransmitters. *Annals of Internal Medicine* 86,337-339, 1977c.

GROWDEN, J.H., HIRSCH, M.J., WURTMAN, R.J., and WIENER, W.: Oral Choline Administration to Patients with Tardive Dyskinesia. *New England Journ. of Medicine* 297,524, Sept. 8, 1977a.

HAWKINS, D. and PAULING, L.: *Orthomolecular Psychiatry*. San Francisco. W.H. Freeman and Co., 1973.

HIRSCH, M.J., GROWDEN, J.H., and WURTMAN, R.J.: Relations Between Dietary Choline or Lecithin Intake, Serum Choline Levels, and Various Metabolic Indices. *Metabolism* 27,8, August, 1978a.

HIRSCH, M.J. and WURTMAN, R.J.: Lecithin Consumption Increases Acetylcholine Concentration in Rat Brain and Adrenal Gland. *Science* 202, (4364), 223-225, October 13, 1978b.

HOFFER, A. and OSMOND, H.: Megavitamin Therapy, In Reply to the American Psychiatric Association Task Force Report on Megavitamin and Orthomolecular Therapy in Psychiatry. *Canadian Schizophrenia Foundation*, 2229 Broad St., Regina, Saskatchewan, S4P1Y7, 1976.

HOSPITAL PRACTICE: Goldberger: An Unremitting Struggle to Conquer Pellagra. *Hospital Practice* 13,3,136-164, March, 1978.

KUHN, T.S.: *The Structure of Scientific Revolutions*. 2nd Ed., Chicago, U. of Chicago Press, 1970.

KUO, CHE-HUI, FUMIYAKA, H., YOSHIDA, H., YAMATODANI, A., and WADA, H.: Effect of Ascorbic Acid on Release of Acetylcholine from Synaptic Vesicles Prepared from Different Species of Animals and Release of Noradrenaline from Synaptic Vesicles of Rat Brain. *Life Sciences* 24,10, 911-916, 1979.

MANDELL, MARSHALL: Personal communication.

- MAWSON, A.R. and JACOBS, K.W.: **Corn Consumption, Tryptophan, and Cross-National Homicide Rates.** *J. of Orthomolecular Psychiatry* 7, 4,222-229,1978.
- McCULLY, K.S. and WILSON, R.B.: Homocysteine Theory of Arteriosclerosis. *Atherosclerosis* 22,215-227,1975.
- McGUIRE, W.J.: Cognitive Consistency and Attitude Change. In: Martin Fishbein, (Ed.): *Readings in Attitude Theory and Measurement.* New York, John Wiley and Sons, 1967.
- McGUIRE, W.J.: Persuasion, Resistance, and Attitude Change. In: Ithiel de Sola Pool, Wilbur Schramm, (Eds.): *Handbook of Communication.* Chicago, Rand McNally, 1973.
- MEGAVITAMIN AND ORTHOMOLECULAR THERAPY IN PSYCHIATRY: A Report of the APA Task Force on Vitamin Therapy in Psychiatry. Washington, American Psychiatric Association, 1973.
- NEW YORK TIMES, October 3,1979.
- PAULING, L.: *Orthomolecular Psychiatry.* Science 160, 265-271, April 19, 1968.
- PAULING, L.: Personal communication, 1979.
- POVOLOTSKY, Y.L. and KRIVOKHATSKAYA, L.D.: Effect of Dibazol and Ascorbic Acid on Antiviral Activity of Human Interferon in Cell Culture. *Antibiotiki* 24,4,291-294, April, 1979.
- SCHRAUZER, G.: Paper presented at the Third International Symposium on Trace Element Metabolism in Man and Animals. Germany, Summer, 1977.
- SEBRELL, Jr., W.H.: The Importance of Vitamin B6 in Human Nutrition. Paper presented at the International Symposium on Vitamin B6 in honor of Prof. Paul Gyorgy. New York, July 23-24,1964.
- SHAMBERGER, R., TYTKO, S.A., and WILLIS, C.E.: Anti-Oxidants and Cancer. Pt. 6, Selenium and Age-Adjusted Human Cancer Mortality. *Archives of Environmental Health* 31,231 -235, Sept.-Oct., 1976.
- SIEGEL, B.V.: Enhanced Interferon Response to Murine Leukemia Virus by Ascorbic Acid. *Infect.-Immunity* 10,409,1974.
- SIEGEL, B.V.: Enhancement of Interferon Production by Poly (rI) Poly (rC) in Mouse Cell Cultures by Ascorbic Acid. *Nature* 254, p. 531, London, 1975.
- SITARAM, N., WEINGARTNER, H., CAINE, E.D., and GILLIN, J.C.: Choline: Selective Enhancement of Serial Learning and Encoding of Low Imagery Words in Man. *Life Sciences* 22,17,1555-1560,1978.
- SMITH, H.: *The Forgotten Truth: The Primordial Tradition.* New York, Harper and Row, 1976.
- STENT, G.S.: *Prematurity and Uniqueness in Scientific Discovery.* Scientific American, 84-93, Dec, 1972.
- SOYKA, F. and EDMONDS, A.: *The Ion Effect.* New York, Bantam, 1978.
- U.S. GOVERNMENT: *Diet Related to Killer Diseases, V: Nutrition and Mental Health.* Hearing before the Select Committee on Nutrition and Human Needs of the United States Senate, June 22, 1977. U.S. Government Printing Office, Washington, 1977.
- WEISS, PA.: *The System of Nature and the Nature of Systems. Empirical Holism and Practical Reductionism Harmonized* In: Schaefer, K.E., Hansel, H., Brady, R. (Eds.) *Toward a Man-Centered Medical Science.* Mt. Kisko, New York, Futura Publ. Co., 1977.
- PUNSAR, S. and KARVONEN, M.J.: Drinking Water Quality and Sudden Death: Observations from West and East Finland. *Advances in Cardiology* 25,25-26,1978.
- RHINE, B.J.: A Concept-Formation Approach to Attitude Acquisition. In: Martin Fishbein, (Ed.): *Readings in Attitude Theory and Measurement.* New York, John Wiley and Sons, 1967.
- WILLIAMS, R.J.: *Biochemical Individuality.* New York, John Wiley and Sons, 1956. Republished by U. of Texas Press, Austin and London, paperback, 1975.
- WURTMAN, R.J., COHEN, EX., and FERNSTROM, J.D.: Control of Brain Neurotransmitter Synthesis by Precursor Availability and Food Consumption In: Usdin, E. et al., (Eds.): *Neuroregulators and Psychiatric Disorders.* New York, Oxford U. Press. 103-121,1977a.
- WURTMAN, R.J. and MOSKOWITZ, M.: The Pineal Gland. *New England Journal of Medicine* 296,23,1329-1386, June 9,1977f.
- WURTMAN, R.J.: Relation Between Choline Availability, Acetylcholine Synthesis and Cholinergic Function. In: S. Garattini, (Ed.): *Depressive Disorders.* Stuttgart, Schattauer, 1978a.
- WURTMAN, R.J. and GROWDEN, J.H.: Dietary Enhancement of CNS Neurotransmitters. *Hospital Practice*, 71-77, March, 1978b.
- WURTMAN, J.J. and WURTMAN, R.J.: Drugs that Enhance Central Ser-otonergic Transmission Diminish Carbohydrate Consumption by Rats. *Life Sciences* 24,10,895-904,1979.