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Editorial

The End of an Era

For forty-two years Abram Hoffer served as Co-Editor and Editor-in-Chief for this Journal, which began as *Schizophrenia* in 1967, was renamed *Orthomolecular Psychiatry* in 1972, and adopted its current title, *Orthomolecular Medicine*, in 1986. Few publications can boast such longevity on the part of an editor. Dr. Hoffer was at the helm for two generations, outliving many of his fellow editorial board members, including Linus Pauling, Humphry Osmond, Carl Pfeiffer, William Philpott, David Hawkins, Emanuel Cheraskin, Hugh Riordan, and Bernard Rimland.

For twenty-two years I worked alongside Abram, as the managing editor of the Journal. We spoke with each other by phone at least weekly, communicated by e-mail almost daily (Abram was the most responsive e-mailer, always replying within a few hours), and visited in person several times each year. We became close friends and allies in developing the reach of orthomolecular medicine through the Journal. We published hundreds of articles by great clinicians and researchers but it was Abram's writing that was most anticipated and set the tone in nearly every issue. His countless editorials, book reviews, and articles were clear, convincing and inspiring, never losing sight of the goal of demonstrating the efficacy and safety of orthomolecular medicine.

This Journal was as important a part of Abram's life work as his medical practice and his involvement with International Schizophrenia Foundation and the International Society for Orthomolecular Medicine. It was gratifying for him to see the Journal reach readers in over forty countries despite being ignored by much of mainstream medicine.

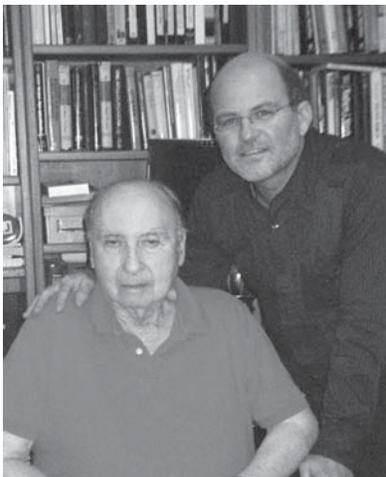
The two memorials for Abram, held in Victoria in September and in Toronto in October, afforded opportunities for many people to say goodbye to their dear friend and colleague, mentor and doctor. Now we bid farewell to him and to his era of great leadership in these pages of the Journal. We begin with an article, "Abram Hoffer: Orthomolecular Pioneer", by Robert Sealey, accompanied by photographs from various periods of Dr. Hoffer's life. This is followed by an interview with Andrew Saul, Assistant Editor, and a selection of Tributes to Dr. Hoffer posted in the guestbook on-line at www.orthomed.org from people around the world. We've also chosen three articles which represent Abram's life-long interest and spirit of innovation: "Orthomolecular Treatment of Schizophrenia," "The Adrenochrome Hypothesis" and "The Future of Psychiatry." We reprint them in this commemorative issue honouring him.

After Abram's passing in May, Harold Foster, who had been Associate Editor of the Journal for several years, agreed to serve as interim Editor-in-Chief. When Harry died in August, the loss to the orthomolecular

community was compounded. Harry and Abram were long-time friends and colleagues, who met regularly in Victoria. Tributes to Harry from the on-line guest book are published here.

This issue of the Journal marks the end of a long and illustrious era. While saying goodbye to Abram and Harry, we look forward to the first issue of the Journal of Orthomolecular Medicine for 2010, with a new Editor-in-Chief and Associate Editors, a revitalized editorial board and a renewed outlook.

—Steven Carter



Abram Hoffer: Orthomolecular Pioneer

Abram Hoffer, Ph.D., M.D., became a pioneering psychiatrist over 50 years ago when he successfully applied the life science of biochemistry to the art of psychiatry. Not content with helping many of his patients recover from schizophrenia, he cooperated with colleagues to research and to develop treatments based on diagnosis, nutritional status and biochemical individuality. As he cared for his patients, Dr. Hoffer discovered a new dimension of restorative care which complemented the standard medications, talk and shock therapies. Over the span of his long and distinguished career, Dr. Hoffer inspired a paradigm shift: leading by example, he learned to resolve patients' episodes, even psychoses, and restore mental health by correcting brain chemistry. This innovative and important work was welcomed by grateful patients but frowned upon by skeptical psychiatrists. After years of sharing his research and reporting positive progress in medical journals, Dr. Hoffer realized that most doctors either ignored or dismissed his ideas -- without

trying them. Believing that millions of mental patients deserved better quality care, Dr. Hoffer embarked on a campaign to educate the public.

What made Dr. Hoffer study schizophrenia so carefully? What did he think when his patients heard voices? What motivated him to research, develop and nourish the concept of orthomolecular medicine? What intrigued him so much that, as he reached 90, he still consulted, he still researched and he still wrote? Hoffer's scientific memoirs share the fascinating story of his life's work and his medical adventures.

Advances in medicine don't happen overnight. The quality of care usually improves by fine-tuning existing routines. Years of clinical observations and outcome analyses can lead to flashes of insight that reveal possible solutions to age-old health problems. A pioneering doctor trusts his instincts, investigates the probabilities and perseveres until he finds better ways to practice medicine. Anything new takes decades to imple-



Abram's parents, Clara and Israel Hoffer, in the 1920s



Favorite dog.



The Hoffer homestead in 1917, when Abram was born



Schoolhouse in Hoffer, Saskatchewan, where Abram attended from age 6 to 12

ment. While trusting patients cooperate, the innovator has to develop and test theories, conduct research studies, perform clinical trials and prove the efficacy of his discoveries. And then write progress reports, submit journal articles and speak at conferences to educate health professionals. This important work requires well-above-average intelligence, inspiration, dedication and determination. Paradigm shifts require even more exceptional capabilities, not to mention serendipity, opportunity and a network of colleagues. As it turned out, Abram Hoffer had what it took: the necessary smarts, a kind heart, a quick wit, stick-to-itiveness, a supportive family and a knack for making friends, even with patients.

Abram Hoffer attended one-room schools in Saskatchewan, obtained his Ph.D. in biochemistry from the University of Minnesota and studied for his medical degree at the University of Toronto. Rather than take quick and easy short cuts in his work as a keen young research psychiatrist in the 1950s, Abram Hoffer wondered what could cause the human brain to hallucinate and what could stabilize brain

chemistry. No one told Dr. Hoffer what most doctors believed: “There is no cure for schizophrenia!” The practice guidelines of psychiatry encourage physicians to differentiate the root cause(s) of each patient’s symptoms before recommending effective treatment(s). True to the guidelines, Dr. Hoffer and his co-workers researched how to diagnose psychosis and restore brain chemistry by prescribing nutritional supplements – in therapeutic doses–and by improving patients’ diets. A surprising number of patients recovered and kept well, as long as they continued their regimens.

What prompted Dr. Hoffer to prescribe supplements? How could nutrients restore mental health? Hoffer’s memoirs explain that, according to the Hoffer-Osmond adrenochrome hypothesis, the dysfunctional metabolism of adrenalin can cause psychosis, in some people. Vulnerable patients metabolize adrenalin (a healthy brain chemical) to hallucinogenic compounds: adrenochrome and adrenolutin. Dr. Hoffer and Dr. Osmond believed that unbalanced brain chemistry could be restored. By means of the first double-



Bachelor of Science
in Agriculture 1938



Abram and Rose with children John, Bill and Miriam

blind clinical trials in psychiatry, they tested two vital amines: divided doses of either niacin or niacinamide (vitamin B₃ – a methyl acceptor) with ascorbic acid (vitamin C – an antioxidant). This proved the efficacy of their double-barreled treatment which, for years, has continued to work better than antipsychotic medications alone, tranquilizers, insulin comas and metrazole therapies.

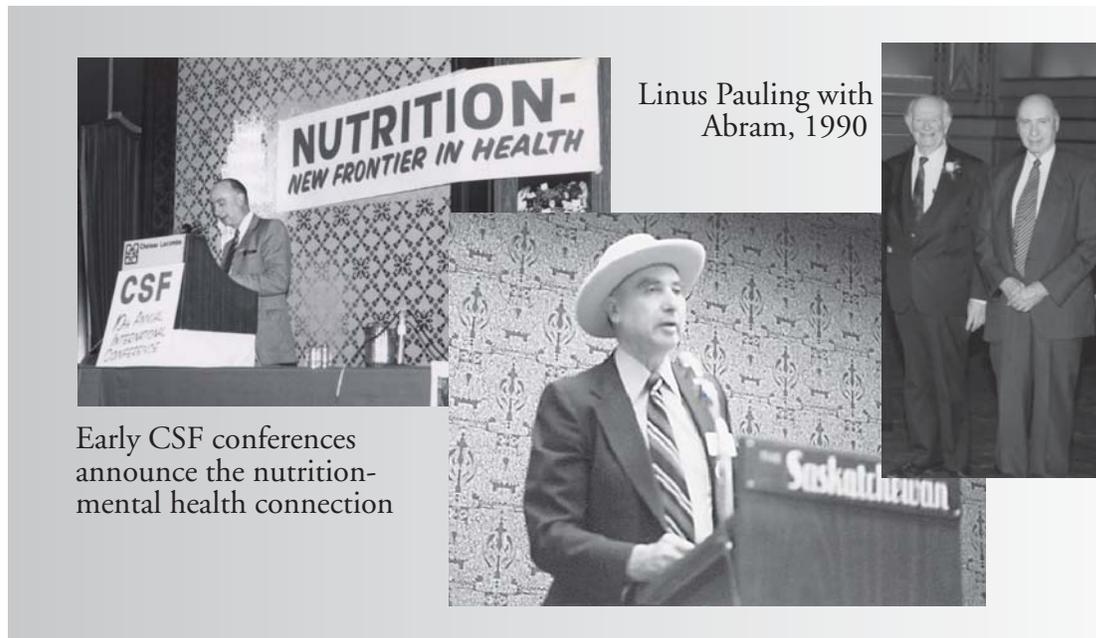
If nutrient-based therapies sound unscientific, remember that Dr. Hoffer earned a Ph.D. in biochemistry before he became a physician. Practicing with medical integrity, Hoffer and his team respected each patient's biochemical individuality by customizing regimens of medical nutrients: vitamins (or vital amines), trace minerals, amino acids, antioxidants, methyl acceptors and sources, energy and enzyme co-factors, essential fatty acids and precursors. Thousands of patients got well enough to resume their educations, continue their careers and realize their destinies.

Conventional doctors scoffed at the idea that mere vitamins could heal patients with schizophrenia, a serious

mental illness. However, when world-renowned, Nobel-Prize-winning chemist Linus Pauling, Ph.D., read Hoffer and Osmond's 1966 book, *How to Live With Schizophrenia*, he realized that "orthomolecular therapy," using vitamins and other essential nutrients as treatments, could help many patients by "the provision of the optimum molecular concentrations of substances normally present in the human body."

Pauling's word "orthomolecular" explains the ortho-care concept of medicine: restore patients to good health by prescribing healthy molecules. Linus Pauling came out of retirement, researched the biochemistry and then championed orthomolecular medicine.

Other researchers had tested specific nutrient therapies before and used them to treat nutritional deficiencies and metabolic problems: vitamin C for scurvy (Lind, 1795); foods rich in vitamin B³ for pellagra (Goldberger, 1914-1928); and insulin for diabetes (Banting and Best, 1920-1925). When these cures were first discovered, uninformed doctors disputed, discounted and denied the healing value



of nutrients. Before long, clinicians proved the treatments so safe and so effective that biochemical supplements became the standard of care for these three illnesses which affect millions of patients. Linus Pauling's "orthomolecular" concept and Dr. Hoffer's success treating schizophrenia and other disorders with orthomolecular regimens have encouraged many open-minded health professionals to cooperate. They discovered restorative treatments for a range of mental and physical illnesses.

However, the majority of psychiatrists followed their tradition of nihilism, dismissed Dr. Hoffer's work and kept their minds closed to the reality that medications and talk therapies, however well-intentioned and useful, do not restore sick brains to normal. Just as thousands of sailors suffered for decades before the British admiralty provisioned vessels with citrus fruits to prevent scurvy, legions of trusting mental patients have suffered while most psychiatrists have refused to review Dr. Hoffer's orthomolecular research or test his complementary clinical regimens. Unwilling to let skeptics discredit his life's work, Dr. Hoffer continued his research and re-

ported his progress by publishing the case reports of recovered patients in medical books and journals, for over 50 years.

Dr. Hoffer had many clinical adventures as he determined the optimum doses of smart nutrients for his patients and encouraged ethical colleagues around the world to apply his methods. In order to share research results and educate caregivers, Dr. Hoffer founded and edited the *Journal of Orthomolecular Psychiatry* (later the *Journal of Orthomolecular Medicine*). He wrote many articles, editorials and books including: *Niacin Therapy in Psychiatry* (1962), *The Hallucinogens* (1967), *Orthomolecular Medicine for Physicians* (1989), *Smart Nutrients* (1994), *Vitamin B3 & Schizophrenia: Discovery, Recovery, Controversy* (1998), *Vitamin C & Cancer*, *Dr. Hoffer's ABC of Natural Nutrition* (1999), *Orthomolecular Treatment for Schizophrenia* (1999) and *Healing Schizophrenia: Complementary Vitamin and Drug Treatments* (2004). He contributed to *Orthomolecular Psychiatry - Treatment of Schizophrenia* (ed. Hawkins & Pauling 1973).

In addition, Dr. Hoffer helped to establish, direct and maintain the In-



Abram and Rose with Steven Carter, Executive Director of ISF in 1994

With long-time colleague Hugh Riordan (right); an "OrthoSamurai" gift from Japan in 1996



ternational Schizophrenia Foundation (ISF) and the International Society for Orthomolecular Medicine (ISOM). Since 1971, 38 annual international Orthomolecular Medicine Today conferences have shared information, medical research, progress reports and success stories with patients, families, caregivers and health professionals from around the world. The Orthomolecular Medicine Hall of Fame recognizes outstanding achievements by medical professionals.

Thousands of grateful patients owe their recoveries and their restored destinies to Dr. Abram Hoffer. Thanks to his original work, vision, integrity and leadership in researching and developing restorative orthomolecular medicine, patients no longer need to suffer for decades with symptoms of schizophrenia, psychosis, depression, bipolar disorder, attention deficit disorder or autism. Dr. Hoffer's work will encourage patients, families and caregivers to ask for restorative care; hopefully the paradigms of medicine will expand until the standards of care routinely offer orthomolecular treatments to patients with mental

health problems, even schizophrenia. This won't happen on its own. We all need to help

—Adapted from Robert Sealey's book review of Adventures in Psychiatry

There are very few physicians in the world who deserve more credit for establishing the health benefits of vitamins, minerals and other nutrients than Abram Hoffer. Over the past 55 years his pioneering contribution to the rapidly expanding field of orthomolecular medicine have become known internationally through Dr. Hoffer's more than 500 publications and extensive lecturing. Yet, like the proverbial prophet without honor in his own country, there continues to be a lack of awareness of and recognition for his work here in North America. This may be due, in part, to his natural humility, rooted in his prairie farm upbringing, which provided him with the simple, honest and direct approach to everything he undertook. Dr. Hoffer's career was marked by tireless work, dedication and, above all, his exemplary humanity.



Abram with his beloved Rose in 1998



With Fran Fuller, his coworker of 30 years

Forty Years in the Desert

Dr. Hoffer had a favorite way of illustrating the powerful resistance to change and the reluctance to accept new ideas, particularly among members of the medical establishment. "Have you ever wondered why Moses spent 40 years in the desert with the Israelites after leading them out of captivity and slavery in Egypt? The journey could have been accomplished in a matter of months, yet Moses knew that the generation born in slavery must die out before the people could be led to claim and govern a new land for themselves. Old ideas are very difficult to dislodge, new ideas take at least 40 years to become established."

The resistance to Dr. Hoffer's ideas is gradually wearing away. The value of vitamin and mineral therapy is now recognized by leading institutions which had dismissed it as worthless a generation ago, had dismissed as worthless. Nutrition has finally been allotted its rightful place as a primary factor in health maintenance and disease prevention and treatment. Dr. Hoffer always advocated a "junk free" diet. He said, "For the first time in history it is possible to eat too much and still suffer malnutrition.

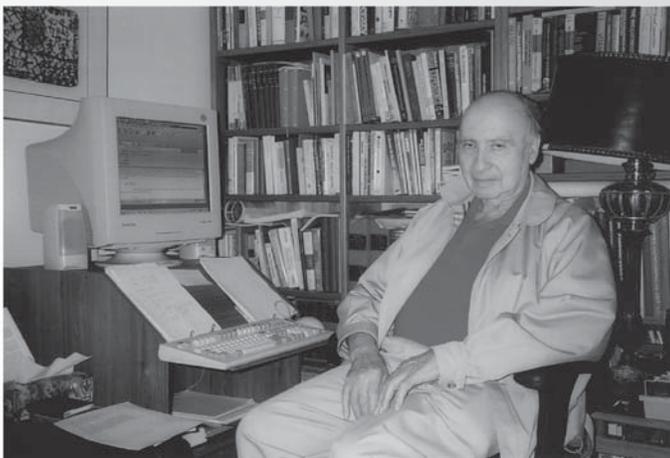
We have devitalized our food, refined it so that most of the essentials have been lost. This is what I call affluent malnutrition."

The Hoffer Legacy

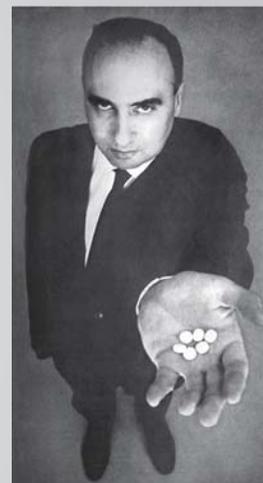
Through more than five decades as a practicing physician and researcher, Abram Hoffer experienced the slow shifting of attitudes regarding orthomolecular medicine. He has never lost his courageous vision or his remarkable receptivity to new ideas.

As entered his nineties, Dr. Hoffer was sharper than many of his colleagues half his age. He worked four days per week at his Orthomolecular Vitamin Information Centre in Victoria, British Columbia, and was busy preparing several new publications. Dr. Hoffer's medical practice, which he retired from in December 2005, began as primarily psychiatric and later evolved to include hundreds of cancer patients, who were referred to him by their oncologists. "They usually came to me when their doctors had exhausted the possibilities of standard treatment. Just imagine how well they'd be if they had sought orthomolecular treatment first!"

– Steven Carter



Command centre: Abram in his home office



McLean's Magazine 1966
"Take your Niacin!"

An Interview with Abram Hoffer

Andrew W. Saul¹

Introduction

Some years ago, as I sat at lunch with Dr. Abram Hoffer, I took some vitamin pills. Dr. Hoffer leaned over towards me and said, “You know, you’re going to live a lot longer if you take those.” As I looked at him, he added, “I guarantee it. If you don’t, come back and tell me.” So said the founding father of orthomolecular medicine.

It was nearly 60 years ago when Abram Hoffer and his colleagues began curing schizophrenia with niacin. While some physicians are still waiting, those who have used niacin with patients and families know the immense practical value of what Dr. Hoffer discovered. Abram Hoffer’s life has not merely changed the face of psychiatry; he has changed the course of medicine for all time. His 30 books, 600 scientific papers, and thousands of cured patients have yet to convince orthodox medicine. Dr. Hoffer has said that it takes about two generations before a truly new medical idea is accepted. Perhaps in the case of orthomolecular therapy, maybe it is three generations. Great ideas in medicine, or anywhere else, are never self-evident. At least not until a brilliant mind like Dr. Hoffer’s sees more than others have seen, and has the courage to speak out in the teeth of some often surprisingly bitter professional adversity. As a college lecturer, I learned some years ago that if you want to clear the department’s lunch room in a hurry, just say something positive about orthomolecular therapy.

The day after I first met Dr. Hoffer, I sat in as he taped a television production about his work. He did the entire 45-minute video in one take. Over the years, I was honored to ultimately write four books with Abram, and work with

him on the Editorial Board of the *Journal of Orthomolecular Medicine*.

Abram taught me much, as he taught so many. Among the lessons I had was this: a speaker at a medical conference made two factual errors about niacin. I was sitting next to Abram, and he was, to all appearances, dozing off. He was not. He gave me a nod, and during the question session, got up to take the microphone. He complimented the speaker on his presentation, mentioned a few additional things about niacin, made another supportive remark, and sat down. The speaker was delighted. And, the speaker never knew he had just been contradicted and corrected. This was Abram Hoffer.

At 91 years of age, Dr. Hoffer was widely and justly regarded as a living legacy. As I had conducted a series of interviews with some of the key figures in nutritional medicine for *DoctorYourself.com*, it seemed high time to interview the main man. Abram being in British Columbia and I in New York, we settled on email for our conversations. He was a prompt responder and enthusiastic. Hardly a day went by without an email from Abram, and typically there were several. They were both wide ranging and frequent, answering my questions and then some.

My final email from Abram was a copy of his announcing to his colleagues the publication of one of our collaborative books, *The Vitamin Cure for Alcoholism*. It is based on Abram’s experiences with one of his patients: Bill W., cofounder of Alcoholics Anonymous. We will begin there.

Andrew W. Saul: *Dr. Hoffer, you cured AA founder Bill W. of his depression using niacin.*

Dr. Abram Hoffer: His depression, yes, but I did not cure his alcoholism. He never did consider himself cured. He organized

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AA, and was able to establish fellowships that helped and millions stay sober. However, it was the niacin that made him comfortable in his sobriety. It takes the entire nutritional approach, plus AA.

Saul: *Tell us more about Bill W.*

Hoffer: From the day he was freed of life-long tension and insomnia by taking 3,000 milligrams of niacin daily, Bill Wilson became a powerful runner with us. Bill helped me organize the first Schizophrenic's Anonymous group in Saskatoon which was very successful. Bill introduced the orthomolecular concepts to a large number of AA members, especially in the United States. AA International did not approve of this. Bill made an immense contribution to orthomolecular medicine because he publicized the term "B₃" to replace the chemical names niacinamide or nicotinic acid. Had Bill lived another ten years, orthomolecular medicine would have been much further advanced than it is today.

Saul: *And how do things stand today?*

Hoffer: I have treated 5,000 schizophrenic patients with niacin. The first was a 12-year-old boy in 1960. To get the boy to take it, his father crushed the niacin tablet and spread it into a jam sandwich. That boy is now a research psychiatrist. The treatment that worked in 1960 is still working today. That treatment is called orthomolecular medicine. Orthomolecular medicine restores natural metabolism with nutrients, such as vitamins and minerals, in optimum quantities. This means much more than the RDA or DRI. To overturn decades of error on the part of governments and the professions will take a good deal of effort and patience. Linus Pauling often spoke vigorously against the RDA in general and was ignored. These old, erroneous standards are part of the vitamins-as-prevention

paradigm and will not yield until this old and stale paradigm is fully replaced by the vitamins-as-treatment paradigm. Pauling took 18,000 milligrams of ascorbic acid daily, which was 300 times the RDA. He loved to tell his audiences why he took so much.

Saul: *That's what I personally take. When people ask why, I tell them that Dr. Pauling did, and he had two more Nobels than I have. Dr. Hoffer, where has high-dose nutritional therapy been most successful?*

Hoffer: It has been most successful for treating the walking wounded, that is, for those with arthritis, neurological conditions, and virtually all the psychiatric diseases. Orthomolecular medicine can be utilized within the whole field of medicine, even for patients whose primary treatment is surgery,

Saul: *When were you convinced that orthomolecular medicine was the way to go?*

Hoffer: By 1960 I was convinced. My conviction was reinforced by the hostility generated by the profession. I assumed that this hostile reaction was stimulated by our success. The same thing happened to the Shute brothers with vitamin E. New research exposes the weakness of current medical doctrine. Such a challenge is often answered only by hostility, as there is no evidence to otherwise disprove it.

Saul: *Please tell the story of how Linus Pauling first learned of nutritional medicine.*

Hoffer: Linus became aware of our work from two families I treated who got well and stayed well. By then my book, co-written with Dr Humphry Osmond, called *How To Live With Schizophrenia* had been published and one night Linus saw it on a

friend's coffee table. He stayed up all night reading it. That book convinced him that here was some merit to the idea of vitamin therapy. Later he found no contrary evidence. Linus had the desirable personality characteristic that he tended to believe people if there was no logical reason for them to lie to him. For that reason he did not accept the stories put out by the drug companies and the FDA. Pauling knew for whom they were working, and it was not for you or me.

Saul: *What about niacin and cholesterol?*

Hoffer: My colleagues and I demonstrated that niacin lowered total cholesterol in a 1954 study and we should have been given an award. But, of course, niacin is not a drug and cannot be patented, and therefore our discovery remains mainly a major irritant to the drug companies who have not been able to discover anything as safe and as effective. It is remarkable that niacin is the best for blood lipid levels and also for the psychoses. Nature is not dumb.

Saul: *What are the alleged "dangers" of niacin therapy?*

Hoffer: Niacin is probably not quite as safe as water, but pretty close to it. Patients ask me, "How dangerous is niacin therapy?" I answer them, "You are going to live a lot longer. Is that a problem for you?"

Saul: *Data compiled by the American Association of Poison Control Centers (AAPCC) indicates that, over the past 25 years, there have been a total of one or two deaths attributed to niacin. When I looked for evidence to substantiate even this very low number of alleged fatalities, it was absent or assumed.*

Hoffer: There have been no deaths ever from niacin. The LD 50 (the dosage that

would kill half of those taking it) for dogs is 6,000 mg per kg body weight. That is equivalent to half a pound of niacin per day for a human. No human takes 225,000 mg of niacin a day. They would be nauseous long before reaching a harmful dose. The top niacin dose ever was a 16-year-old schizophrenic girl who took 120 tablets (500 mg each) in one day. That is 60,000 mg of niacin. The "voices" she had been hearing were gone immediately. She then took 3,000 mg a day to maintain wellness.

Saul: *If I do not press this point, a reader will: maintained high doses of niacin may raise liver function tests, and this is used as evidence of harm.*

Hoffer: Niacin is not liver toxic. Niacin therapy increases liver function tests. But this elevation means that the liver is active. It does not indicate an underlying liver pathology. Dr. Bill Parsons discussed this extremely well in his book on niacin and cholesterol (*Cholesterol Control Without Diet*, Lilac Press, 2000). I personally have been on 1,500 to 6,000 mg daily since 1955. The biggest danger of taking niacin is that you live longer. One of my patients is 112. She does cross country skiing and has been on niacin for 42 years. The fear doctors have of niacin is not based on data or facts and, like any myth, is very hard to eradicate. So many patients are on niacin that by chance some will also have liver damage from other conditions such as alcoholism, hepatitis and so on. Niacin does not make it any better nor worse.

Saul: *What are the differences among the various forms of niacin?*

Hoffer: Niacin and niacinamide are equally effective for schizophrenia, but higher doses of niacin can be tolerated without nausea. Inositol hexaniacinate (a no-flush form of niacin) works, too, but

not quite as well. Only niacin or inositol hexaniacinate can lower cholesterol; niacinamide does not.

Saul: *You have long been interested in nutrition as adjunctive therapy for cancer.*

Hoffer: I have treated over 1,600 cancer patients, most of whom were given 12,000 mg per day or more of ascorbic acid, in combination with other nutrients. The results have been good and at least 40% of the 1,600 reached ten year cure rates. A small number of patients who were on every attending physician's terminal and untreatable list were cured. Linus Pauling and I had examined the follow-up data and found that the significant prolongation of these patients' lives favors the use of the vitamins. We published this in our book *Healing Cancer: Complementary Vitamin & Drug Treatments* (CCNM Press, 2004).

Saul: *Another of your close colleagues was Dr. Hugh Riordan (1932-2005), also an advocate of high-dose vitamin C therapy for cancer.*

Hoffer: Hugh was such a great healer, a marvelous physician, afraid of no one and willing to do what had to be done to help his patients get well. I am so sorry he went too soon. He needed another five years at least so that he could enjoy the fruits of his labors. I do hope that Hugh did have the final vision, the eventual result of the work that he did. I am reminded of Moses who angered God because he struck the stone instead of pointing his staff at it in order to bring water for the complaining Israelites. God said, "You will never see the Promised Land". But at the end God relented and he showed Moses in a far vision the Promised Land. This is a remarkable little tale and I have learned a lot from it. I learned to be very patient. The les-

son is that no one should ever expect to get into the Promised Land because it will always recede from you. The noble objective is to strive to reach it knowing full well that it cannot be done.

Saul: *I had just spoken with Hugh the very morning of the day he died.*

Hoffer: The last time I felt bereft and hopeless was when my wife Rose died three and a half years previously. Death is so sudden and so unexpected especially to be struck down when one is so close to achieving so many great things. I do believe that the good Hugh did will live forever.

Saul: *There seems to be a lot of bad press about vitamins, claiming evidence that they are not effective against disease.*

Hoffer: The modern church of medicine does not relish alerting the press when the news is good about vitamins. There is no money in it and potentially a loss if vitamins displace drugs, as they should. I sometimes harbor a silent wish for all our critics: that is that they should never under any circumstances ever take any supplemental nutrients, and must be restricted to only eating modern high tech food. Can you think of a more severe punishment?

Saul: *Yet it turns out that most of the negative reports are based on research that used ineffectively low doses of vitamins.*

Hoffer: I agree. I could also spend millions to prove that the small amounts of these nutrients will not prevent car accidents. Who is funding all these silly studies? No orthomolecular physician ever claimed that giving 200 IU of vitamin E and 500 mg of C cured anything. Perhaps you should write a paper with tongue in cheek in which you announce, "Antibiotics Do Not Cure Infection". Then,

report somewhere hidden in the paper that you only gave them 200 or even 20,000 IU of a drug that requires doses of one million or more. Such reporting is a superb example of the cynical, expensive and sleazy research so loved by Big Pharma. This is because it delays the real introduction of good medicine, in the same way that tobacco companies denied smoking causes cancer and we supposedly needed more and more and more research to prove anything. All this allows the companies to add millions of dollars to their coffers. Their defense is delay, delay and delay. The only objective of Big Pharma is to make money, lots and lots of it. How dare we try to prevent them from doing so?

Saul: *Vitamins have also been attacked with allegations that they are somehow actually dangerous.*

Hoffer: I am really impressed with the concern some scientists share over those “dangerous” vitamins. I wish they were as worried over those dangerous poisons called drugs. Each bottle of pills should have a poison label with skull and crossbones, and the word “poison” in large letters.

Saul: *It seems that lately, while advised to take more vitamin D, the public has been specifically warned off of vitamins E and C.*

Hoffer: I am always amazed at the chicanery and slipperiness of vitamin critics. Perhaps they realize they are beginning to lose the public and they are flailing out in all directions. Almost all of my patients, whenever they read one of these screeds, laugh at it because they know first hand how wrong it is. Half the population of Canada and USA is taking vitamins. And, if it will help dispel the nonsense about any supposed “dangers” of vitamin E,

here is the program I personally follow. I started years ago. But I also take several other antioxidants. A combination is better than any one alone. Currently I daily take 1,200 IU of vitamin E as succinate, the water soluble form. For my patients I have gone as high as 4,000 IU as a treatment for Huntington’s Disease and it has been very helpful. I cannot recall any adverse reactions even though thousands of my patients are also taking vitamin E. I do take the B vitamins, vitamin C of course, vitamin A, vitamin D and other nutrient factors. I think this has been helpful in keeping me active at my present age.

Saul: *How do we best tailor nutrient doses for our own unique needs?*

Hoffer: Each person must take an individualized program which they can discover if they are lucky to have a competent orthomolecular doctor. If they do not, they can read the literature and work out for themselves what is best for them. I believe the public is hungry for information. As more and more drugs drop by the wayside, the professions are going to become more and more dependent on safe ways of helping people, and using drugs is not the way to do that. Using nutrients is.

Saul: *When does orthomolecular medicine not work?*

Hoffer: It usually does work. For schizophrenics, the natural recovery rate is 50%. With orthomolecular medicine, the recovery rate is 90%. With drugs, it is 10%. If you use just drugs, you won’t get well. This is because mental illness is usually biochemical illness. Mental illness is a disorder of brain dysfunction. Schizophrenia is vitamin B₃ (niacin) dependency. Not a deficiency, a dependency. If schizophrenia strikes someone at age 25, he’s finished. That is, if he’s only given drugs. Patients are given drugs and released. The new

mental hospital today is the streets.

Saul: *You have been a sharp critic of Evidence Based Medicine.*

Hoffer: One would be very polite to even describe EBM as pseudoscientific. The word “science” can not be used anywhere close to what is happening with EBM. It has become the main weapon to prevent innovation. It must be sent back to its archaic roots. Instead, we once more have to learn to think rather than calculate.

Saul: *And double-blind, placebo controlled studies?*

Hoffer: Double blinds are for the birds. I have been opposed to double-blinds for decades, even though my colleagues and I were the first psychiatrists to do them, starting in 1952. I consider them a license to kill. They are a dangerous fashion. There is no evidence that anecdotal information is any less accurate than clinical information. Devotees see everything filtered through their beliefs. If we abolish anecdotes, guess what will happen to medicine? It will die from sheer boredom.

Saul: *You have actually described this as a paradigm war (Townsend Letter for Doctors and Patients, June 1996).*

Hoffer: Yes, and we are winning the paradigm war. Clinical research is continually a battle, pro and con. The reason is that probability theory is of no value whatever when dealing with people. This was pointed out very clearly by Lancelot Hogben (*Statistical Theory: the Relationship of Probability, Credibility, and Error*, Norton, 1957) over 50 years ago. Clinical tests were developed for plants and for animals and the various factors were much more readily controlled.

Saul: *Much medical knowledge has come from physician reports, which are neither*

double-blind nor placebo controlled. They are the valuable experiences of qualified observers. They are valid: just ask the patients who got better. Yet doctors' reports, as well as those of their patients, are typically marginalized as mere “anecdotes.”

Hoffer: Where are the good old days, when honest physicians honestly reported what they saw in language that any doctor could understand?

Saul: *What is the primary problem with modern medical research?*

Hoffer: The problem is a monstrous cancer affecting all of us and it is called Big Pharma. It needs a combination of surgery, radiation and chemotherapy. The medical profession has been reduced to the state of well-paid salaries for the drug companies and it is we who pay the bills. For example, Vioxx was promoted by one of the largest of advertising budgets and had characteristically high kill rates. Money, like water, will leak into every possible crevasse. We are literally inundated with this poisonous water coming from this industry. For too long has Big Pharma ruled the roost.

Saul: *You are still a fighter, at nearly 92 years of age.*

Hoffer: We have to continue our way without regard to the opposition. If not we will soon be working for them.

Saul: *Tell us about your roots.*

Hoffer: I was born on a farm in southern Saskatchewan in 1917 in our first wooden house. My three older siblings were born in a sod shack. Public and high school education was completed in single room schools. I had little to do with selecting my parents, selecting Canada, being raised on a farm, learning how to live with my-

self, and having to work hard physically. I was educated by and during the Great Depression. The Depression was so enormous that any recent so-called recession is laughable. I remember when the president of the University of Saskatchewan in 1938 circulated a memo to staff and students that they must use toilet paper sparingly. Some tried to split the rolls. That was a real depression.

Saul: *Where does your drive today come from?*

Hoffer: I have a secret which I cannot patent. I married Rose, had three marvelous children, made nutrition my career choice, and took niacin for the past 50 years. My parents provided me with the love and security and the same type of toughness they had shown in coming to the Saskatchewan prairies in 1904 and preparing me for this run. My wife, Rose, helped push me into medicine and supported me during every phase of our run. Her parents Fannie and Frank Miller helped us out so that I could become a medical student from 1945 to 1949. Rose believed in fate. She often told me that I would get the Nobel Prize. I did not bank on it, even though Linus Pauling had nominated me.

Saul: *Many honors have come your way. You won the Dr. Rogers Prize, have been inducted into the Orthomolecular Medicine Hall of Fame, and have won the Linus Pauling Functional Medicine Award, among others. Still, there is one distinction that not everyone is already aware of: Abram Hoffer is an honorary Maori Chief.*

Hoffer: Many years ago Rose and I were on a speaking tour. In New Zealand we were staying in a hotel where there were many guests. One afternoon, I was asked whether I would like to be made an honor-

ary Maori chief. When I discovered that all I had to do was to be there, I agreed. Later in the afternoon, in the large lobby with Rose and a swarm of hotel guests, the doorman, who was a Maori, started the solemn ceremony. I stood in front of him very respectfully. He began to talk to some one, silently, using his facial expressions and contortions. I was then told that he was cleansing me of any evil spirits. He did not tell me that he had seen any, and I was too cowardly to ask, but this was an important precaution as no one with evil spirits was going to be given that honor. After he had cleansed me, he stepped forward and threw a rather large, and, I hope, dull sword which fell in front of me. He must have had ample practice with this. Then he came forward and did something with it and lo and behold, I was a Chief. I have always taken this honor seriously especially since I am free of all evil. Someone should tell the American Psychiatric Association.

Saul: *You and the APA have not exactly seen eye to eye. Why?*

Hoffer: In 1950, I became Director of Psychiatric Research for Saskatchewan's Department of Public Health. I was a founder of the Canadian Schizophrenia Foundation, now the International Schizophrenia Foundation. My main objective was to research the cause of this disease and to find a better treatment. This is now called orthomolecular medicine, after Dr. Pauling published his seminal paper in *Science* in 1968. After the American Psychiatric Association called my good friend and colleague, Humphry Osmond, and me before their Committee on Ethics because of what I had published, they effectively killed interest in the use of vitamins for treating mental illness. The APA bears major responsibility for preventing the introduction of a treatment which would

have saved millions of patients from the ravages of chronic schizophrenia. Just as the APA was once captured by psychoanalysis, it is now captured by pharmaceuticals. They are biased. No amount of evidence will persuade someone who is not listening.

Saul: *And for those who are, you and I have two new books in the works.*

Hoffer: Our publisher is a great gambler. At age 91, I cannot guarantee that I will be around by the fall of 2010. But let's go ahead anyway, and you youngsters can complete it if I move on to other fields of existence.

In Memoriam

Abram Hoffer died May 27, 2009. Thanks to Dr. Hoffer, medicine will never be the same. That may be the best of legacies.

Postscript

The two most recently published books by Abram Hoffer, both coauthored with Andrew Saul, are *Orthomolecular Medicine for Everyone* (2008) and *The Vitamin Cure for Alcoholism* (2009). The first is a comprehensive guide to the nutritional treatment of dozens of illnesses. It is an updated, expanded version of Dr. Hoffer's 1989 textbook *Orthomolecular Medicine for Physicians*, which has been out of print for some years. The second book is about how to stop addictions to alcohol, caffeine, cigarettes, and drugs, and also relieve depression using high-dose nutrition. So effective is this approach that Bill W., co-founder of Alcoholics Anonymous, strongly urged AA members to use vitamin therapy. Bill W. was a patient of Dr. Hoffer's.

Like Linus Pauling, the volume of work Abram Hoffer produced resulted in a backlog. At the time of his death, Abram Hoffer was working on two more books: a definitive guide to niacin, and a guide to making your hospital stay orthomolecu-

lar. Both books will be completed by Dr. Hoffer's coauthors Andrew Saul and Steve Hickey, and published by Basic Health Publications in 2010 and 2011.

For Further Reading

Hoffer A, Saul AW. *The Vitamin Cure for Alcoholism*. Laguna Beach, CA: Basic Health Publications, 2009. ISBN: 978-1-59120-254-7. Reviews at <http://www.doctoryourself.com/alcoholcure.html>

Hoffer A, Saul AW. *Orthomolecular Medicine for Everyone: Megavitamin Therapeutics for Families and Physicians*. Laguna Beach, CA: Basic Health Publications, 2008. ISBN: 978-1-59120-226-4. Reviews at <http://www.doctoryourself.com/orthomolecular.html>

Hoffer A & Osmond H: In Reply to the American Psychiatric Association Task Force Report on Megavitamin and Orthomolecular Therapy in Psychiatry. Canadian Schizophrenia Foundation, Regina, SK, now at 16 Florence Ave., Toronto, ON, Canada M2N 1E9. August 1976. Full text at http://www.iahf.com/orthomolecular/reply_to_apa_tfr_7.pdf

A bibliography of Abram Hoffer's books and papers is posted at http://www.doctoryourself.com/biblio_hoffer.html

Abram Hoffer Tributes from Around the World

Greg Schilhab Canada

Abram, you changed my life. I first heard of you many years ago as I researched alternatives for my father who was diagnosed with incurable cancer. Forgotten in the dark stacks of the medical library at the University of Western Ontario, I found your *Journal of Orthomolecular Medicine*. From that moment on our family traded despair for real hope and, implementing all the protocols of orthomolecular cancer therapy, my father survived for years in good health instead of the few weeks the oncologists had given him. Thank you Abram. *Requiescat in Pace*.

Joseph Then Australia

Rest in Peace Dr. Hoffer. I am a retired almost 60 year old engineer and I know of your work only because I have one of your books, access to this website and because I have an interest in health and nutrition to ensure I age in good health and well-being. I have great respect for the pioneers in the field of orthomolecular medicine in which I count yourself as one with Nobel laureate Prof Linus Pauling. May your work inspire the next few generations of orthomolecular scientists.

Sandra Breakspeare United Kingdom

Dear Dr. Hoffer, I weep at your passing, I admired you so much, your dedication, commitment and genuine caring for your fellow mankind. When I heard of you and your work it gave me hope for my son whereas before there was just desperation and hopelessness. Although I'm not a professional I will continue to do what I can to spread the word of your work. You will be sorely missed.

Bill Reynolds Canada

I first met Dr. Hoffer in the mid 1960s at a lecture on psychedelics at the University of Montana. To say "meet" at that time is a slight overstatement; it was a very small group of students and so, quite intimate, so it was as if we actually met. I learned a bit about how B vitamins could be very helpful in working with young people who would get lost on psychedelic journeys and who could be assisted in reestablishing stasis with these vitamins.

I had no idea at that time that here was a man whose path I would cross countless times in the country and subsequent life path I would choose. In 1980 I commenced my career selling vitamins in Canada. At that time the company I was with was almost completely orientated to the professional market of doctors and pharmacies and we not only did some direct work with Dr. Hoffer supplying high potency pure vitamins, specifically niacin, we also attended, as an exhibitor, the conferences that the Canadian Schizophrenia Foundation held every year.

Through these events I was afforded the opportunity to meet Linus Pauling on a number of occasions, as well as another pioneer medical doctor in the US, Dr. Robert Cathcart. Meeting these people and listening to their discussions on the use of vitamins and nutritional supplements as adjuncts in the truly wholistic approach to human health have been a great benefit to me in my career.

I do not mourn Dr. Hoffer's passing so much as celebrate the life of a man who

never took the easier path, who not only practiced medicine but fought vigorously to expand the practice to include nutrients. He was a man whose legacy has left a mark on us all. Thank you, Dr. Hoffer.

Atsuo Yanagisawa, MD Japan

Dear Dr. Hoffer, You saved my son. My son was schizophrenic and was treated with niacin and other vitamins and minerals according to your book with sophisticated advice from your friends. My son is now getting well and working in a pharmaceutical company. I couldn't have a chance to say thank you until today, so what a sad day. Thank you and love always, Dr. Hoffer.

Albert L. Dardanelli, MD Argentina

Dr. Hoffer is no longer physically with us, however his work and his kind personality will stay with us forever. He was very friendly to me in spite of the distance, and generously contributed with his enlightening advice to the well-being of many of my patients. I can only regret that Dr. Hoffer never received the Nobel Prize. Dr. Hoffer, I know you are immortal and I will keep you in my heart for the rest of my life.

Andrew W. Saul United States

Abram Hoffer's life has not merely changed the face of psychiatry; he has changed the course of medicine for all time. His 30 books and over 500 scientific papers have yet to convince everybody, but they have well taught so many of us. We who have seen the benefits will tell the world. Such momentum is unstoppable.

If I might offer only one especially high compliment to Abram, it would be this: By experience, I have found everything he has written to be true. But there is much more than that: it is his presence and kindness to me that I miss the most.

Dag Viljen Poleszynski Norway

I was saddened to hear of Abram's death and would like to express my condolences to his family and many followers all over the world. I shall do my best to carry his legacy in my part of the world and I am grateful that I learned to know this great man!

Dr. Erik T. Paterson Canada

For more than half my life, and a major portion of my professional life, you were there as my best friend, mentor, father figure, and inspiration. In times of great stress, your fortitude was a great reminder to keep on. When I learned of your death I cried, mourning you more than I mourned the death of my father. Thank you for your and Rose's hospitality to me and my family. The world will be a poorer place without you. May you be back with Rose again.

Christine Miller, PhD United States

This sad news has affected me deeply, as I will forever regret that I did not get the chance to meet Abram Hoffer in person. Although his pioneering work has not yet received the complete recognition that it deserves, I believe that it will because he was following the correct path. From the time that he first wrote to me about my studies into the molecular basis of schizophrenia, there began a process of opening my eyes to the possibility that an orthomolecular approach might really work. With

intelligence and caring, he responded carefully to all my questions and it was clear that I would learn very much from our continued correspondence. There are still questions that I wanted to ask. I can therefore hope he left this world knowing that there are those of us out there who placed high value on his knowledge, his contribution, and what he had to say at the very end of his life. My heart goes out to his family and to all who were friends of this remarkable man.

Gert Schuitemaker Netherlands

The message came as a shock to me. Unexpected, despite his old age. But he still was so alive! He was a kind of director (as of a movie) in Victoria, giving directions, encouragements and comments, so characteristic for him.

Since the 1980s I had contact with him. It was a big encouragement to have the support of the founding father himself. This has helped a lot to get orthomolecular medicine on the road in the Netherlands.

But, now, a feeling of gratefulness is predominating. We can look back to a most valuable life, where he has helped so many people. We may say that he has helped mankind perceptibly. Not many persons can say that. Most probably one of the best things, that could occur in his professional life, was stated by him in his last email to me: "we are starting to flourish. I think we have turned the corner." (May 17, 2009)

Jonathan Prousky, MSc, ND Canada

I am so sorry about the passing of Abram. He was a tremendous person and physician. I have been so significantly impacted by his work and his generosity that I will miss him very much. I will miss his emails to me and his constant encouragement and support.

He was a mentor of mine and probably never realized how much he actually shaped my clinical work with patients. Abram was a tremendously gifted and creative person who will be missed by the thousands of patients that he helped and the thousands of clinicians that he inspired. Thank you Abram for all that you did and the incredible legacy that you leave behind.

Angela Webster Canada

Abe has made a significant difference in his lifetime. Very few people have the courage, integrity and fortitude to take a stand on principles as he did. He paid a price in the short run in terms of peer recognition and endured barbs and criticism, but in the long run, his work will continue to provide benefits to everyone in the field of complementary and alternative medicine as well as conventional medicine and people generally. He was a true pioneer and a curious, energetic professional until the end. What an exemplary life and an inspiration to many for years to come.

His presence will be missed but he will live on in the hearts and minds of the innumerable people he has helped and inspired.

Norma MacKellar Canada

It is with sadness that I read of Dr. Hoffer's passing. I took my son to see him in Victoria three years ago. His work played a major part in turning our family life around. I greatly admire his commitment to supporting families like us giving us back hope in our future. Abram Hoffer's life will be long celebrated in our home.

Robert Sealey, B.Sc., C.A. Canada

Abram Hoffer saved my life - but he was not my doctor. After decades of living with a bipolar II mood disorder and getting misdiagnosed and mistreated, in 1995 I was sick, suicidal and desperate for help. Another depressed person suggested the Journal of Orthomolecular Medicine. Two miles from my home, Steven Carter introduced me to books about restorative care and I quickly recovered by reading and carefully following the suggestions of orthomolecular health professionals. Even though I was just a nobody from nowhere (and not his patient), Abram Hoffer showed me respect, approval, interest, support and encouragement. He encouraged me to pay-it-forward by volunteering, attending orthomolecular conferences, reading and reviewing orthomolecular books and telling other people so they could benefit from the best quality care in psychiatry: differential diagnosis and restorative treatments. Thank you Abram Hoffer for saving my life and for helping thousands of other patients to recover and live well.

Thank you for researching and developing orthomolecular medicine as a restorative dimension of care. Thank you for writing books and articles and editorials and thank you for setting up a worldwide network of friends, patients, family members, caregivers and health professionals who know that orthomolecular medicine can restore health so patients can recover and live well. We will never forget you, Abram Hoffer, for co-founding orthomolecular medicine and dedicating your life to researching and developing restorative treatments, caring for patients, writing, networking, educating the public and sharing your adventures in psychiatry for more than 50 years!

W. Todd Penberthy United States

What a terrible void I personally feel with Abram not here. He was so apolitical yet monumentally successful as a medical doctor and scientist in the truest sense of the word successful. It is so rare to find an individual so generous with advancing human knowledge in such incalculable fashions. He was just a shining example of what a medical doctor and/or scientist should strive to be. Abram was a man who really cared about the patients more than all of the material things. Cannot even begin to say enough about him and I only met him once in my life. He was one of the few people that really endlessly asked the question: What works best?

Maie Liiv Canada

Pericles - "What you leave behind is not what is engraved in stone monuments, but what is woven into the lives of others."

Patricia Jobst United States

I did not have the pleasure of meeting Dr. Hoffer; however, as an assistant to Dr. Riordan, I corresponded with him. He impressed me as a very kind and compassionate man, dedicated to helping others. Mostly, I will remember the enduring friendship and respect between Dr. Riordan and Dr. Hoffer.

"Death comes to all, but great achievements build a monument which shall endure until the sun grows cold." - Ralph Waldo Emerson

Raymond J Pataracchia, BSc, ND Canada

I will always remember Abram as a humble giant in his field. Abram left us a detailed knowledge base suited to alleviate human suffering. When I was an intern,

he instilled in me a passion for psychiatric nutrition. I will not forget the direction he gave so freely when I was a student and later in clinical practice. Though it is a great loss and we are all in mourning, Abram left us tools to move ahead and forge orthomolecular medicine into the landscape. Big shoes to fill

Rosalie Moscoe Canada

It still doesn't feel real - Abram Hoffer, this giant of a man, having passed away. I will miss his brilliant and always caring mind and heart. I was fortunate to know him and work with him through the International Schizophrenia Foundation. His books are enlightening and highly recommended to all. He was caring, determined, and pioneered a new paradigm in medicine which is slowly but surely taking hold - nutritional therapy to help ailments of humankind and to prevent them as well. His work will live on, but I will miss seeing and hearing him speak in person. He was determined to help those with schizophrenia and other mental illnesses, so that they could live a better life and prosper.

One of his early books on schizophrenia helped save a member of my own family. How fortunate our family is that I found that book It spurred me on to become a holistic nutritionist. My family and I send our deep sympathies to Dr. Hoffer's loving family for their loss. His work will shine and live on through his books, research papers, editorials and in those he has treated and mentored. I know that in time his contribution will be felt by all on this planet. We'll all miss you Abram. We are all so grateful for your tremendous contribution, your spirited tenacity, and for your life's work of helping others.

Kent Macleod Canada

His death has come as a surprise. His mind and his drive never seemed to age. All of us who have strived to help others using orthomolecular methods have been inspired and encouraged by Abram. Sometimes, when I have felt discouraged simply the thought of Abram has put a smile on my face and a jump in my step. When I have faced adversity I have used the technique "what would Abram say or do?" to guide me in my next step. It is a great loss but his heart and mind are not easily forgotten. I am a better person and I am grateful for having known him. I express my gratitude personally and on behalf of my clients.

Barry Breger Canada

Some thoughts on Abram Hoffer, my teacher: I can only reflect with some regret on my decision not to go see Abram last February and thinking "at his age, we never know how long he will be with us". My reasons for not going seem small and unimportant in retrospect; alas, that's life. No regrets, just lessons.

We have lost a giant, a force of sanity, logic, knowledge and above all, strength and inspiration for those of us who follow. With him go his deep well of memories, his perspective on the history that he lived and that he studied, his experience; in short, the wisdom that can only come with the weight of years.

I am greatly saddened for myself, for our struggle and for the world. It sounds like he died as he lived - no beating around the bush, no wasting time or words; a life lived to the fullest, a short hospitalization and on to the next stage. If he had something to say, whether it was in speech or through the written word, he just got on with it - direct, well informed and to the point. I will miss his editorials in the Journal. I was already missing his closing talks at the OMT conferences.

His life and his work have profoundly affected my life. They are responsible for the direction my life has taken, from my first reading Linus Pauling's book in 1970 *Vitamin C, the Common Cold and the Flu*, a book and a direction that Pauling took because of Dr. Hoffer, to his book, *Adventures in Psychiatry*. Through me, many people's lives have been affected, and I hope many more will be.

Bradford S. Weeks, MD United States

Abram Hoffer was a mentor - infinite in his compassion, encouragement and inspiration. It is an oxymoron, breath-taking as it is bewildering, that such a potent and persistent force for health and life has passed on.

I credit so much of what I do well for my patients today to this fine doctor. Abram was a true scientist and an inspiring teacher whose successful, innovative orthomolecular practice offended lesser physicians. Fully deserving of the Nobel Prize in medicine, alas his remedies were natural, not patentable, (cheap not expensive) and his life-transforming work was therefore shunned by the medical industrial complex.

Who will miss this man? All those suffering with psychiatric illnesses and those who like me who strive to help them. We can recall the words of the 14th century physician, Paracelsus in reflecting upon the career of Abram Hoffer - Paracelsus wrote: "I pleased only my patients."

Abram pleased his patients (an understatement!) as well as his students and his orthomolecular colleagues, but he terrorized those doctors whose practice was limited to patent pharmaceutical remedies for they were neither scientific nor, in the long run helpful. Today psychiatry offers less benefit than did the Quakers over 100 years ago when their cure included: 1) low stress "time out" from the life process which drove them to a nervous breakdown, 2) good whole food nutrition and shelter (lowers stress and thereby adrenochrome); 3) opportunity to develop self esteem through meaningful activities while they recovered.

Primum non nocere - first, do no harm - described Abram's orthomolecular work and because of him, tens of thousands of lives are more whole and fulfilling and (his personal yard stick of recovery) more taxes are paid, because he brought the psychotic back to (specifically a productive and rewarding) life.

No one else was able to do that when Abram started out. He changed medical history and he changed the lives of everyone who was fortunate enough to meet him.

What will we orthomolecular doctors and we families of those suffering with psychiatric illnesses do now without Abram to guide us? Who else stands astride the entire history of modern psychiatry and remembers the relevant old studies which hold orthomolecular keys to new therapies? No one can fill the professional void he left.

Pavel Aksentyev United States

Dr. Hoffer has passed away, but his legacy will remain. The field of Orthomolecular Psychiatry is entering a new phase, and we, as a community, have grown enough to continue without the direct support of our forefathers. Thank you, Dr. Hoffer, and have a wonderful journey! Peace

Joan Mathews-Larson, PhD United States

Abram's passing fills me with such sadness. His wisdom and innate goodness has pioneered a real renaissance in healing that continues to prove itself all over this planet wherever orthomolecular medicine has taken roots. To leave such a legacy for

humankind is breathtaking! Abram, your personal kindness and support shall never be forgotten. To Abram's children Miriam and Dr. John: God bless and comfort you both through these sorrowful days.

Harold D. Foster, PhD Canada

I can think of no words to describe the loss of a great doctor, a great man, a great nutrition pioneer, and friend. The world has lost a leader of Orthomolecular Medicine. I would like to think that he, Dr. Pauling, Dr. Riordan, Dr. Cathcart and the other great scientists are gathered around a table and planning a great Heavenly "Orthomolecular Meeting." I will miss him and his expert advice more than I can say. We have lost him, but not his goals. It is our obligation to make sure that, ultimately, orthomolecular medicine triumphs.

Dr. Steve Hickey United Kingdom

Abram Hoffer's leadership and genius will be sorely missed. The last of a generation of great doctors and scientists in the field of nutritional medicine, he was an inspiration to all who knew him. Hoffer gained worldwide fame, firstly for his work on the origins of schizophrenia and, later, for his contributions to nutritional medicine.

To those who knew him, Hoffer had a spirited sense of humour and, in his own words, the hide of a politician. He needed that protection as, for much of his career, he was in conflict with prevailing ideas and paradigms in medical science.

On one occasion, I told him of my astonishment at seeing niacin, his favourite vitamin, transform a patient suffering from an intense psychotic episode back to normal functioning. His reply illustrates his good humour, despite decades of fighting the medical establishment: "My critics never called me liar when I spoke about recoveries, but they knew that it was due to my marvellous healing personality, as they also knew as a matter of fact that vitamins had absolutely nothing to do with schizophrenia. Now we know that you, too, have that marvellous personality. Congratulations."

Dr. James A. Jackson United States

Dr. Abram Hoffer was an intellectual giant and visionary who deserves my total admiration and respect

Orlando Pacin, CFT Malaysia

This has been a great loss, but his legacy will live forever, we need so much more of this type of medicine that he mastered. Your thoughts and genius will always be with us. Thank you for all your kind work. May you rest in peace.

Dr. Ian D. Brown Canada

My sincere condolences. Abram Hoffer was a great man! I had the privilege of preceptoring with him at his office in Victoria. He treated everyone with compassion and respect, and most of all gave them hope. I enjoyed seeing him at Orthomolecular conferences across Canada. My thoughts and prayers go out to his family and many friends. I can rest assured that he lived a full and service filled life. May his memory and work live on.

Patrick Holford United Kingdom

I am so grateful for Abram's life. Together with the greats of orthomolecular medicine - Linus Pauling, Roger Williams and Carl Pfeiffer - we have the legacy of a

truth about a new approach to medicine and mental health that cannot be undone. When we invited him to the UK to lecture at a conference he cornered me in the lift (elevator) and said 'You will make a huge difference to mental health in Britain.' It felt more like a command than a prediction. I hope he keeps sending his blessings from above because we've got lots of work to do in his honour.

Dolores Bruni Canada

Abram Hoffer was such a wonderful, inspirational man and helped many people. I wish I had the opportunity to meet him. I had e-mail correspondence with him and he encouraged me to pursue my quest in helping my mother who was diagnosed with Schizophrenia. I have learned so much from him, I just wish that I could have learned about him sooner. He was a giant in his field and beyond and hopefully with all of his advancements, the face of conventional mental illness will be changed. We owe a lot to this man and I am truly grateful to know of him.

Efrem Caballero United States

We've known about his scientific works only a few weeks and we are convinced of the great benefits that they have and continue to contribute to the mentally ill and their families. He has given hope to the desperate and abandoned. After reading three of his books we came to the decision of traveling next week to Victoria B.C., Canada seeking a cure for our son.

Through his books and articles we learned, for the first time, about the existence of the International Schizophrenia Foundation and we plan to become members. Today we just received in the mail the DVD *Masks of Madness – Science of Healing*. We are deeply saddened for his death but grateful he left well trained and competent people to carry on his mission. We shall do our best to make known his legacy around the world, especially in our country, Colombia, South America.

Jan and Pat Galasso Canada

From Jan: How can I thank you Dr. Hoffer for your advice on what nutrients to take when I was diagnosed with breast cancer in Apr. 1997. You answered many questions and always got back to us promptly. What generosity and kindness you showed to me and so many others. Your leadership has taken Orthomolecular Medicine to a much larger number of people and many are following your lead. 12 years later I say Thank You from the bottom of my heart.

From Pat: The surgeon sloughed off any discussion of nutrient assistance prior to contacting Dr. Hoffer. A month later, after Jan had been on the nutrients recommended by Dr. Hoffer, and just prior to the surgery, the surgeon said "Excellent, the tumour has not progressed". We knew why. The lumpectomy was performed and we then met with the oncologist who strongly recommended radiation treatments. At the end, Jan said "I intend to go the natural route, and not take radiation", after which the oncologist said, "Just think, Mrs. Galasso, how you are going to feel when you realize that you have made the wrong decision." So much for medical ethics.

How does one evaluate, measure, assess the knowledge, generosity and dedication of someone who saved the life and quality therein of the one you love so dearly? God Bless You Abram. You have set the bar at a height never to be surpassed in a life dedicated to the wellness of others.

Chad Wilcox United States

I would like to offer my condolences for the friends and family of Dr. Hoffer. I have been conducting historical dissertation research on orthomolecular psychiatry and megavitamin therapy for schizophrenia, and have necessarily spent much time reading the works of Dr. Hoffer. I am thoroughly impressed with his seemingly indefatigable dedication to his field. His contributions to the biochemistry of mental illness will not be forgotten. Psychiatrists around the world would be more capable professionals if they exhibited the passion of Dr. Hoffer.

Linda Santini United States

It is so hard to accept that my hero, Abram Hoffer, is no longer with us. To this day, I can separate my life into two distinct halves: Part 1 was the chaos and misery we suffered at the hands of APA psychiatrists who only gave labels for my loved ones' psychiatric problems, then prescribed synthetic drugs to cover up the symptoms. Part 2 began the day I learned of Dr. Hoffer and orthomolecular medicine. Now, instead of my loved ones being forced to live out their lives with "ADHD" or "bipolar with psychosis," or "uni-polar bipolar," or other meaningless labels, we have real mental health and lives worth living. Dr. Hoffer taught us to be intelligent about mental health. I wish everyone knew about Dr. Hoffer and orthomolecular medicine. I am honored that Dr. Hoffer wrote the foreword to my book, encouraging me all along the way until it was finished.

Revered by so many, myself included, Dr. Hoffer was a great man and will be sorely missed. My deepest condolences to Dr. Hoffer's son and daughter, John and Miriam, and the rest of his family. You will always be in my heart, Dr. Hoffer.

Steven Battaglino, D.C. United States

The ending to Dr. Hoffer's In Memoriam video says it all, "thank you." I must echo Dr. Hoffer's own prediction that the currently accepted treatment paradigm will be forced to reverse itself in the future, due in very large part to his tireless efforts. Indeed, a shift has already begun, and the truth can never be permanently suppressed. History will honor you as I do.

Eva Herr United States

I am so honored to have known Dr. Hoffer. I had the privilege of interviewing him on my radio program (Infinite Consciousness www.bbsradio.com) on April 12 just a few weeks before he died. What a brilliant and honorable man!!! If anyone would like an MP3 of the audio, please email me at evaherr@gmail.com and I'll be glad to email one free of charge. Agape.

KM Canada

My psychotic episodes are gone now thanks to Dr. Hoffer! I have not been hospitalized in 9 years. I take Hoffer's prescription for me: 3000 mg of niacin a day, 1000 mg of vitamin C, super halibut oil, B 50, 5 mg of folic acid. I also take a low dose of Risperidone because I am too scared to not take it. I am not sure if I need it now that I have quit smoking, too. I am avoiding chemicals in foods that helps too. I adored Dr. Hoffer. He was a very important and also courageous man. I think his patients should petition the medical field to research niacin once again. Why should people suffer needlessly when they don't have

to? I have been through hell with my illness and so have others. Why won't the medical field work on the advancements Hoffer has made? I will miss Dr. Hoffer terribly he was an awesome individual with a huge intellect! Must remain anonymous as I do a radio show and do not want my listeners knowing I am bipolar/schizo affective.

Aileen Burford-Mason Canada

A true pioneer, and a life lived well. My condolences to his family and the colleagues who worked closest to him. He will be sadly missed.

Patrick Kelly Canada

Dr. Hoffer, I'm so sad that you've passed on. I wanted to come and take you for lunch again. You saved my life from the grips of what was called terminal bone cancer. In 1999 I was diagnosed with chondrosarcoma and you were the first person that offered me hope other than surgery (which I didn't have). I still take most of the orthomolecular program that you prescribed for me ten years ago. You gave hundreds, perhaps thousands of cancer patients important hope to live. You were a great inspiration and leader in the world of complementary health care. I will miss you!

Romarico Galvez Singapore

I first learned about Dr. Hoffer's orthomolecular medicine in 1978 when I was suffering from depression and hypoglycemia. My physician at that time was Dr. Purificacion Verzosa (deceased) a pioneer Orthomolecular practitioner in the Philippines. She prescribed me an intake of vitamins C, E, niacin and niacinamide. I stopped the sessions with Dr. Verzosa due to budget constraints but continued with the intake of the vitamins on an ad-hoc basis. The therapy did not completely resolve my problems but it was helpful in increasing my appreciation of safe alternative medicine. I owe this all to Dr. Hoffer. Rest in peace, Dr. Hoffer, you will be missed by many. God bless you.

Irene Carlson Canada

A wonderful pioneer in his field that we will never again see the likes of again. He was kind, gentle and ever so humble! Thank you God for this wonderful man, a gift to the abandoned and the wealthy. It did not matter with him he loved everyone.

Audrey Alexander Canada

My heart is heavy at the passing of a dear friend. Abram's prompt replies to my queries for my family and clients were always right on, encouraging and supportive. His life and how he gave to mankind is an inspiration to all of us, colleagues and patients alike. We will all miss him greatly but pledge to "carry the torch" for Orthomolecular Medicine. My deepest sympathies are extended to Miriam, John and families.

Noemi Rodriguez Mexico

I met Dr Hoffer in Victoria with my aunt who had liver cirrhosis and traveled from Mexico a long way, to see him and Frances, in order to get help with orthomolecular medicine. He and Frances not only helped me but gave my aunt a program with kindness and good will. She died in December, 2008. I know Frances and many more will continue with this purpose.

Sara Sochaczewski Canada

You saved my daughter's life and, by extension, my own. That's where it started but that's not where it ends. You gave me a new passion in life and I will continue to spread the Orthomolecular message in any way I can.

You gave me a card that says, "Strength does not come from physical capability. It comes from an indomitable will." And I have that will. Thank you.

Rose Carreras Canada

He was a wonderful man, true to his ethics and pursued his beliefs to the end. We are a family that have progressed from crisis to calm, with the application of his advice.

Malcolm Canada

A very kind and encouraging individual.

I saw him on many occasions for my schizo-affective disorder which I treat with niacin, other B vitamins, fish oil, and a low dose of medication. I agree with other posts that Niacin (and its flushing properties) should be researched for its ability to make significant benefits to stress and psychotic symptoms. Hopefully his work will continue to inspire new physicians to better treatments that drugs along do not provide. Thank you Dr. Hoffer.

Darlene Bird Canada

My son and I had seen Dr. Hoffer again about 10 months ago. He looked wonderful and we found he has the most kind and sincere spirit. He made the world a better place and we feel privileged to have known him. What a brilliant man.

Bill Houston Canada

I was first made aware of Dr. Hoffer and his work in 1969. I had had a "nervous breakdown" at school and was having a difficult time trying to distinguish reality from fantasy. On his treatment program (niacinamide and ascorbic acid), I fully recovered and have remained so ever since. Thirty years later, at an orthomolecular conference, I was surprised that he actually remembered me and my case! This encounter convinced me that he was no ordinary doctor. Dr. Hoffer and I corresponded by email during the last years of his life and I will always treasure my association with him. I was amazed at his clarity of thought at such an advanced age. It was obvious to me that he was doing something right.

During a long and distinguished life, he brought hope to people for whom there had been no previous hope. He stood up for what he believed even in the face of fierce opposition and he challenged arrogance and ignorance wherever he found it - even when he found it at the top of the established order. I will miss him but will celebrate his life as long as I live.

Maria B Canada

Dr. Hoffer lived a long and productive life with the aim of alleviating the suffering of people. His family and the ISF will continue his work. Let's see the work of Dr. Hoffer and Linus Pauling become mainstream medicine.

S Boisvert Canada

Last month I wanted to sent an e-mail to Dr. Hoffer to let him know that my son started his orthomolecular program again and that his health is improving ... I feel

sorry that I did not ... We first read about orthomolecular in 97 and it was really great to be able to send Dr Hoffer an E-mail and to receive an answer within a few days. He gave us hope and personal encouragement. He really cared and even if we feel it as a great loss not to have him with us any more ... his spirit lives on and with it the feeling that we have the power to make our lives better . Thank you Dr. Hoffer.

Donna Robinson Canada

Dr. Hoffer was a courageous, compassionate and brilliant man, truly a unique physician and a great Canadian. We were fortunate to hear him speak and to speak personally with him two years ago, and to be able to thank him for all he has done for others. He was a blessing to all.

Sam Ibrahim Canada

I saw Dr. Hoffer quite a few times and I used his orthomolecular treatment as pharmacist in my store in Edmonton for about 30 years until I retired five years ago. He was great, gentle and kind. I will miss him.

Celia T. Lising Philippines

I wanted so badly to take my daughter to see Dr. Hoffer as early as last year but my daughter was not ready then. Finally in May, our family made the 11,000 plus miles trip to Canada to see him but was only met with disappointment. Dr. Hoffer had gotten ill and we found out he had died 6 days after our appointment date.

Although my daughter was never able to see him, she has already taken the “orthomolecular route” to recovery and healing. We will forever be grateful to Dr. Hoffer for this. I am personally enlightened by the books he has written and because of this, I have gained faith, peace, and confidence in dealing with my daughter’s illness. Thank you so much, Dr. Hoffer!

Jack Phillips United States

As a new friend and admirer of Abram Hoffer, I am saddened by my loss of a mentor. He encouraged me to do what I could to remove the stigma associated with mental illness and to improve the circumstances of those unfortunates who are forced to reside in jails and flophouses in my country. His death at my age makes me aware of my mortality, but with continued vitality I shall continue to pursue the goal of making orthomolecular treatments available to the mentally ill.

Anna Gabrilo Canada

I just want to say that Dr. Hoffer was my ultimate healer for all my illnesses and it was a pleasure meeting you and to all the others him. He changed my life for the better and I’m glad, happy and enlightened that I got to use the power of his healing to cure my mind, body and soul. He is an amazing man and rest in peace because the universe is watching you! Love always

Karen Serene Carr United States

I just want to say that Dr. Hoffer will be missed. I never had the opportunity to meet him personally, but I had the opportunity to speak with him over the phone. Dr. Hoffer instructed me concerning my son’s illness with schizoaffective disorder.

He was very helpful by giving me the name of a doctor who could help my son. I will miss Dr. Hoffer, He was a great man!

Dr. Elisabeth Gold Canada

I am sad to hear of Dr. Hoffer's death. He generously replied to my many emails about my son. His wisdom and caring helped me through many dark times and also helped my patients. His legacy is tremendous. A real mensch.

Ron Montgomery Canada

Dr. Hoffer saved my life almost 40 years ago. He is a true hero. Being trained as a film maker I've always wanted to tell the story of how I triumphed because of him. It became clear the stereotype of schizophrenia is still out there and even just saying that you were cured of it leads to suspicious reactions. People just don't believe it's curable. Well it is and I'm living proof. Thank you forever, Dr. Hoffer.

Sung Ho Park (Korean Society for Orthomolecular Medicine) South Korea

What a great loss, indeed. But what great legacy he leaves behind for us all to continue. Not only was Dr. Hoffer an amazing gift to science and medicine, his courage to challenge the conventional wisdom of his time continues to inspire us all today.

When the Korean Society for Orthomolecular Medicine (KSOM) was founded in 1998, orthomolecular medicine was a relatively unknown concept in Asia. Over the past decade or so, I was able to witness Dr. Hoffer's passion for his work that was simply contagious. And it is in the spirit of that same passion that KSOM continues its work today. The impressive number of Asian delegates in attendance at the recent Orthomolecular Medicine Today Conference in Montreal is a testament to Dr. Hoffer's passion that is alive and well!

Lori Holman United States

Dr. Hoffer was without a doubt one of the greatest humanitarians and physicians in the world. He knew not only how to help to cure with orthomolecular medicine, he understood genetics and stress as it contributes. I feel honored to have met him and been treated by him. His deep sense of inquiry and his compassion was inspiring to me and informs my work as an advocate. I will never forget him.

Andrea Chernin, MD Canada

What a rare privilege to meet such a brilliant man and true patient advocate, and to have him transform the lives of so many who could not be helped by conventional medical "best practices." I look forward to a time when conventional medicine/ psychiatry matures and embraces Dr. Hoffer's paradigms sufficiently to become the true healing profession they desire to be.

Lisa Maxine Kjernisted Canada

I am eternally grateful to have met Dr. Hoffer in the late winter of 2009. He treated my children who suffered from bouts of acute, debilitating rage &/or anxiety, children who were 95% of the time well adjusted, compassionate & confident. His recommendation of high doses of B₃ and vitamin C has worked effectively to help them to deal with life's curves & tailspins calmly & thoughtfully. I will never forget Dr. Hoffer (nor will Jasper & Sara) for the simple yet effective life altering

treatment he suggested. I continually share my experiences & what Dr. Hoffer suggested with others to advocate for Dr. Hoffer's orthomolecular medical philosophy. Rest in peace Dr. Hoffer. We will always love you and remember how you changed our lives for the better.

David Lalande Canada

What a joy it was to meet such a caring man. When I had brain cancer, he was the only doctor that told me I was going to be alright, and he was right! I will miss him so much.

John Lalande Mexico

Dr. Hoffer is a hero to myself and my family. This great man helped to save my brother's life when he was battling cancer. As well he inspired me through his treatment protocols to beat a vicious cycle of alcoholism. Peace, Dr. Hoffer.

Karen Khoo Malaysia

I will always be thankful, appreciative, and honoured to have met Dr. Hoffer. May his legacy continue by those who share his vision. My thoughts are with his children and their families, and those who have had the privilege to know him; be it personally or through his books and writings. Thank you, Dr. Hoffer, for being here as long as you were.

Deirdre MacKenzie Passmore, BC

Dr. Hoffer saved my life in 1993. He diagnosed pellagra and recommended the treatments I needed. Every creature is grateful for another's kindness - but isn't it wonderfully gratifying for a doctor to be able to see such a marvellous effect of his/her treatment and advice on a patient, and to witness the amazement, the relief, the joy of improvement. I had cataracts, dx'd in 1992, But they'd gone away - that is, I was able to see again. But the improvement had been dependent on my improved metabolism. It was all a great mystery. However I can attest to the fact that without Dr. Hoffer's help I would never have had the confidence or the determination to persevere in my struggle to get treatment such as cataractomy, and finally, the respect of physicians who consistently behave as though I was too old and too sick to bother with.

I would like to say that his patients are his life work's legacy and all the proof the world needs of the rightness or orthomolecular treatments. My own doctor - an excellent doctor who knows far more than most physicians the worth and the benefit of vitamins, minerals and enzymes and factors and co-factors.

Cyndi Hoholik and Robert Maldonado United States

Unfortunately, I did not have the privilege of meeting Dr. Hoffer, nevertheless, that doesn't mean he hasn't helped us. My son and I have read several of his books and have spoken numerous times with Frances on the telephone. It doesn't take genius to recognize genius and that's precisely what Dr. Hoffer was. More than that, however, was who he was. Even without meeting him personally, I feel confident in say that Dr. Hoffer was a kind man with an insatiable drive to help people. This fact is reflected in his every word throughout his many published books and articles.

Because of Dr. Hoffer's incredible research and his infinite compassion for people suffering from biochemical imbalances, I believe that one day all will acknowledge

that mental illness is a physical illness that can be cured. Dr. Hoffer wrote in his book, *Healing Schizophrenia*, that someday the name of the mis-termed chemical disorder, schizophrenia, would be dropped for a more appropriate term/name and the group that excretes KP (kryptopyrrol) would be termed pyroluriacs. Thus the stigma placed on these individuals would be removed, as pyrolle disorder is a vitamin B₆ and Zinc deficiency. God knows our physicians and psychiatrists here were not willing to listen or acknowledge what I knew in my heart was the truth when I read Dr. Hoffer's many articles and books.

Therefore, I thank God for Dr. Hoffer and all of his research that has saved so many from pain and anguish, including my son and myself. So today, to begin the change, I want to say that my son suffers from pyrolle disorder and he is not schizophrenic, but instead more correctly termed, pyroluriac. Thank you Dr. Hoffer! You've made the world a better place. What a great legacy to leave.

I extend my sincere sympathy to Dr. Hoffer's family and close friends.

Sara Kjernisted Canada

I am 8 years old and want to say that what Dr. Hoffer suggested really helped me.

Sigmund Rosen, MSW United States

My family and I are all much better due to good doctoring, and especially the kind attention of Dr. Hoffer. A seer is often recognized by his progeny and influence in following generations; we look forward to continued research and fine-tuning of the diagnosis, treatment and possible prevention of illnesses. Institutionalization of his protocols is a must. A patient dx. with Schizo-affective and 79 IQ now has a magna cum laude. He remains on the protocol.

B. Popovic Croatia

I was diagnosed with schizophrenia in September 2007 by a renowned Swiss psychiatrist, who ironically for some time was my professor in Zurich, where I studied Psychopathology of Adults as a minor at University. He wanted to prescribe Haldol, predicted that I would be coming to a mental hospital from time to time, and that I will need to take Haldol until the end of my life. Of course I would not be able to work and function socially. Lucky me, I did not listen to him.

I found the information about Dr. Hoffer and his work with B3 on Internet. The moment I started to take it my condition improved. In December 2007 I visited him and Frances in Canada and started multivitamin treatment which helped me a lot. The truth is that I also meditated, exercised and started my own business to be able to socialize with people. Now I feel completely cured, and except for some of my friends and my closest family members nobody even knows that I ever have been sick. Meanwhile I passed two exams in a very rigorous MBA program.

I feel so blessed that I found out about Dr. Hoffer's work. He was great personality, a pioneer and I hope that his work will posthumously get the recognition, that it deserves.

Kim Bezaire Canada

I was fortunate enough to have loved one of Dr. Hoffer's patients, and will always be thankful for this. It was while I was pouring over a fascinating dog-eared paperback I had scrounged from the Sally Ann bookshelves in Winnipeg,

in my zeal to learn all things healing by nature. *Nutrients to Age Without Senility* made me call out to my partner of how fascinating and wonderful these decades old words reached into my brain, igniting my lifelong passion for information to ease the pain of the world. Having never told me of his “former” schizophrenia, he said, “Oh, that is the doctor who treated me for the acne on my back!” I get a chuckle out of it to this day, because my partner was functioning in life without schizophrenic symptoms, and so I came to see the actual power of Dr. Hoffer’s work in my everyday life. I now see orthomolecular medicine as a language to read the world, past, present and future. The politics of capital tries to destroy the momentum of this information reaching out to the world, but it is now unstoppable. It is my life goal to make sure that orthomolecular medicine is defended and brought forward, at all times applicable. I will always honour this great human being and all those who supported him. Let’s keep the momentum going!

Lila O’Connell United States

I am deeply saddened by the loss of such a great man. My heart goes out to his family and to all of us whom he helped with his experience, knowledge, and compassion. When I finally met him a couple of years ago, I was impressed by his brilliant mind and also his humility. I wish we had met sooner. I thank God for Dr. Hoffer and all he taught us.

Marina Jacobs United States

I send my deepest sympathy to the family of Dr. Hoffer. After my 12 yr old son’s fits of rage and cursing at the slightest thing for the last year, I prayed to God to give me an answer to save him from a life of misery. I typed in Chemical imbalance last night and there was Mr. Hoffer’s book online. I read it through last night. I believe God has lead me to the answer. The symptoms are on key. I will be trying the vitamins and looking for a Doctor that specializes. I have only known of Dr. Hoffer for 12 hours and I feel hopeful and blessed. Thank you to the family and God bless you.

Anthony Kupnicki Canada

Abram was a friend, a role model, and an inspiration for the truth. He claimed the interview I held in his office was the best he’d ever had - even better than when the BBC came to visit him there.

Lisa Interollo United States

I was deeply saddened to hear of Dr. Hoffer’s passing. He was truly a great man and a pioneer who demonstrated remarkable courage.

A & M Delgado Canada

We had the great opportunity to meet Dr. Hoffer, a brilliant man who dedicated his entire life to help the sick especially those afflicted with schizophrenia. He was tireless and ready to help at anytime.

Because of the benefits received through his advice, conferences and books, we can say that we owe Dr. Hoffer the peace and well-being of our family. Our deepest gratitude to the late Dr. Hoffer. He will always be in our hearts. Our condolences to his family.

Robyn Hertz Canada

Dr. Hoffer gave me the chance to achieve optimum health. He saw my obstacles and understood my psychology, which led to my development as a strong independent adult. He made me realize that success in health is the ultimate position in life.

He helped show people who I am. This gave me confidence and trust in myself. It made me realize what type of life I choose for myself.

It is through his guidance that my development will continue even in his absence. I feel that even with his death, he is still here among us. I know that I have not been forgotten by his death, that he is a presence for eternity.

Judy Wong & Care Smith Canada

We are very saddened to hear that Dr. Hoffer has passed away. He saved my daughter's life. She was unwell for the better part of her life. Doctors could not figure out what her problem was. She was seen by psychiatrists as early as age 9. When she was 15 and presented with the same symptoms she had had all of her life psychiatrists had the audacity to say "oh well now we know what is wrong with her because now she is old enough to have these symptoms". They wanted to admit her to hospital and fill her with psychotropic drugs. Psychiatry paid no attention to the fact that her skin was scabbing and flaking. That she couldn't run or move fast without passing out. That her condition could be medical - imagine that.

Thank you to a friend who listened to my story and asked me if I knew of Margot Kidder and her history and introduced me to Dr. Hoffer. One year following her visit with Dr. Hoffer my daughter was doing extremely well. We never took the psychotropic drugs and you can well imagine that this did not go over well with the psychiatric community and we were met with lots of controversy but blazed ahead anyway. Care is a healthy teen, earning a B average in high school. She is completely symptom free and has been for over 2 years now. She never misses taking her niacin and other suggested vitamins and she really misses Dr. Hoffer - he truly saved her life. Thank you.

Francoise Krampf United States

Dr. Hoffer saved both our lives (joined by Doctor Hitching). I have Huntington's Disease in my family and I am 75 and no symptoms yet, When I spoke to him he was sure that HD can be prevented with his therapy. I faithfully take all my vitamins everyday and hope to make the 100s! Thank you to all the people involved in this therapy and bless him for all his research.

Jan Peregrine United States

I'm very sad to hear of Dr. Hoffer's sudden death. Recently I've discovered him through his fascinating books and am reading *Orthomolecular Medicine For Everybody* now. I'm a book reviewer and am hopefully spreading his name and work to lots of people. My best to his family.

Diane Dawber Canada

Publication of *Hoffer's Laws of Natural Nutrition*, by Quarry Press in Kingston, coincided with the formation of the Health Pursuits Reading/Study Group there in 1996. We read it and were inspired to keep working on our nutritional, dietary and environmental protocols which have proven so successful that our group is the only model of a support group in the medical literature proven to help people with fibromyalgia,

chronic fatigue and multiple chemical sensitivities improve. I myself have regained so much and have dedicated my tenth book, *Driving, Braking and Getting Out to Walk*, to be launched on Sept.10, to Dr. Hoffer. Thank you, Abram, for encouraging our group through writings, example and emails. We couldn't have done it without you and we will continue to spread your message in every way possible.

Leslie Joy Canada

Dr. Hoffer was a fine gentleman, a man of intelligence, integrity, and compassion, with a quiet sense of humour. When my son first became ill fifteen years ago, Dr. Hoffer in his kind way, educated us about schizophrenia and orthomolecular medicine. I sincerely believe that my son would be on a larger dose of medicine to treat his schizoaffective disorder, without niacin, prescribed by Dr. Hoffer. Also, the trips to Victoria gave us purpose and hope. Over the years, I found myself many times in the surprising situation of having to defend Dr. Hoffer and his treatment plan. I will continue to do so. He has left a wonderful legacy and in time perhaps more people will come to his way of thinking.

C. Vaughan Canada

I am deeply saddened to hear of Dr. Hoffer's passing. It was wonderful to be able to meet him and find hope for my depression. Dr. Hoffer was a wonderful doctor and will be missed. I know that Frances will be able to follow in his footsteps and that all patients will be cared for in the same manner that Dr. Hoffer offered.

B. Harris United States

Many years ago I accidentally treated myself for schizophrenia while using B₃ for chronic hallucinogen reactions (I was collecting hallucinogenic mushrooms at the time, with occasional prolonged experiences). I had already familiarized myself with some of AH's work and once I discovered I had dysperceptions I became a steady reader and a Journal subscriber. RIP, doc.

Gary Los Angeles

Dr. Hoffer was truly an admirable and commendable doctor providing hope and help to so many!

Klas Cederwall Sweden

I miss you very much! When I first contacted you by e-mail you responded quickly and proposed that I should contact Karin Munsterhjelm in Finland as one of the best OM doctors in Europe. I did so and I am glad I followed your advice! Magnus is now

better, relieved from neuroleptics and getting niacin! Not in adequate amount but that will come. It was also a starting point for me to learn more about OM. I have made use of my scientific experience from many years of research to critically review what is going on in medicine. It seems to me that what you represent in terms of scientific achievements is very important and I am happy to see that the communication and expanding knowledge that Internet and different forms of “social media activities” involving patients and their families, will assure is going to preserve for ever what you and your research colleagues created. I will never forget what you once said to me: “Klas, next time you meet a psychiatrist ask how many patients he or she has cured.” Thank you Abram for your kindness!

Mark Sandrock United States

Dr. Hoffer was (and is) a truly great man. I hope his work will continue to grow worldwide.

Donna L. Johnston Canada

I have only recently been introduced to Dr. Hoffer's Ideas on mental illness and believe truly he was the only person or professional that truly cared about the persons dealing with the unhealthy brain. The logic of the body needing proper nutrition and lacking certain vitamins and minerals. Thank god for this man courage, meaning going up against the beasts of greedy Doctors and pharmaceutical companies. It is a sad passing for all of us who need real Doctors more than ever now.

Karin Munsterhjelm-Ahumada MD Finland

Dear Abram, I miss you so much. Because of a very sick relative I e-mailed you in deep fear in January 2001. 12 hours later I had your answer “your program is good but you give too little niacin”. There started my journey into orthomolecular medicine. Later I sat by him in his practice in Victoria learning that even schizophrenia can be cured. I have a long interview with him from Ottawa 2007 that will be published in Sweden. I am one of the founders of the Swedish Orthomolecular Association, <http://www.ortomolekylar.se/> - all thanks to the teachings of Abram! Every time I had difficulties with a patient's program I could consult him - and always got a clear and inspiring suggestion how to proceed. His books have given me the courage to give lectures. His friendly and human personality has helped me in difficult times. I feel the most deep gratitude having known him and am convinced that, in spite of all hard resistance, his immense scientific and clinical work will survive and pave the way for a new understanding of human health and medicine. Thank you Abram!!

Lolita Cleaves United States

Your life's work and your name will be remembered for the ages because of the health and hope you rendered to countless lives.

Thomas Claycomb United States

I am writing to you in heaven to thank you for saving my life when I started reading about your orthomolecular medical files on previous patients of how you treated them with vitamins. I was diagnosed bi-polar and schizoaffective disorder as a little boy at the age of 5 years old. I tried to blow my head off with a gun in 1998 to stop all the voices. The only thing to say about myself online without being locked up again in the mental

hospital, is I wasn't the lucky one with antipsychotropic medicines. There's only a 10% recovery rate for people being that sick to come back into society again with their best tranquilizers, but like myself, I wasn't the lucky one to come out of the hell with their best treatments. If it wasn't for Dr Hoffer and Dr Hugh Riordan nobody would ever see me back into the community. My illness finally took me out and my mind took me as a prisoner with no hope of ever coming back to society with a normal life, until 2002 when I went to the Center in Wichita, KS. I lost ten years of my life with no work and or money. I finally got relief in 2006. If my house wasn't paid for I wouldn't be here telling you what Dr Hoffer and Dr Riordan did for me, incalculable, for me to describe what Dr Hoffer's research with schizophrenia and biochemical imbalances did for me.

Thanks to Hoffer's adrenochrome discovery and niacin I wouldn't be able to write this clearly. Nobody will ever know I am recovering from Bi-polar/Paranoid Schizophrenia, and when I am out in public, some think I am unique and little eccentric at times. I was hoping in 2010 to meet with Dr Abram Hoffer and tell him he is a God send to all humanity. I will always love him and carry him in my heart until I draw my last breath. I am so eternally grateful to him for saving me from my illness. So, even though Dr. Hoffer never personally met me, I did call to talk to his staff to share my story. Good bye my friend - see you on the other side when my time is up !

Josh Wapp Canada

I'm so sad that I never got to meet him. His work has changed my life incalculably; I was diagnosed with schizophrenia in my 20's. I have no fear of returning to that state thanks to the wonders of orthomolecular psychiatry.

There are a lot of decent people in this world but Dr. Hoffer was an exceptionally fine individual who was one of the most altruistic people I've ever known about.

Long live his research!

Byran Lee Canada

I am indebted to Dr. Hoffer's vitamins regimen. It gave me hope, as the sole caregiver to my schizophrenic grandma.

My grandma's condition has improved significantly and there is no question about it. Dr. Hoffer not only helped my grandma, he has help me as well because I'm much happier when my grandma's condition improved. Rest in Peace, Dr. Hoffer, let us spread the great work on Orthomolecular Psychiatry.

Ernesto Prieto Gratacòs Argentina

I firmly believe Dr. Hoffer has helped - directly as well as indirectly (through perhaps hundreds of health practitioners who discovered orthomolecular medicine studying his books) - a vast number of human beings. Let us never forget Abram, a beautiful rebel. May the Divine Intelligence embrace his soul.

Namik Omerspahic, BSc Bosnia-Herzegovina

Great man, doctor, humanist. Will always respect him.

Nonie De Long Canada

At age 4 my son was diagnosed ADHD. At age 7, he was diagnosed Bipolar, Defiant, and ADHD. He was indiscriminately medicated and harmed by psychiatrists. When he was 9, I flew him across Canada to see Dr. Hoffer, after reading about his clinical

success with mental health disorders. My son had been violent for years, hallucinating, obsessing, arguing, and often manic for days. He needed two staff at all times at school and in the community and was hospitalized regularly. A month after seeing Dr. Hoffer he was 70% improved - with vitamins and a special diet. He has continued to improve since. Now 15, my son is no longer suffering from any hallucinations, is much more agreeable, has no more seizures, is no longer violent, and attends a public high school without special support. His life is more 'normal' than I ever imagined it could be. He is no longer diagnosed with the mental health issues. We owe this, with much gratitude, to the dedication and intelligence of Dr. Hoffer and Orthomolecular medicine. I am forever in his debt.

Jamie Tams Canada

I saw Dr Hoffer for many years he was a good doctor and his help in my recovery of shizophrenia was very good. He was intelligent, compassionate and caring and someone that understood people and their illnesses. I have read some of his books and they are very good I would like to read more and I thank him. Rest in peace.

G Satyan India

I think Dr Hoffer was pioneer in the field of vitamins for therapeutic applications. He had much of knowledge in schizophrenia, cancer and heart diseases, even though he couldn't offer me some help I needed. I read his articles. They carried clear expressions of straight facts, with simple mannerisms in writing. Though I haven't met Dr Hoffer, still many of my thoughts resemble his. I support his ideals despite I haven't observed his practice in his office. I hold him high as a researcher and for his pragmatic approach. It's clear he has done a worthy job and lived a satisfied and meaningful life. I understand you Dr Hoffer. God will praise you!

Orthomolecular Treatment of Schizophrenia

A. Hoffer, M.D., Ph.D.¹

A. Evolution of The Concept

In 1968, Dr. Linus Pauling* stated, "I have reached the conclusion, through arguments summarized in the following paragraphs, that another general method of treatment, which may be called Orthomolecular therapy, may be found to be of great value and may turn out to be the best method of treatment for many patients." Immediately following this, Professor Pauling defined Orthomolecular psychiatric therapy as, "the treatment of mental disease by the provision of the optimum molecular environment for the mind, especially the optimum concentrations of substances normally present in the body."

In 1968, the Committee on Therapy of the American Schizophrenia Association consisting of around a dozen physicians all practicing, what was then called, megavitamin therapy for schizophrenia and other diseases, felt the need for a unifying concept. Dr. Linus Pauling's concept of Orthomolecular psychiatry seemed most appropriate at that time and still does because we all realized that we were, in fact, practicing a form of Orthomolecular medicine.

The historical roots of Orthomolecular psychiatry go back many years. One of the major roots began with the vitamin pioneers like Dr. Casimir Funk who first coined the term "vitamin." He was followed by a long line of distinguished vitaminologists and nutritionists. But a few have a special interest for us because they introduced the use of megavitamins into psychiatry. These are men like Goldberger,

Sydenstricker and Joliffe and many others who did much of their work in mental hospitals. It includes psychiatrists like Cleckly, Medlicott, Sherill, Washburne, Thompson and Proctor. Gould completed very valuable work in England nearly twenty years ago.

The Adrenochrome Hypothesis of Schizophrenia

Another major root arose from the work that was started in Saskatchewan. With Osmond who recently arrived from England, I began to develop what was called the adrenochrome hypothesis of schizophrenia. We realized that the establishment of the adrenochrome hypothesis would require many decades and we were not prepared to wait patiently for this great day before developing a therapeutic program. In 1952, there were no specific therapies for schizophrenia. If ECT or insulin coma did not work, we were helpless and our patients could look forward to many years of deprivation in totally inadequate institutions. We, therefore, made the assumption that our adrenochrome hypothesis might be correct and began to develop chemotherapy which could be used to counteract the production of the endogenous hallucinogens.

Water Soluble Vitamins

An examination of the chemistry involved suggested to us that the water soluble vitamins might be the most important factors in the treatment of schizophrenia. Of these, ascorbic acid, thiamin, riboflavin and nicotinic acid or vitamin B₃ seemed most relevant. The one that seemed the most promising was nicotinic acid. This was based upon the fact that a number of mental illnesses had already yielded to treatment with small doses of nicotinic acid. We also knew that pellagra,

* Pauling, Linus: Orthomolecular Psychiatry Science, pages 160, 265-271, 1968.

This paper was presented at the joint meeting of The American Schizophrenia Association, The Canadian Schizophrenia Association and The Schizophrenia Association of Great Britain; London, England, September 28-30, 1971.

which had, at one time, been endemic around the Mediterranean Basin and Southern United States, was remarkably alike schizophrenia.

Megadoses of Nicotinic Acid

It also arose from observations that nicotinic acid in larger dosages had been used for the treatment of bromidism. We began to use megadoses because we were aware that if one or two grams a day of nicotinic acid had worked on chronic schizophrenics, this certainly would have been reported. We did not realize that due to error in philosophy, psychiatrists had prevented examination of the use of large dosages of vitamin for the treatment of chronic schizophrenia. When schizophrenic patients were given one gram of nicotinic acid per day and recovered, they were promptly rediagnosed as pellagra. This prevented proper examination of these dosages for chronic schizophrenics.

In addition, up until 1950 when most of this work was done, nicotinic acid was very expensive and the idea of giving dosages of up to 30 grams a day could not have arisen, as it would have depleted most of the research budgets of these men.

We, therefore, decided to begin with at least three grams of nicotinic acid per day and to go up to 30 if necessary, in a carefully controlled research program. It was our hope that the use of this vitamin would effectively cut down the production of adrenochrome and adrenolutin and in this way would allow the normal, reparative processes of the body to become more effective.

Vitamin C

Another root comes from the work of Dr. Irwin Stone who has been gathering the literature on vitamin C or, as he prefers to call it, ascorbic acid. It is Dr. Stone's thesis that over the course of mil-

lions of years certain essential nutrients which were manufactured within the body can no longer be made and species have become dependent upon external sources. Without ascorbic acid, man is one of the few species who will develop scurvy. Every person, therefore, suffers from a condition called hypoascorbemia which is kept in control only as long as that person is able to maintain his exogenous supplies of ascorbic acid.

Biochemical Individuality

Another major root was the work of Professor Roger Williams who has shown with remarkable clarity the marked individuality of people. It is clear that there is sufficient biochemical individuality so that one day a proper examination of a person's enzymes would be enough to identify him.

Orthomolecular Medicine

Finally, a major historical root was the work of Professor Linus Pauling who, established a basis for the term orthomolecular medicine with his pioneering work on sickle-cell anemia and its relationship to hemoglobin. Dr. Pauling, having examined all of these roots, developed his present concept of Orthomolecular medicine and showed how it would be possible for species of animals to drop certain enzymes and become more dependent upon external sources of nutrients.

Dr. Pauling concluded, "The functioning of the brain is affected by the molecular concentrations of many substances which are normally present in the brain. The optimum concentrations of these substances for a person may differ greatly from the concentration provided by his normal diet and genetic machinery. Biochemical and genetic arguments support the idea that Orthomolecular therapy, the provision for the individual person of the optimum concentration of important, normal constituents of the brain, may be

the preferred treatment for many mentally ill patients.” Then he goes on to say, “It is suggested that the genes responsible for abnormalities (deficiencies) in the concentration of vital substances in the brain may be responsible for increased penetrants of the postulated gene for schizophrenia and that the so called gene for schizophrenia may itself be a gene that leads to a localized cerebral deficiency in one or more vital substances.”

B. The Orthomolecular Program

The present Orthomolecular program for treating schizophrenia was developed chiefly by members of the Committee on Therapy of the American Schizophrenia Association. Each physician uses essentially the same program although there are minor variations in dosages and in the adjunctive therapies which are used.

The program is based upon our philosophy that schizophrenia is a chronic condition which is more comparable as a model to diabetes which requires the continuous use of insulin and diet than it is to pneumonia which will respond to one series of treatments of antibiotics.

The Orthomolecular Approach

In the Orthomolecular approach, we apply the simplest treatment first, then depending upon the response, apply more difficult and varied treatments until the patient has achieved either a full or near recovery. The program cannot be defined in terms of months or years. No trial is completed until at least five years have lapsed from the beginning of the treatment. Several patients have become well after seven years.

My treatment program is divided into phases. Phase I is the chemotherapy of schizophrenia without electro-convulsive therapy (ECT). It is usually given to acute schizophrenics who can cooperate with treatment as outpatients, or who have families who ensure that the medication

is taken as directed. Patients who are so ill that they have to be admitted to hospital for treatment are not started on Phase I but go into, what I call Phase II, that is, they are given a series of ECT in combination with chemotherapy.

Phase I. Treatment

In Phase I, the patients are started on vitamin B₃ three or four grams per day. Vitamin B₃ is used to cover both nicotinic acid, the form which produces a flush the first few times it is taken and nicotinamide, which is not a vasodilator. I start with nicotinamide with all patients under the age of 21 simply because young people have a much harder time with the flush. With male patients over 21, I start with nicotinic acid because of the positive side effects, such as, the lowering of cholesterol levels and the decrease in the incidence of coronary disease as well as a decrease in the incidence of senility. With women who are concerned about the cosmetic effect of the flush, I start with nicotinamide but otherwise will begin with nicotinic acid.

Chronic patients tend to do better with nicotinic acid, the reason being that it is possible to increase the dose to higher levels. There is a maximum dose beyond which one cannot go, not because it will produce any serious toxicity, but because it produces physiological reactions such as nausea and vomiting which severely limits further intake. As a rule, it is seldom possible to go beyond six or nine grams a day of nicotinamide, but it is quite possible to go up to 25 or 30 grams a day of nicotinic acid without developing nausea and vomiting.

In addition to the vitamin B₃, patients are also given ascorbic acid from one to three grams per day and other water-soluble vitamins. I use vitamin B₁ (thiamine) if there is a good deal of depression and vitamin B₆ (Pyridoxine) if there is a good deal of muscular hyper-

activity, for example, in the hyperkinetic child or in the epileptic. For fatigue, I use vitamin B₁₂.

In addition to adjusting the vitamins, they are placed upon a nutritious diet which means reducing the intake of refined foods, such as flour and sugar, increasing the frequency of feeding and of course, increasing the proportion of protein. Attention must also be given to the use of minerals such as zinc, calcium, magnesium, iodine.

Many early cases of schizophrenia will not require anything more than this nutritional approach. I have a series of several hundred who have never received any other chemotherapies commonly used in psychiatry. However, if the patient is severely disturbed or severely depressed, it may be essential to use the tranquilizers, etc. I use moderate quantities of tranquilizers on out patients because the vitamin approach tends to improve the efficiency of these substances. Patients admitted to the hospitals where I work are treated with heavy dosages of tranquilizers because it is important to bring them under control within 48 hours.

At the initial interview, the patients are given perceptual tests. The one that I commonly use is the Hoffer-Osmond Diagnostic Test which has proven to be a very efficient diagnostic aid, not only for diagnosing but also for monitoring treatment. It also has great value in determining when relapse is occurring. Another test is the EWI test developed by Dr. El Meligi and Dr. Osmond which is a much more skillful and sophisticated test.

After the patient has been on this program for a reasonable period of time, say about a month, he is reevaluated. If he is much improved, he is continued on the same program until he has made a complete recovery. By recovery I mean that he is free of signs and symptoms, that he is functioning well in the community, that he is getting along well with his fam-

ily or at least as well as he did before he got sick, that he is a productive member of society. In other words, this patient, if examined by the most objective psychiatrist, would not show any evidence of residual disability.

The dosages of vitamin B₃ may have to be varied in order to achieve this state; between three to 30 grams a day for nicotinic acid and usually between three to nine grams a day for nicotinamide. However, once the patient has recovered, the dosages are slowly reduced until a proper maintenance is obtained. This is usually well under nine grams per day although a few cases have been higher. Tranquilizers, etc. are slowly removed from the program.

Phase II. Treatment

If the patients do not respond in a reasonable period of time to Phase I treatment, he becomes a candidate for Phase II treatment, that is, he will receive a series of ECT either as an outpatient or as an inpatient in addition to the chemotherapy.

Over the past four years, I have been using a modification of standard bilateral ECT called unilateral ECT for some patients. This has been a great improvement because it has allowed me to treat a large number of patients as outpatients and because it has reduced the average day in hospital over the past four years to fourteen days. In comparison, the University of Saskatchewan, University Hospital, Department of Psychiatry, averages around 18 to 21 days including what are called emergency admissions who are discharged after 48 hours. The patients are given anywhere from five to 20 ECT but the mode tends to be around eight to 12 ECT.

After the ECT, if the patients are substantially improved, they are discharged on the same chemotherapy.

Phase III. Treatment

If the patients have not responded, they are Phase II failures. I consider

them Phase III treatment problems and will continue to work with them trying out various forms of chemotherapy and often adding to the therapeutic program penicillamine, known commercially as cuprimine, up to one gram per day. Penicillamine is a copper chelating agent which picks up extra quantities of copper from the body.

In Phase III, a five year program is laid down which might include bringing them back into the hospital every six to twelve months for a short series of ECT and for the application of various chemicals which might be of some help to them. They are special research cases. I do not give up unless the patient is taken away from me either by his own wish or by going to one of the local mental hospitals who will usually immediately discontinue the megavitamin program that they had been following. In most cases, however, as soon as they are discharged, they come right back to me. In this stage, one will also use more sophisticated techniques, for example, injectable vitamins.

Expected Results

One can expect the following results. If one were to start with a cohort of schizophrenic patients ill for one year or less, coming from the community but who have not been injured by residing in a chronic mental hospital, one would expect over a two year period to achieve over ninety percent recovery rate. The other ten percent will be better and none will have been made worse.

If, however, one started with a cohort of patients who have been sick between one and ten years but who have not been injured by residing in a chronic mental hospital, one would expect perhaps 70 per cent recovery or better.

If one were to start with a chronic population who have been treated in chronic mental hospitals for anywhere from one to 20 or more years, the recovery

results are very much less and I would be surprised if one could get more than 25 per cent recovery. However, even with these chronic cases most of them will be vastly improved and will be able to function in the community to a limited degree.

I have for the past five years been following about 25 chronic schizophrenics whose average duration of stay in hospitals had been around 25 years. They have been on the megavitamin approach. I have been astonished at the remarkable improvement in some of them although none will ever be considered well. I am positive that had these unfortunate schizophrenics been started on the program 20 years ago most of them today would be well.

C. Evidence That The Orthomolecular Program Works

It is the fashion today to depend upon double-blind control experiments to establish new treatment in psychiatry. I really cannot complain about this because Dr. Osmond and I directed the first double-blind control experiment in the history of psychiatry in 1951 in Saskatchewan. The first experiment was a controlled study of the effect of certain yeast nucleotides. The second double-blind experiment was a study comparing the efficacy of nicotinic acid, nicotinamide and placebo in each case using three grams per day.

Double-blind Study of Thirty Acute Schizophrenics

This study was started at the Munroe wing, General Hospital in Regina, Saskatchewan. Thirty acute schizophrenic patients admitted to this hospital and diagnosed by their own clinicians were randomized using random numbers into three groups of roughly ten each. All of the 30 patients received the usual psychotherapy given at this unit which was very dynamic and gave each patient about

three hours per week of psychotherapy.

In addition, each therapist gave his patient ECT if this was indicated. Insulin coma was not used and the tranquilizers had not been introduced. Ten of the patients received nicotinic acid three grams per day. This group would be betrayed by the flush due to the nicotine acid and therefore, could not be considered a proper control group. However, a second group was given nicotinamide which does not produce any flush, while the third group received placebo.

The clinical and nursing staff were informed that there would only be two medications in this trial-placebo and nicotinic acid. They would assume that all of the patients who flushed were receiving nicotinic acid and that the others were on placebo. In fact, half of the non-flushers were on nicotinamide. The patients were all evaluated before the treatment by a team of psychologists and clinicians. The study ran 33 days at the end of which time the medication was discontinued and the patients were reevaluated.

One Year Follow Up

We decided not to use discharge criteria alone because it had become obvious that whether or not a patient was discharged did not depend primarily upon his own clinical state. It depended much more upon what the psychiatrist felt about him. The patients were followed up for one year by a trained worker who did not know what treatment they had had in the hospital. Patients were recalled at three-month intervals. At the end of twelve months, after the last patient had been treated, the code was broken and the results were evaluated.

Evaluation of the Study It turned out that of the ten or so patients receiving nicotinic acid seven had remained well over that year. Of the ten or so nicotinamide patients, seven or eight had

remained well, while of the ten placebo patients only three had remained well. Around 75% of the patients receiving vitamins had remained well, whereas, only one-third of the patients receiving placebo had remained well. It is important to remember that about two-thirds of all the patients had also received ECT so that this was a study of the combination of ECT plus megavitamins.

Double-blind Study of Eighty-two Schizophrenic Patients

The results of the study were relatively clear cut, but it seemed very important to us, not to report this until we repeated the study on a larger scale, to make sure there had been no hidden errors. We, therefore, started the second double-blind clinical experiment using the same design except that this time we did use nicotinic acid and placebo while informing the staff that we were going to follow the previous design. With our second study, we were able to treat 82 patients. The results were very similar.

Additional Studies with Schizophrenic Patients

In the meantime, I encouraged a psychiatrist working on our staff to run a study on a group of chronic schizophrenic patients using three grams per day. We proved to our own satisfaction that this dose was inadequate for this group of patients since none of them got well. (P.O. O'Reilly 1955*).

Additional evidence is based from the combined experience of the Committee on Therapy who have a total experience of 15,000 schizophrenic patients or more. We have compared notes every year for the past five years. There is no doubt that we are all obtaining similar results.

Schizophrenic Twins

Recently, I reviewed a series of 11 identical schizophrenic twins. Of these 11 identical twins which are the subject of

a separate paper, every twin treated with the megavitamin B₃ approach recovered, whereas, every twin treated by the standard, that is, tranquilizer approach, is still ill. The most striking pair are a couple of women who were so identical at birth that their parents could not tell them apart and who were able to confuse their teachers and their boyfriends for a long time.

They both became psychotic about 25 years ago, and over the next 20 years each one suffered frequent relapses. They went into a mental hospital at least once a year for between one and three months and between their admissions to hospital were barely able to function. About five years ago, one of these twins consulted her family physician for backache. He diagnosed her schizophrenic, started her on the megavitamin B₃ and she recovered. Her identical twin had a similar history except that she was not permitted to start on the megavitamin by her psychiatrist. The control twin, therefore, not receiving therapy but receiving expensive psychotherapy and tranquilizer therapy has in the past three years been readmitted to a psychiatric ward at least a dozen times.

The Evidence is Conclusive

Looking over the evidence, I have concluded that every physician who has used the Orthomolecular approach, as described, with care, skill and industry, has gotten identical results. On the other hand, every physician who has not used the program, as described, has been disappointed in its results. This should not be very surprising.

A few papers have appeared recently with claims that the results of the megavitamin approach have not been obtained. When these papers are examined carefully, it is obvious that they have not followed the Orthomolecular approach because of ineffective low doses without ECT and without the other nutrients.

D. Expansion Of The Orthomolecular

Concept

One of the greatest but perhaps least well known psychiatrist was Dr. John Conolly who worked in England at Hanwell Hospital over 130 years ago. Dr. Conolly had a modern conception of psychosis which he described as a perceptual disease. I am at a loss to understand how this brilliant work by Dr. Conolly has been so totally submerged in British psychiatry and only now is beginning to emerge. It is ironic that the first hospital to be called the John Conolly Hospital is now being built in New Jersey by Dr. Jack Ward and his associates.

Dr. Jack Ward, many years ago, became aware that a large number of patients, not schizophrenic but with many perceptual changes and high scores on the HOD* test, responded very quickly to megavitamin B₃. His concept was taken up by Dr. Bella Kowalson who wrote a brief paper describing a disease she called metabolic disperception. Most of her patients were schizophrenic but she felt that her term was not only more accurate but was much safer for her to use since as a general practitioner she did not want to argue with her psychiatric colleagues about her right to diagnose schizophrenia. In any event, we are now aware of a large number of patients who do suffer major perceptual changes which can be diagnosed by the clinical interview but which can be done more economically by the use of the HOD and EWI tests. They do respond very well on the megavitamin or Orthomolecular approach.

Effective Treatment for Alcoholic Patients

Another large group of patients are alcoholics. It has been found that they too will respond effectively. Some of the pioneers in this work are Dr. David Hawkins and Dr. Russell Smith. This work was encouraged by Mr. Bill Wilson, formerly known as Bill W. and whom you might know as

the cofounder of Alcoholics Anonymous. Bill W. who was one of my closest friends had watched our program with great care for many years and when he saw many alcoholics recover, he became excited, began to think about it, began to look at the evidence and eventually, depending upon data produced by men like Dr. Hawkins and Dr. Russell Smith, prepared a memo which he distributed to physicians interested in the treatment of alcoholics.

This work was primarily responsible for the present major use of the Orthomolecular approach in the treatment of alcoholism. Just to illustrate the kind of results which might be obtained, Dr. Russell Smith has been treating over 500 chronic alcoholics who had failed to respond to the best previous program including membership in Alcoholics Anonymous. Dr. Smith follows an AA program. Over the past five years he has treated these people with megadoses of nicotinic acid, ascorbic acid and with other adjuncts.

Today, 85% of these alcoholics have been abstinent for the past three years. Many of them, at first, continued to have relapses which gradually became less severe and did not last as long until the alcoholic was able to discontinue his alcohol. His work had an unexpected consequence because there was a major decrease in the highway traffic fatality rate which dropped in one county from approximately 150 to about 80 per year.

Treatment of Emotional and Behavioral Disorders in Children

The third major area where this work has expanded is in the treatment of emotional and behavioral disorders in children. I have corroborated everything that has been reported by Dr. Cott and Dr. Hawkins. A large majority of hyperkinetic children or children with learning disabilities will respond to this treatment. I have recently reviewed 140 children under the age of 14 treated with this technique. Of the total

number who were maintained on the program, most are well today.

Schizophrenia an Orthomolecular Disease

I have concluded after reviewing all of this material that schizophrenia is one of the Orthomolecular diseases.

If a person consumes a diet too low in vitamin B₃ and if his average requirements are normal, he will develop pellagra. This is a condition which is so like schizophrenia that they are easily confused. If, however, the person has an average diet containing average quantities of vitamin B₃ but due to some defect in his chemistry requires quantities of vitamin B₃ which are not provided by the diet, he will suffer from exactly the same deficiency but he is said now to have a dependency condition since the error is in his body and not in the diet. It is my contention that schizophrenia is a vitamin B₃ dependency condition.

It is also my contention that this vitamin B₃ dependency condition can strike at any time from infancy to senility. If it strikes, or becomes apparent before puberty, then it will take on any of the forms of learning and other behavioral disabilities.

Study of Thirty Children with Learning or Behavioral Disorders

I am completing a study on about 30 children who were all either learning or behavioral disorders. I was not concerned about their diagnosis but merely about the fact that they were not doing well at home or at school and had been referred to me by their family physician. They were all placed upon Orthomolecular treatment and in every case where this was followed, recovered. There were a very small number where treatment could not be continued due to factors beyond my control. After these young patients had recovered, they were given placebo instead of nicotinamide and in every case, within one month had relapsed to their previous condition. When

they were again placed upon nicotinamide, they once more recovered but in many cases it took a much longer period of time thereafter, as if one major relapse had had a gravely pathological effect on their need for vitamins thereafter.

Childhood Vitamin B₃ Dependency

In my opinion, the majority of childhood illnesses of this nature, where there are perceptual and behavioral changes, which can be measured using perceptual tests or behavioral tests are instances of vitamin B₃ dependency.

During adolescence this takes the form of rebellion, hostility, excessive use of drugs like LSD, marijuana and more recently, heroin and methadone. These young children also suffer from a variety of perceptual disturbances which, by and large, are ignored by psychiatrists who deal with them and who are not aware that these are there.

Adulthood Schizophrenia

If the condition should express itself during adulthood, then, of course, we have the more typical cases of adulthood schizophrenia. We, however, run into the difficulty of diagnoses in that various countries use different diagnostic criteria and people who are considered schizophrenic in Canada and the United States might be considered not to have schizophrenia in London. These discrepancies in diagnosis will disappear as soon as all of the psychiatrists begin to use proper perceptual tests to aid them in their diagnosis.

If the condition should strike after the age of 60, these patients may be diagnosed senility. I have a fair number of so called senile patients who have been treated with the Orthomolecular approach and who are now normal.

Many Need More Essential Nutrients

Finally, there is a most important expansion of this program to include

most people. According to Dr. Linus Pauling, there are at least 40 to 50 essential nutrients and perhaps 50,000 enzymes in the body. It is quite obvious that we are all different and it makes sense to believe that a large number of people may require extra quantities of one or more of these essential nutrients. At the moment, there is no scientific way of determining which of these nutrients are lacking, although a beginning has been made in this area. Dr. Arthur Robinson working with Dr. Linus Pauling, has shown that schizophrenic patients tend to retain more ascorbic acid, nicotinic acid and pyridoxin than do normal controls. When they are given a test dose of these vitamins, much less appears in their urine than it does in normal people. Their theory is that a body which requires these vitamins will tend to excrete less. This technique might one day be developed to determine which of these nutrients, any one of us might lack. There is, however, a practical way, which is for each one of us, to run experiments on ourselves, with the essential nutrients, none of which are toxic. By trying out these nutrients, one after the other and measuring our own response, we could soon, discover whether or not, we do suffer from these Orthomolecular but perhaps, minor diseases.

Conclusion

I have outlined the evolution of the Orthomolecular approach where various historical streams of research have come together and have been combined into a major stream that we call Orthomolecular psychiatry. Orthomolecular therapy in psychiatry has been proven more effective for treating schizophrenia than standard therapy. It is coming into use very rapidly for treating learning and behavioral problems in children, for alcoholics and for other patients with many perceptual difficulties.

The Adrenochrome Hypothesis of Schizophrenia Revisited

A. Hoffer, M.D., Ph.D.¹

Introduction

For about one hundred years theories of schizophrenia have oscillated between physical or biochemical hypotheses on the one side and psychosocial hypotheses on the other side of the spectrum. The change in points of view over the years depended upon the sophistication of the various scientists and also upon the fashion of the era. This dichotomy is probably false since every factor which shapes the development of personality must also play a role in both the development of and in the recovery from schizophrenia.

Early biochemical hypotheses were simple and were more properly medical guesses. Physicians favoring this view accepted it as a disease and looked for the same factors which played a role in shaping other diseases. These included stress, infection, nutrition, trauma and so on. Physicians using pathology, physiology and bacteriology had been successful in developing treatments for a large number of diseases; naturally they would try similar techniques in searching for the cause of schizophrenia.

Psychosocial theories did not exist. I exclude the theory of demonic possession as this has never been considered a scientific hypothesis. Psychosocial theories arose from psychoanalysis especially after Freud described the Schreber case, the case of a paranoid judge, but few physicians were aware of this until psychoanalysis began to flower about thirty years ago.

Every factor ever found to cause disease has been examined as a cause of schizophrenia. Psychiatrists have never been persuaded of the truth of the hypothesis. It was, in fact, found that hormones which were clearly related to diseases such as Addison's and thyroid states also had

a weak association with schizophrenia. Patients who suffer from too much or too little activity of the thyroid or adrenal gland may be psychotic. A few patients with hyperthyroidism had schizophrenic features. Perhaps even more with hypothyroidism (Graves' disease) were equally psychotic. We still see schizophrenics who become normal when their hyperactive, tumorous adrenal gland is removed.

A few patients with severe infections develop a schizophrenic syndrome but more often it is accompanied by memory disturbances, disorientation and confusion and is classed as a delirium. Chronic infections may cause similar reactions; GPI (general paresis of the insane), chronic syphilis of the brain at one time was very prevalent in mental hospitals and was difficult to distinguish from schizophrenia. Chronic rheumatic fever was once considered a cause.

Thus, out of a large number of mentally ill patients diagnosed schizophrenic, clear causes were discovered in a few. When this was established the disease was renamed; the patient was rediagnosed as GPI, or hypothyroidism, or pellagra and pulled out of the schizophrenic group. As a result the patients who were ill without any of these factors remained. They remained under psychiatric care while the other forms disappeared from psychiatry to be taken over by other specialists. By a strange irony, psychiatrists were always left with the hopeless untreated cases because no cause nor specific treatment was known. This has been hard on psychiatrists but has been valuable to schizophrenia for it has slowly purified the group. The schizophrenic syndrome has become more homogeneous and this process will continue. Orthomolecular psychiatry has

continued this process by discovering a number of new causes such as vitamin dependency, cerebral allergy and mineral problems, leaving even a smaller proportion of the total schizophrenic population unaccounted for.

Schizophrenia Hypotheses

Schizophrenia is a disease which has attracted hypotheses from nearly every school of thought. It is so variable in its course and symptomatology that there is something there no matter how it is approached. Biochemical hypotheses have also proliferated. They began with simple statements of difference. The indole hypothesis nearly one hundred years ago postulated that more indoles would be found in schizophrenic patients. Latterly most hypotheses center about the role of neurotransmitters such as the sympathomimetic amines, acetyl choline, serotonin and so on. This type of hypothesizing becomes much more difficult as the number of suggested transmitters increases so rapidly. All the sympathomimetic amine hypotheses derive from the work of Osmond and Smythies (1952) who pointed to the structural similarity of adrenaline and mescaline as well as to their potential hallucinogenic effects. All the amines derived from tyrosine may be involved. They have been investigated intensively for the past thirty years for their chemical properties, biochemical inter-reactions and end products derived from them. These investigators have been reluctant to look at the indole derivatives of these amines called aminochromes. The best known is adrenochrome from adrenaline. Other derivatives include dopachrome, noradrenochrome, their leuko derivatives or dihydroxy indoles and their yellow or trihydroxy derivatives such as adrenolutin and noradrenolutin. These substances are very difficult to make in a pure crystalline form and most research laboratories interested in psychiatric research did not

have the skill nor resources for doing so. Nor were they motivated to acquire them because of the powerful criticism and biases of research groups such as the National Institute of Mental Health led by scientists such as Dr. S. Kety.

After H. Osmond had completed his studies with Dr. J. Smythies he came to Saskatchewan where he and I joined forces. Especially important was their observation that pink or deteriorated adrenaline caused psychological changes in a few asthmatics who used adrenaline sprays. This pointed to a reddish colored derivative of adrenaline. This turned out to be adrenochrome but deteriorated adrenaline also contained a large number of similar indoles in various states of oxidation. The indole structure of adrenochrome and of most of the hallucinogens then known, i.e. d lysergic acid diethylamide (LSD), harmine, ibogaine, drew our attention to the importance of indoles in searching for a schizophrenic toxin. This soon led to our adrenochrome hypothesis which Osmond and I presented first in 1952 to the Dementia Praecox Committee of the Scottish Rites Masons at the Canadian suite in the Waldorf Astoria Hotel, New York. Osmond and I can still remember the prophetic advice given us by a very eminent elderly scientist. He wished us good luck and then warned us to expect a tremendous amount of opposition. The adrenochrome hypothesis was published in 1954 by Hoffer, Osmond and Smythies.

Not much was known about adrenochrome and what little was known often turned out to be wrong. Thus it was generally believed adrenochrome was essentially an unstable, highly reactive molecule which could never be prepared as a crystalline, stable substance. The best preparations we could get or make were bright or dull red powders, sometimes almost black, which deteriorated even when stored under nitrogen and temperatures below -40 C and in minutes in solutions

at room temperature. Each new batch had a slightly different appearance but it was all we could get and I too accepted the false belief it would always be so. Later it occurred to me that this instability was due to its residual content of silver ions which were used to catalyze the oxidation of adrenaline to adrenochrome. In short our preparations were impure, dirty. Dirty organic compounds tend to be unstable. We had the same problem with its derivative, adrenolutin.

As soon as it occurred to me to remove the silver I directed our chief biochemist to dissolve a portion of the adrenochrome on hand, pass it through a resin column which would remove the silver and to recrystallize the pure adrenochrome; this solved our problem. The first time this was done we were able to prepare crystals of adrenochrome which were relatively stable even at room temperature in the dry state. The preparation of stable adrenolutin soon followed.

A few years later Prof. M. Altschule began to make and to use these stable preparations in his research. The group at the National Institute of Mental Health toyed briefly with the idea of studying adrenochrome but they did not know how to make any and were able to get a tiny supply by taking some from another scientist to whom I had sent some, without his permission. Later they gave us credit for it even though they had never requested I send them any and I had not done so. Unluckily a report by Dr. Max Rinkel killed interest in adrenochrome as an hallucinogen. He obtained a supply of adrenochrome semicarbazide, known commercially as stable adrenochrome. It was used by surgeons to decrease bleeding. Rinkel gave this inert material to a few subjects and found no hallucinogenic activity. He was unaware this substance is not hydrolyzed in the body, does not release adrenochrome and has different properties. Adrenochrome critics apparently never read Rinkel's subsequent

report where he acknowledged his error.

Interest in the aminochromes is returning because some of the properties of the centrally active amines can not be understood unless their degradation into these oxidized derivatives is considered. Graham (1978, 1979; Graham et al., 1978) for example explains the toxicity of levo dopa (l-dihydroxy phenylalanine) on the basis of its conversion to dopachrome which probably had adreno-chrome-like properties.

Many investigators have found evidence for the formation of adrenochrome in the body. Kaliman (1961) and Kaliman and Koshlyak (1962) reported rabbit heart tissue, kidney and brain but not liver and skeletal muscle, oxidized adrenaline to adrenochrome. Langemann and Koelle (1958) found cells of the intestinal mucosa formed identical-looking pigments from adrenaline and adrenochrome. Axelrod (1964) found an enzyme in salivary gland tissue which oxidized adrenaline to adrenochrome. The DOPA oxidase system in ocular tissue also produces adrenochrome (Angenent et al., 1952). Earlier Roston (1960) found coenzyme A inhibited formulation of noradrenochrome and adrenochrome. He suggested that the cytochrome system plays a role in controlling catecholamine oxidation reactions. A more complete discussion of adrenochrome as an *in vivo* oxidation product of adrenaline is given in Hoffer and Osmond (1967).

Hoffer, Osmond and Smythies (1954) suggested that in schizophrenics too much adrenochrome was formed, that it reacted in the body by producing perceptual and thought disorder changes, that it was the schizophrenic endogenous hallucinogen or more accurately the endogenous schizogen. The presence of this aberrant biochemical system would account for many of the physiological and biochemical findings present in many schizophrenic patients if not in all.

Too much adrenochrome could arise from excessive oxidation of adrenaline and in turn this would increase the production of toxic metabolites of adrenochrome such as adrenolutin. Osmond and I have described the adrenochrome hypothesis several times, in *The Hallucinogens*, (1967) and in *Ortho-molecular Psychiatry* edited by D. Hawkins and L. Pauling (1973) (Grof et al., 1961; Rice et al., 1957; Schwarz et al., 1956; Vojtechovsky et al., 1962).

The adrenochrome hypothesis can be described biochemically by a series of reactions as follows: a) Noradrenaline + methyl --> adrenaline b) Adrenaline + oxygen --> adrenochrome c) Adrenochrome --> leukoadrenochrome > adrenolutin. We suggested that any reaction which diverted adrenochrome into adrenolutin rather than into leukoadrenochrome would cause or aggravate schizophrenia.

To test the hypothesis we pursued a series of studies beginning in 1952. These were supported by the Saskatchewan Department of Public Health for whom we worked, by federal health grants and by the Rockefeller Foundation. One does not test a hypothesis directly; the hypothesis predicts a series of sub hypotheses or ideas which can be tested. If the data supports these testable hypotheses it increases the probability the original hypothesis is on the mark.

1. Noradrenaline and adrenaline in the pure state do not cause hallucinations or schizophrenia, but decreasing the amount of adrenaline will ease the biochemical pressure toward schizophrenia; less will be available for conversion into adrenochrome. Theoretically, decreasing the production of adrenaline from noradrenaline by any means would be helpful. Since stress increases the formation of noradrenaline and adrenaline, reducing stress should be therapeutic, and it is. Diverting methyl groups away from noradrenaline will decrease adrenaline

formation but this may not be possible since any general shortage of methyl groups may cause a methyl deficiency syndrome. Excessive quantities of methyl groups could be harmful but only where it led to an increase in the production of methylated hallucinogenic indoles.

2. Adrenaline is oxidized to adrenochrome in a two step process. One electron is lost, forming a highly reactive free radical, an oxidized adrenaline. It is readily changed back to adrenaline. The reversible NAD <-> NADH system is involved. If another electron is lost adrenochrome is formed but this is a one-way process. Adrenochrome is not reduced back to adrenaline. This may be a mechanism at synapses in the brain by which the body regulates the reactions of the neurotransmitter amines. Trihydroxy dopamine (6 hydroxydopamine or TOPA) is highly toxic to dopamine receptors, perhaps because of the formation of aminochrome at the receptor site thereby destroying it. Vitamin B₃ which controls formation of NAD is thus involved. With a relative deficiency of Vitamin B₃ too much trihydroxy dopamine may be converted into its aminochrome. Whatever increases oxidation of these central amines to their indole derivative will be hazardous to brain function while any reaction which reverses or inhibits them will be therapeutic. Adrenochrome inhibits synaptic transfer of electrical signals as do LSD and other hallucinogens. The oxidation is accelerated by increased oxygen pressure such as deep sea diving. It causes convulsions in mice. At autopsy these animals' brains have no adrenaline and are pigmented red. Radiation will accelerate oxidation and some enzymes, especially copper-containing oxidase, will do the same. Reducing conditions include ascorbic acid, glutathione which combine with oxidized free radicals and neutralize them. Vitamin E ought to play the same role. Heparin might be helpful if one could

obtain a heparinoid molecule which had no anticlotting properties. Heparinoids are complex polysaccharides which have a remarkable avidity for other molecules. They are efficient scavenger molecules (Jacques, 1979).

3. Deteriorated adrenaline, adrenochrome and adrenolutin are hallucinogens. This is an essential element of the adrenochrome hypothesis because it provides an explanation for the clinical symptomatology. The dopamine hypothesis does not provide for such an explanation unless it invokes some aminochrome mechanism. The methylation hypotheses do provide for methylated derivatives such as bufotenine.

The evidence for the hallucinogenic properties of adrenochrome and adrenolutin is provided in our book *The Hallucinogens*, Hoffer and Osmond (1967) and will not be repeated here. See also Hoffer (1962,1966), Grof et al., (1963) and Weckowicz, (1962).

Twenty-five years ago it was impossible to test the properties of noradrenochrome or of the other aminochromes as we did not know how to prepare pure material. This may still be a problem as these compounds are difficult to crystallize. None of the other neurotransmitters were hallucinogens. Serotonin is an indole with no striking psychological properties. It may be closely involved in catecholamine metabolism. Vander-Wende and Johnson (1970) reported serotonin was an effective inhibitor of both enzymatic and autoxidation of dopamine and noradrenaline. They suggested serotonin could modulate the activity of catecholamines. Most of the dopamine in the substantia nigra and caudate nucleus is in the soluble fraction of the cells while serotonin was bound. Thus, serotonin would not have any effect on dopamine until it is released, when a complex of the two would be formed. This is how serotonin could modulate dopamine's

central activity. The presence of too much serotonin would decrease the formation of neuromelanin from dopamine. Perhaps this is why in Parkinsonism there is a depletion of melanin in the substantia nigra. Increasing serotonin might also decrease formation of adrenochrome.

Any reduction of these aminochromes should be therapeutic for schizophrenics (VanderWende and Johnson, 1979). They point out it has been difficult to relate either catecholamines or serotonin to abnormal behavior, because the role of serotonin in modulating the metabolism of catecholamines was unknown. The ratio of adrenaline to serotonin is critical. When a lot of serotonin is present relative to adrenaline, adrenochrome formation is suppressed. When the serotonin level is too low, formation of adrenochrome is accelerated.

They finally conclude, "Greiner recently reopened the question of the abnormal pigment formation in schizophrenic patients and concluded that there is an increase of melanin formation either from enzymatic or auto-oxidative mechanisms (Greiner, A.C., *Dis. Nerv. System* 29 (Supp.), p. 14,1968). Our postulation would provide a common basis for Cramer's observation and the suggestion by Wooley that the disease results from a deficiency of serotonin. Not only would adrenochrome formation be accelerated at low levels of serotonin and consequently melanin formation from epinephrine, but also melanin formation from dopamine; and norepinephrine would be freed from the inhibitory effect of the indole amine." Perhaps the efficacy of Vitamin B₃ is partially due to the increase in serotonin which follows administration of this vitamin (Scherer and Kramer, 1972).

Today there are around thirty candidates for neurotransmitters, most of whom are being investigated, but so far there is no evidence they are hallucinogens. The aminochromes are the only

ones. They are derived from the parent amino acid tyrosine via a sequence of amines l-dopa, dopamine, noradrenaline and adrenaline. Boulton (1978) provides a comprehensive outline of the relationship of these amines to each other.

These amines all have the potential for becoming aminochromes. The proportion of each which does so is, of course, unknown since these reactions have been neglected by most investigators. L-dopa and dopamine are oxidized to aminochrome, noradrenaline to noradrenochrome and so on in a series of reactions illustrated in Figure 1, below).

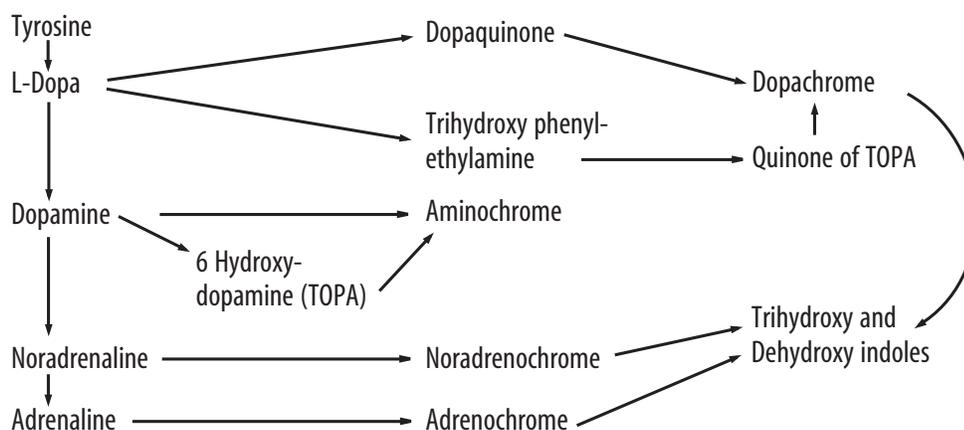
Graham (1978, 1979) in a series of informative reports summarized the evidence these reactions are native to the brain. Our adrenochrome hypothesis was a model for one amine but equally well models all amines which are oxidizable into chrome indoles.

Very little of the chemistry of adrenochrome was known until Dr. R. Heacock began his studies in our research laboratories (Heacock 1959, 1965; Hutzinger,

1965). He found it readily changed into dihydroxy and trihydroxy N methyl indoles. We had found that adrenolutin (trihydroxy N methyl indole) was an hallucinogen. The dihydroxy derivative (leukoadrenochrome) created a pale yellow aqueous solution. We examined its psychological properties on a large number of subjects including normal people and patients with depression.

We soon discovered it was not an hallucinogen. On the contrary it tended to relax people; we used five milligram sublingual tablets. A large fraction of our patients noted marked relief from anxiety and tension within a few minutes and a few were "cured" of their anxiety. A large proportion did not respond but were not made worse. Its anti anxiety activity ranged from none to very remarkable. We could not continue our studies as our resources were limited and we could not discover that person who would respond except by a therapeutic trial. Two drug companies who were interested were looking for something which would act

Figure 1. The Adrenochrome Hypothesis



on nearly everyone as did the tranquilizers and antidepressive drugs which were then being introduced into psychiatry.

Thirty years ago the aminochrome pathway for destruction of the central amines was considered a very likely one. Doubt remained because adrenochrome had not been isolated from tissues. It could be seen when the adrenal medulla is sectioned it may turn red. This is adrenochrome, but this does not occur in the adrenal medulla in the body. There the medulla, containing noradrenaline and adrenaline, is surrounded by the adrenal cortex which is very rich in ascorbic acid. This stabilizes the amines as do other natural anti oxidants. We summarized the evidence for the formation of adrenochrome (Hoffer and Osmond, 1967; Hoffer, 1973). For about twenty years only the two other pathways of adrenaline degradation were studied, via monoamine oxidase and by orthomethylation. I believe the main reason is that there was no stable adrenochrome available commercially and neuro-psychopharmacologists did not want to make their own.

Also attempts were made to account for all the amines using tracer studies. The analysis, in my opinion, was so crude that claims that all the adrenaline decomposition could be accounted for via these two mechanisms only are completely unconvincing. In one study the adrenaline metabolites accounted for much more adrenaline than was injected. What we do know is that the proportion of the adrenaline diverted into all three pathways is not known. It likely varies a good deal. But even this is not as important as knowing what happens to the metabolites. Those that are retained in the body will (1) not show up in excretion studies, (2) have more significant effects in the body and may accumulate, increasing the damaging effect. The aminochromes easily polymerize to melanins which are excreted with great difficulty. Interest in

the aminochromes is returning, perhaps because the other two pathways have been explored so thoroughly and no longer yield exciting new information. Graham concluded "an as yet undefined proportion of catecholamines may be oxidized by the routes given in Figure 1, (p.165) thereby providing the quinone species that polymerizes to form neuromelanin. Neuromelanin could then be viewed as a waste product of catecholamine metabolism accumulating progressively within the cytoplasm of the neuron with the passage of time." This accumulation is slow indicating that only a small fraction is oxidized. It also depends on maturation. Thus until a person reaches age six there is insufficient pigment in the brain to be detected without a microscope. Graham suggests that 6 hydroxy dopamine (TOPA) is toxic to the dopamine receptors because it is converted to its aminochrome. L-dopa appears to be beneficial in alleviating some of the symptoms of Parkinsonism but because it can be oxidized to aminochrome can accelerate the process of destruction of dopamine receptors. L-dopa does cause up to 20 percent of its recipients to become psychotic. Perhaps the proportion showing psychological changes will be greater when series of Parkinsonism cases so treated are examined by psychiatrists rather than by general practitioners and neurologists. L-dopa decreases the conversion of tryptophan into NAD forcing the body to depend more on food sources for vitamin B₃. Bender, Earl and Lees (1979) found that patients given L-dopa were as low in vitamin B₃ levels and in the amount of vitamin B₃ metabolite excreted in the urine as were pellagrins, yet they did not have pellagra. Probably they did not have pellagra because for this disease to develop there must also be a deficiency of tryptophan and exposure to sun. A deficiency of Vitamin B₃ would remove one mechanism available to the body to protect itself against the toxic effect of TOPA.

This will be discussed further on. Graham (1979) found that the volume of cells in the locus ceruleus and substantia nigra increased with age due to the accumulation of neuromelanin. He concluded "The administration of l-dopa would not only result in replenishment of dopamine as a neurotransmitter but would in concept present the catecholamine neurons with dopa and dopamine both of which could result in increased cell injury through auto oxidation and the production of cytotoxic quinones and free radical species. Thus treatment with l-dopa may accelerate neuronal degeneration while providing symptomatic relief." Strehler et al. (1959) measured the percent volume of human heart cells occupied by old age pigment. The average percent volume of this pigment increased one-half percent per decade. Old heart muscle cells may contain ten percent of this pigment. It does not occur under age 10. Since heart tissue can form aminochromes, it is likely this pigment resembles neuromelanin. Substances which inhibit oxidation should prevent heart muscle deterioration.

Patients with Parkinsonism take l-dopa for years during which there is time for toxicity to develop. L-dopa when used for short periods of time may be helpful in an unsuspected way. Friedhof and Alpert (1978) used l-dopa to reverse tardive dyskinesia. In one case TD had been present for two years after tranquilizer medication had been stopped. He was given three grams of l-dopa per day for several weeks; at first the patient became worse but then he improved markedly. When l-dopa was discontinued all symptoms of TD disappeared and had not returned in three years. Friedhof et al. based their treatment on the idea that super sensitivity of dopamine receptors resulting from blockade (by neuroleptics) would respond to an increase in supply of dopamine with an adaptive decrease in receptor sensitivity. The same phenomenon does not oper-

ate in patients with Parkinsonism; they do not improve when l-dopa is discontinued as did Friedhof's patients with tardive dyskinesia. If dopamine is oxidized to aminochrome at the dopamine receptors some of them will be destroyed. Adrenochrome does block synaptic transmission. This would help the patients with tardive dyskinesia who receive l-dopa for a brief period but would not help Parkinsonism where the toxicity is chronic. If l-dopa is given to patients with tardive dyskinesia for long periods of time the results may not be so beneficial.

Vitamin B₃ appears to protect patients against tardive dyskinesia. Hawkins in a personal communication reported that over fifteen years he has not seen any cases among many thousands treated. In my own practice I have not seen any develop in twenty years. It may well be some of the protective effect is due to the lower doses of tranquilizer required but there is a direct protective effect as well, probably at the synapse. Kunin (1976) found that many cases of tardive dyskinesia disappeared quickly when manganese was given these patients. A few required both manganese and nicotinic acid. Manganese may have a protective effect by inhibiting aminochrome formation.

Friedhof et al. also treated ten schizophrenic patients with l-dopa over a four week period. The improvement was equivalent to that achieved by chlorpromazine. They suggested further studies should be done. This short term treatment may be comparable to the response of tardive dyskinesia but I would expect that chronic use of l-dopa will make schizophrenics worse unless they are protected against the formation of toxic aminochromes by large doses of Vitamin B₃, ascorbic acid and by other antioxidant procedures.

Friedhof (1979) is convinced that too many dopamine receptors are involved in genesis of schizophrenia. He suggested the tranquilizer Haldol might be given

to mothers to decrease the number of dopamine receptors in their children. I doubt many women would follow this therapeutic prescription. But since ascorbic acid is as active as Haldol it would be worthwhile to determine whether pregnant women given optimum doses of ascorbic acid would have children who would eventually be less apt to develop schizophrenia.

Melanin has some beneficial properties. McGinnes, Corry and Proctor (1974) found that melanin acts as an amorphous semiconductor threshold switch. Switching occurred at gradients present in some biological systems; only cytochrome had these properties but required higher potentials. No other biological substances had these properties. Melanins are found where electrical energy is transferred such as skin retina, midbrain and inner ear. Perhaps these areas contain semiconductor switches which are essential to their normal function. Melanins may also bleed off excess energy such as is received on the skin from the sun; skin tanning is a protective device.

Galzigna (1970) suggested a relationship between acetylcholine, a neurotransmitter, and catecholamines. Acetylcholine interacts with oxidized noradrenaline, yielding a complex which does not change to adrenolutin in ascorbic acid medium. It reacts similarly with dopamine. Both acetylcholine and nicotinamide increase the auto-oxidation of noradrenaline but the complex reacts differently with ascorbic acid. The acetylcholine/noradrenaline complex is relatively stable but the nicotinamide/noradrenochrome complex is reduced much faster to dihydroxy indoles and adrenolutin. Galzigna postulates that if a central catecholamine leaks into the synapse an aminochrome could form; acetylcholine would stabilize it. Nicotinamide would increase its removal. "The leak of catecholamine and the stabilization of its oxidation products could produce an ab-

errant communication which, on the one hand, might be the chemical event leading to a short circuit between adrenergic and cholinergic systems and on the other hand, might be the origin of irritative foci of stabilized psychogenic agents at cortical level. Both effects could possibly explain the onset of mental illness." Both Smythies (1976) and Teller (1979) reviewed the biochemical hypothesis relating to efficiently. Others may prefer a different schizophrenia. The sympathomimetic amines ranking. But then what are the phenomena we and their methylated derivatives have received should try to account for most of the attention. Before I outline these and a few others I should define what an hypothesis is supposed to do. Scientists wish to arrange their data in a meaningful way. This may mean that the data can be ordered along a mathematical model or can be accounted for by a formula or can be explained biochemically. Thus the rate of falling objects can be determined by a simple mathematical formula. The advantage of such an explanation or model is that it suggests new questions which are interesting to examine. In so doing it gives direction to future research. This will in turn lead to new discovery. An hypothesis is not necessarily true although one hopes to approach the truth. As supporting data are gathered the strength of the hypothesis improves but inevitably the new data will require that the hypothesis be modified. Hypotheses are evanescent and it is their fate to be altered; thus one asks of an hypothesis not that it be right but that it be fruitful. Of course it would be ideal if it could be both, but as there is no limit to the number of hypotheses there must be some constraint. The available data provide this constraint. The best hypothesis among competing ones is that which accounts most economically for more of the data than does any of its competitors. The continuing test will be its ability to program ongoing research.

Simple hypotheses merely proclaim that there is a difference; all the early hypotheses of schizophrenia were of this nature. Thus one worker would find that schizophrenics differed from controls by having too much or too little of a known body constituent or that they had a strange substance or group of substances not present in normal controls. Thus we had indole hypotheses, monoamine oxidase hypotheses and so on. These simplest of all hypotheses merely contain conclusions of research already completed. They seldom explain anything and seldom are creative in developing new insight about schizophrenia. Thus I will judge all hypotheses about schizophrenia in a hierarchy ranging from complex to simple. My inclination is to prefer complex hypotheses which account for the phenomena most

We should account for the phenomena inherent in the disease schizophrenia which we recognize to be a syndrome, not a disease. Schizophrenia is a syndrome of symptoms and signs centering about perceptual and thinking disorder. Following Conolly (1964) I believe these are the primary diagnostic changes. I have found these to be much more valuable than the Bleulerian criteria. If one avoids outcome criteria most psychiatrists will diagnose patients with perceptual changes (illusions, hallucinations) and with thought disorder. There has been an unfortunate tendency to wait for the outcome; thus a patient is not diagnosed until he has been ill with no improvement in twelve or fifteen years or some such arbitrary duration. This is equivalent to refusing diabetics insulin until they are nearly dead, or to refusing the diagnosis of arthritis until the patient is hopelessly bedridden with his joints fused out of position.

Once the schizophrenic syndrome has been diagnosed it is necessary to determine what has gone wrong. It is clear that a number of metabolic changes can

precipitate schizophrenia. These include thyroid related disorders, adrenal gland related disorders, acute and chronic infections such as chronic syphilis of the brain, chronic rheumatic fever. They also include a number of orthomolecular syndromes involving vitamins, minerals and cerebral allergies.

The presence of the syndromes creates difficulty for the research psychiatrist especially when schizophrenics are compared against any control group. The normal control is fairly homogeneous in being not ill, not schizophrenic, but the sick group will contain varying proportions of patients who are schizophrenic because they are allergic to wheat, or to milk, or to candida or because they have too much copper or mercury or because they are Vitamin B₃ or Vitamin B₆ dependent. Homogeneous groups are essential in determining differences and must be used in controlled therapeutic experiments.

Modern statistical theory as used in double blind experiments has no theoretical basis unless the groups being compared are homogeneous so that a sample really represents the entire population. But the genetics of schizophrenia as it is accepted was based upon all schizophrenics of unknown origin, i.e. patients psychotic from known conditions such as hypothyroidism were excluded. Usually chronic patients were studied. This is the group which contains a substantial proportion of cerebral allergies as well as the vitamin dependencies. A general hypothesis of schizophrenia should try and account for this.

The minimum facts which should be accounted for are:

(1) That schizophrenia is primarily, but not solely, a genetic disorder, i.e. there must be a genetic potential for schizophrenia no matter what biochemical abnormalities are found.

(2) That there is a genetic advantage

in having some genes for schizophrenia or else it would have disappeared long ago. This will appear mainly in first order relatives as I see no advantage in being sick. However, a patient well because of correct treatment will have the same advantages and no disadvantages (Huxley, 1955; Huxley et al., 1964).

(3) That severe stress, while not a cause, is certainly a negative factor and will usually make patients worse.

(4) In addition an adequate hypothesis should account for the clinical symptoms, the perceptual changes, the thought disorder and the inappropriate behavior which derives from these.

(5) The hypothesis should offer a mechanism for understanding why certain biochemical and physiological changes are often found. These include (a) autonomic disturbance, (b) a scarcity of physical symptoms of allergy when psychotic.

(6) Vitamin B₃ and B₆ dependency should be accounted for and the hypothesis should try to account for the therapeutic value of other orthomolecular treatments such as ascorbic acid and penicillamine.

(7) The hypothesis should allow for an account of the cerebral allergies.

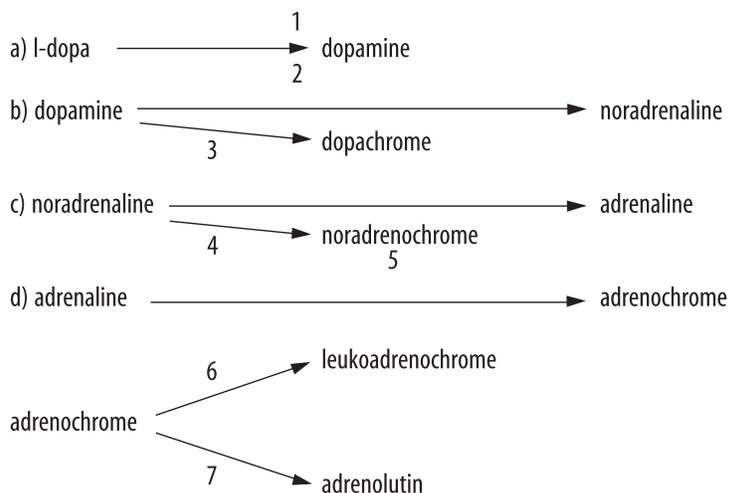
(8) Finally it should allow for the effect of some sympathomimetic amines and for at least some of the hallucinogens.

In conclusion anyone seeing the hypothesis and knowing nothing about schizophrenia should be able to describe it clinically, should be able to foretell what will make it worse and what treatments will be therapeutic. (Figure 2, below)

Reactions 1, 2 and 4 are essential as we can not live without noradrenaline and adrenaline. I suspect reaction 5 and reactions such as 3 are also essential when under proper control. Elsewhere I have suggested that the ratio of leukoadrenochrome to adrenaline (Hoffer and Osmond, 1960) helps to control anxiety. If this is true then adrenochrome is essential but only in very small amounts. Graham concluded that only a small proportion of the amines are oxidized to their aminochromes so that the red pigment areas in the brain only become visible to the naked eye after age six. Reaction 6 would then be therapeutic but reaction 7 is toxic.

The eight attributes of the good

Figure 2. The complete hypothesis.



hypothesis for schizophrenia can be accounted for by the adrenochrome hypothesis.

(1) Genetic basis: A genetic potential which favored reaction 7 over 6 could account for the phenomenon. For excess adrenochrome for any reason whatever would flow into adrenolutin which like adrenochrome is an hallucinogen. Leukoadrenochrome is not an hallucinogen. Any quantity of adrenochrome could be neutralized by diverting it into its leuko derivative. The same reasoning applies to every amine which is oxidized in the body into an amino-chrome.

(2) Physiological advantage: If there is an increased production of adrenochrome, properties of adrenochrome should be conferred upon the patient. Thus it is known that adrenochrome has antihistamine properties; schizophrenia should then impart antihistaminic properties, i.e. they should be less subject to physical expressions of allergy such as asthma, hay fever; adrenochrome has antimitotic properties. This suggests schizophrenics should be less subject to attack by cancer and should have lesser growth rates of rapidly growing tissues such as hair and nails. A few studies suggest that both these conclusions are true. I have had many patients who reported they did not have to have haircuts until they recovered when their hair began to grow at its normal rate. One patient had been bald for many years, her hair began to grow normally when she began to recover on Vitamin B₃ therapy. A decrease in growth rate should extend the life of these tissues i.e. these patients will not appear to age as quickly. However appearance is deceiving and it is likely that in chronic schizophrenia it is, as there is more rapid accumulation of old age pigment in brain and in heart i.e. that aging is accelerated.

Too much adrenochrome formation will increase the sensitivity of the

schizophrenic to high oxygen tension. Fortunately there must be very few schizophrenics who are deep sea divers, at least at the beginning of their career as divers. Bean et al. (1955) found that animals with their adrenal gland removed withstood oxygen stress better; they withstood other stresses less well. When adrenaline is injected into normal animals or animals without adrenal glands oxygen toxicity is increased.

(3) The role of stress: Stress is harmful for two reasons. The increase in the production of noradrenaline and adrenaline will lead to an increase in adrenochrome and in those genetically disposed to reaction 7 instead of 6 this will increase the amount of adrenolutin which is toxic. Secondly any stress decreases the amount of ascorbic acid in the body. Most people are on very low ascorbic acid intake and can ill afford any losses. A decrease in ascorbic acid will increase reaction 5.

(4) The clinical picture: Adrenochrome and adrenolutin are hallucinogens for animals and man (Hoffer and Osmond, 1967). They cause perceptual changes, thought disorder, behavioral changes and depression as do other hallucinogens such as LSD and mescaline. Thus any reaction which increases the formation of these substances will cause the schizophrenic syndrome or will make it worse. Noradrenochrome has not been crystallized and therefore has not been tested but it would very likely have similar properties as would the aminochromes arising from l-dopa, from dopa-mine and from 6 OH dopamine (trihydroxy dopamine). Factors which increase reactions 3, 4, 4a, 5 and 7 will aggravate schizophrenia. This includes excessive methylation, excessive oxidation and a deficiency of antioxidants. Reactions which inhibit these will be therapeutic. Penicillamine tends to drive adrenochrome into reaction 6 thus increasing the ration of leukoadrenochrome to adrenolutin. This will help account for

its therapeutic properties. It is also a copper chelator and by reducing copper levels decreases the activity of copper oxidases, enzymes which drive these amines to their aminochromes.

(5) The physiology and biochemistry of schizophrenia: Schizophrenic patients are not normal. Physically they are ill; the signs include problems with skin and its appendages including acne, dry and coarse or too greasy hair, nail changes and some have a distinctive body odor which I have found only in schizophrenics. It disappears when they recover. Skin may be sallow and puffy. Signs of ill health include posture, lethargy; often they are too thin, less often too fat. It is this characteristic sick appearance which has led clinicians to keep on searching for those biochemical factors responsible, the toxin or the

invading organism, and more recently the allergy or nutritional problem.

It would be unlikely that no differences would be found, for whatever sign is seen must have its internal equivalent. The main problem is that schizophrenia is a syndrome, not a homogeneous group. The commonality of the clinical symptoms and signs is probably internal and not as readily open to examination. There are therefore two main sets of biochemical factors, (a) those which are common to homogeneous groups and, (b) those common to the unique nature of schizophrenia. Thus the syndrome due to brain allergies will differ from that due to a Vitamin B₃ dependency or pellagra, in the syndrome factors. But all schizophrenics will have some things in common which cause perceptual and thought disorder

Table 1. A Comparison of some properties Of adrenochrome and changes found in some (1) schizophrenics.

Property	Adrenochrome	Schizophrenia
Antihistamine	Weak	(a) increased tolerance for histamine (b) decrease in physical symptoms of allergies
Pigmentation	Melanin and neuromelanin formation	a) increased pigmentation of hair and skin (b) decreased incidence of graying of hair
Antithyroid	Increased oxidation	(a) thyroid disturbances (b) increased tolerance to thyroid hormone
Mitoses	Antimitotic	(a) decreased resistance to tuberculosis (b) decreased incidence of arthritis (c) decreased rejection mechanism (d) deviations in growth
Temperature control	Hypothermia	(a) low temperature (b) defective diurnal rhythm
Insulinase mellitus	Inhibitor	(a) decreased incidence of diabetes
Phosphorylation	Inhibits hexokinase	(a) disturbed carbohydrate metabolism
Ascorbic acid	Oxidation	(a) deficiency

(1) Documentation for these comparisons is given in detail in our book. From Table 27, page 338. THE HALLUCINOGENS, Hoffer and Osmond, 1967.

symptoms. The first set of biochemical physiological differences will be found in a small proportion of the population of schizophrenics. If in a hundred patients forty are cerebral allergies and forty are vitamin dependencies, if one measures a factor peculiar to the cerebral allergies then only a small proportion of the entire group will show this difference. The first or the syndrome set of factors will never be found in a large proportion of schizophrenics unless a pure homogeneous group is selected. Thus, if one were to fast one hundred patients and study only those forty who became well by the end of the fast then we would have a homogeneous group. But the schizophrenia factors should be common to a large proportion of the heterogeneous group. A factor present in a large proportion of patients is therefore closer to the real schizophrenic factor than a factor which is only slightly more prevalent in the group. This is a syndrome factor. These two sets of potential differences will account for a finding which has been noted over fifty years. This is that no matter what biochemical or physiological variable is examined the schizophrenic groups have a wider distribution of values. They have a larger standard deviation of the mean for these variables.

A number of differences have appeared over the years. These are present in a number of patients so that mean differences compared to controls are not large. In my opinion they are real and must be taken into account.

In 1967 in our book Osmond and I showed how the adrenochrome hypothesis could account for many of these changes. I have shown some of these changes (from Table 27, page 338 *The Hallucinogens*, Hoffer and Osmond 1967) in Table 1, (p. 172). It seems to me this is a good test of the adrenochrome hypothesis. Every hypothesis in existence and those still to come including one which will render ours

out of date must also try to account for the clinical, biochemical and physiological findings in schizophrenia. (6) Is there a biochemical relation with the action of Vitamin B₃ and Vitamin B₆. Vitamin B₃ is a direct antagonist to adrenochrome. Early in our research we found that adrenochrome injected intravenously into known epileptics greatly worsened the EEG abnormality. One young patient with no previous psychotic episodes was given adrenochrome. Within a few minutes her EEG became more pathological, she became morose and quiet. A few days later she had to be admitted to a psychiatric ward for treatment of her first psychosis. Other patients were injected intravenously with nicotinic acid at the height of the adrenochrome-induced abnormality, within a few minutes their EEG returned to its pre adrenochrome level (Szatmari, Hoffer and Schneider, 1955; Schwarz et al., 1956). It is clear nicotinic acid can quickly reverse the adrenochrome-induced EEG pathology.

Vitamin B₃ also antagonizes the effects of LSD, especially the perceptual component (Agnew and Hoffer, 1955). When we were investigating psychedelic treatment of alcoholics with LSD we routinely terminated the reaction if it was too intense or too prolonged by giving our patients a gram of nicotinic acid.

There is no doubt that it is helpful for many schizophrenics. This certainty is based upon four double blind controlled experiments, upon over fifty clinically controlled trials, on my own experience over twenty-five years, on the experiences of a large number of orthomolecular psychiatrists and on the absence of experiments which are a repetition of the kind of therapeutic trials we have run Pyridoxine was established as an important treatment for autism by Rimland (1978); Rimland, Callaway and Dreyfus (1978) and by Lelord et al. (1978,1979) by double blind controlled experiments using homoge-

neous groups. These were conducted with infantile autism groups, the most difficult group to treat. Pyridoxine can work in one of two ways or by both. It is essential for the conversion of tryptophan into nicotinamide adenine dinucleotide (NAD). It is also required to replenish the pyridoxine removed from the body of patients who have too much kryptopyrrole (KP). This is a substance first discovered by Irvine et al. (1969) primarily in schizophrenic patients under our direction (Hoffer and Osmond, 1963). Later Pfeiffer (1975) and Pfeiffer et al. (1974) developed a quantitative assay and demonstrated KP bound irreversibly with zinc and pyridoxine causing a double deficiency. KP is an animal hallucinogen (Walker, 1975); it has not been tested in humans.

Vitamin B₃ and B₆ tie in with adrenochrome by the following mechanism. (Figure 3, below)

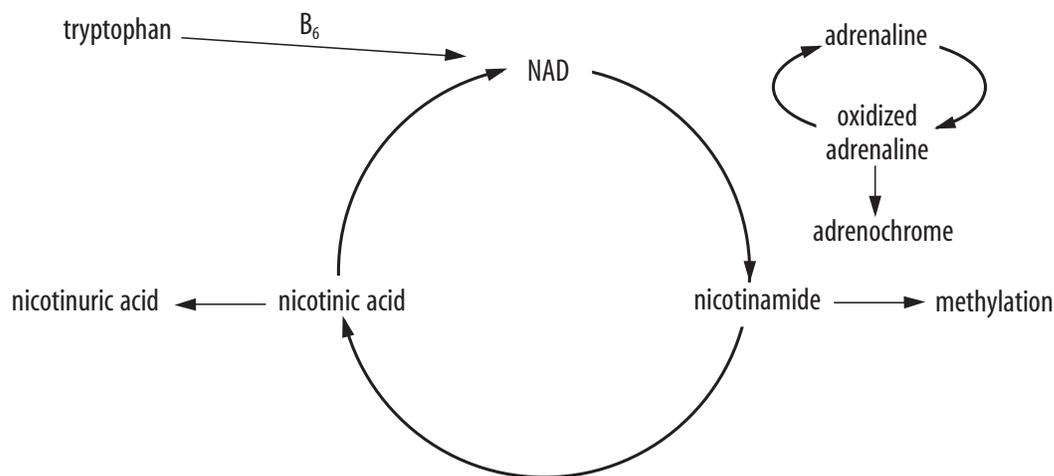
In the absence of enough NAD, oxidized adrenaline rapidly continues to be oxidized to adrenochrome. This reaction is not reversible. When there is enough NAD, oxidized adrenaline is reduced to

adrenaline. This, I assume, is the normal process. The deficiency of NAD should therefore cause or, if it is already present, intensify schizophrenic symptoms.

A deficiency of NAD is present in the Vitamin B₃ deficiency disease pellagra. Pellagra is caused by a diet deficient in Vitamin B₃, by a diet which is too low in tryptophan, too low in absorbable Vitamin B₃ and too rich in leucine. When too much leucine is present too much Vitamine B₃ is lost in the urine. This is reversed by isoleucine, i.e. iso-leucine is an antidote against the pellagra producing property of leucine.

In patients with pellagra the blood levels of tryptophan are low because of the diet. Pellagra is the best natural model of schizophrenia. Many years ago pellagrins filled southern mental hospitals especially in the spring. Dementia praecox was the older name for schizophrenia. Pellagra was one of the differential diagnoses for this disease, the other being syphilis of the brain and scurvy. It may also be a model for Hunting-ton's chorea (Still, 1979). One of my patients with

Figure 3. Mechanism of vitamin B₃ and B₆ tie-in with adrenochrome.



H.C. lost nearly all his symptoms when treated with Vitamin B₃, ascorbic acid and large doses of Vitamin E. As with pellagrins schizophrenics also had low plasma levels of l-tryptophan in contrast to phenylalanine and tyrosine levels which were not different from non schizophrenic controls. After four weeks of treatment the plasma tryptophan levels increased and in women this increase was associated with clinical improvement (Manowitzetal., 1973; Gilmouretal., 1973).

Removing either nicotinamide or nicotinic acid from the pyridine nucleotide cycle will decrease the formation of NAD. Nicotinamide is a good methyl acceptor becoming N methyl nicotinamide. This molecule can no longer participate in the pyridine cycle. Nicotinic acid combines with glycine to form nicotinic acid. It is excreted. These types of reaction decrease the availability of NAD. Mysko (1977) found that methylation of nicotinamide to N methyl nicotinamide was increased in schizophrenics compared to normal controls. It correlated with the presence of hallucinations. With clinical improvement the excessive methylation of nicotinamide disappeared. A decrease in available NAD will allow adrenochrome production to increase and increase the pressure toward schizophrenia in those genetically predisposed to convert it mostly into adrenolutin.

Graham suggests the well-known toxicity of 6 hydroxy dopamine (also called tri-hydroxy indole or TOPA) is due to its conversion to an aminochrome. This aminochrome would be very similar in structure and in properties to adrenolutin, an hallucinogen. Graham's suggestion is a good one; the aminochrome is a very active free radical and unless destroyed very quickly will combine and destroy other molecules. Since TOPA would be attracted to the dopamine receptors its oxidized derivatives would be there ready to destroy the dopamine receptors. This

is what TOPA is believed to do. Adequate amounts of NAD at the same receptor would decrease the formation of the aminochrome and thus protect the receptor. This idea has not been tested. This hypothesis suggests that ascorbic acid and Vitamin B₃ in adequate quantities should protect dopamine receptors against TOPA in the same way that they do protect against the psychosis-producing quality of levodopa. Graham suggests that levodopa while giving patients temporary symptomatic relief will at the same time hasten the destructive effect on dopamine receptors by levodopa. Our work suggests that Parkinsonism disease should be treated with Vitamin B₃ and ascorbic acid to protect the patient against the destructive action of levodopa.

(7) Cerebral allergies: Only a proportion of all patients with cerebral allergy are schizophrenic. There must therefore be another mechanism involved. The allergy triggers a reaction but other mechanisms determine whether the end result will be an anxiety state, depression, fatigue or schizophrenia. In my opinion only patients with the genetic potential for schizophrenia will develop it. They must, if we follow the adrenochrome hypothesis, be able to produce too much aminochrome and adrenolutin-like derivatives. In fact the allergic reaction may invoke this reaction.

Adrenochrome is a weak antihistamine. When the body begins to release too much histamine it takes counter measures. Increased secretion of adrenaline is helpful. Physicians use adrenaline injections in an emergency to save patients threatened with severe allergic reactions, adrenaline provides an immediate relief. If some is converted into adrenochrome this would provide a sustained antihistamine effect. Leukoadrenochrome and adrenolutin may also have similar properties. A person genetically programmed for schizophrenia can invoke this reaction

much more readily; a person unable to make enough would have a less effective defense against these allergic reactions.

If we assume the adrenochrome/adrenolutin defense mechanism is triggered the result will be (1) a reduction in the intensity of the somatic allergic reaction, i.e. less rash, less asthma, etc.,

(2) the effect of the increased amount of adrenochrome and adrenolutin, i.e. the schizophrenic syndrome. It may be that only an allergic reaction will trigger the adrenochrome/adrenolutin defense. These patients will be normal when not exposed to the allergen and schizophrenic when exposed.

Thus, some patients will be psychotic because they require large amounts of Vitamin B₃, B₆ to keep the adrenochrome/adrenolutin reaction under control, others will require an allergy-free environment (including food) while many will require both. Optimum doses of these vitamins will protect many cerebral allergies with little environmental intervention while others will require an equally vigorous anti allergy approach.

Before I became familiar with cerebral allergies I often had to use nicotinic acid dosages of 12 grams a day. When these patients discontinued their milk, or wheat, or sugar, or whatever they could no longer tolerate these high dosages. Whenever I find patients who can tolerate these quantities I immediately investigate them for allergies. My experience suggests that patients free of cerebral allergies can seldom tolerate more than six grams per day.

Unless clinicians are aware of these syndromes they will continue to make the same errors made by Ban and Lehmann (1970, 1975) and Wittenborn (1973, 1974). They will continue to use populations containing a large proportion of cerebral allergies for vitamin-only trials and will achieve the same negative results. The chronic population used by these investigators contain the greatest proportion of

cerebral allergies. Our original controlled experiments were carried out on entirely acute and subacute populations which contain the fewest cerebral allergies. They contain the greatest proportion of vitamin dependent patients.

(8) Most of the hallucinogens resemble the amines or their aminochromes in structure and in properties. This is the observation which pointed at the amines and at the indoles. It is likely hallucinogens would not be hallucinogens if there were no natural mechanism in the body with which they interfered. For example some of our early work with LSD suggested that it required endogenous adrenochrome for its complete hallucinogenic activity (Hoffer et al., 1959).

I will examine the other hypotheses and show how they do or do not fit these eight criteria. These hypotheses have been reviewed by Teller (1979) and Smythies (1976). I will divide the other major hypotheses in two: (a) the methylation hypothesis, (b) the dopamine hypothesis.

The methylation hypothesis derives from Osmond and Smythies (1952). Briefly it suggests that under certain conditions amines are methylated to form hallucinogenic derivatives such as mescaline or bufotenine. I do not mean that mescaline is in fact formed, but that similar molecules with similar properties could be TOPA and could conceivably form such a compound. Excessive methylation would be toxic, a reduction in methylation would be therapeutic.

The dopamine hypothesis simply states there is either too much or too little dopamine activity in the brain. The excess dopamine hypothesis is supported by a number of findings. Many neuroleptics block dopamine receptors and Haldol is one of the most powerful dopamine receptor blockers. However, ascorbic acid which in the brain is as active as Haldol is not a tranquilizer. It has been valuable in controlling anxiety in some schizophren-

ics and has “cured” a few schizophrenics when 20 grams per day was used. Other supportive findings are that hallucinogens can affect dopamine receptors, that l-dopa will make patients psychotic and many reward pathways are controlled by dopamine turnover. Not favoring the dopamine hypothesis are the known observations that tranquilizers do not cure patients, nor is dopamine turn-over related to symptom remission. The dopamine hypothesis rests entirely on pharmacological evidence (Carlsson, 1978). See also Teller (1979) and Van Kammen (1979).

Chouinard and Jones (1980) suggested that schizophrenia is a dopamine deficiency disease. Muller and Seeman (1977) found an increase in the number of dopamine-binding sites in rat brains treated with neuroleptics. Increases have also been found in some schizophrenic brains. Further, Chouinard and Jones (1980) describe a supersensitivity psychosis. This is a response to chronic tranquilizer treatment. They believe that the dopamine deficiency excites a compensating increase in the number of dopamine receptors. It is an attempt by the neurons to retain their sensitivity to the neurotransmitter dopamine.

I would expect that any dopamine deficiency would arise by one of two mechanisms. If there were a decreased synthesis of dopamine from l-dopa there should be a deficiency of the other catecholamines which follow. There does not appear to be a deficiency of noradrenaline and adrenaline in schizophrenic patients. A deficiency of dopamine could be due to an increased turnover, i.e. it would be used up too rapidly. An increase in the oxidation of dopamine to aminochrome would cause a relative deficiency of dopamine in the brain without necessarily decreasing the intensity of the other metabolic pathways. It would also lead to some destruction of dopamine receptors where presumably the oxidation occurs. This could explain

the increase in dopamine receptors, adaptive enzymes increase in quantity when more substrate is present. Perhaps the dopamine receptor attached to the neuron has the same adaptive capability.

I have referred to the possible inter-relationship between serotonin and dopamine. A deficiency of serotonin would increase the conversion of dopamine to aminochrome. Smythies (1976) elaborated the dopamine hypothesis by involving serotonin. He suggests there is an imbalance between dopamine, which is too active, and serotonin, which is not active enough. This fits in with the serotonin-dopamine aminochrome idea. It also involves tryptophan as a source of serotonin and the nucleotide cycle, i.e. Vitamin B₃. Increased doses of Vitamin B₃ would (1) increase NAD levels which decreases oxidation of dopamine to aminochrome (2) increase serotonin levels by blocking the conversion of tryptophan to NAD. In turn the increased serotonin could inhibit formation of aminochrome from dopamine. A deficiency of Vitamin B₃ would by the same reasoning increase formation of aminochrome and perhaps account for a deficiency of dopamine at the synapse and an increase in dopamine receptors.

Serotonin can inactivate monoamine oxidase, one of the enzymes which inactivates sympathomimetic amines. It apparently is changed to an aminochromelike auto oxidation product which attacks the enzyme. Glutathione protects the enzyme (Klemm and Baumgarten, 1978). Inhibiting monoamine oxidase will drive more of the catecholamines into other pathways including the aminochrome pathway. TOPA also inactivates catechol O-methyl transferase via an aminochrome intermediate. This enzyme is the second enzyme which inactivates catecholamines (Borchardt, 1975). Thus aminochromes can block both of the systems which do not lead to aminochromes. It is also possible serotonin is changed into similar

aminochromes under certain conditions. Thus Baumgarten et al. (1978) suggest the toxicity of 5, 6 dihydroxy tryptamine requires oxygen to form an aminochrome. This would polymerize to form a melanin-like compound.

There are a number of other ideas which I would not class as hypotheses since they are really crude findings between schizophrenics and others in a few studies. These include monoamine oxidase low in some patients, creatinine phosphokinase in muscle, autoimmune, endorphins. Perhaps with more research these ideas may achieve the rank of hypotheses. A review of the relation of brain amines and peptides to psychiatric illnesses is provided by Smith and Copolov (1979).

The adrenochrome hypothesis logically fits in with hypothesis. In brief the adrenochrome/adrenolutin all of the eight criteria. The methylation hypothesis is a more holistic one with methylation conforms to only two but if the adrenochrome and dopamine being a part. hypothesis is accepted methylation

conforms with Recently Horrobin (1977, 1979) presented a four more, but then it becomes superfluous. prostaglandin deficiency hypothesis of Methylation is then merely a reaction involved in the schizophrenia. This is probably the only new adrenochrome/adrenolutin hypothesis. The same hypothesis which does not require an ad-comments apply to the dopamine adrenochrome/adrenolutin mechanism but which is not necessarily antagonistic to it. Horrobin points out (1) antischizophrenic drugs stimulate prolactin which stimulates prostaglandin synthesis, but Horrobin does not consider Vitamin B₃ and B₆ anti-schizophrenia and fails to discuss whether these are related to prostaglandin metabolism, (2) schizophrenics tend to be more resistant to pain and inflammation and more resistant against arthritis; prostaglandins may be involved, (3) drugs known to be prostaglandin antagonists cause schizophrenic-like syndromes. Horrobin states the prostaglandin hypothesis may be reconciled with excess dopamine activity, to the endorphins, to cerebral al-

Table 2. Eight prerequisites to which a good hypothesis of schizophrenia must conform.

Item	Adrenochrome	Methylation	Dopamine *
1.Genetic	yes	yes	yes
2.Genetic advantage	yes	no	no
3.Stress	as an antihistamine	no	no*
4.Clinical symptomatology	yes	no*	no*
5.Clinical physiology	yes	yes	yes
6.Vitamin B ₃ and B ₆ therapeutic	yes	no*	no*
7.Cerebral allergy	yes	no*	no*
8.Relation to hal-lucinogens	yes	no*	no*

No* means methylation and dopamine could be active here only via an aminochrome derivative.

lergy and to a role for zinc.

The adrenochrome hypothesis immediately called attention to Vitamin B₃ and ascorbic acid as potential treatments for schizophrenia. The fact that we have indeed found these substances so helpful is a plus for the usefulness of the hypothesis. Osmond and I did not foresee that these vitamins would have a specific reaction with brain receptors. Mohler, Pole, Cumin, Pieri and Kettler (1979) reported that nicotinamide is a brain constituent with benzodiazepine-like activity. It has the same order of activity as the highly potent benzodiazepine. Thomas and Zemp (1977), Tolbert et al. (1979, 1979a) found ascorbic acid to be as active at the dopamine receptors as Haldol, one of the most potent tranquilizers. I will be surprised if future research fails to disclose a direct effect of these vitamins in the synapse and at the receptor site with one of the many amines which appear to play a role.

The Possible Relationship of Endorphins to Schizophrenia

Endorphins are small polypeptides with amino acid sequences found in B lipotropin from the anterior pituitary gland. Some of them have opiate-like activity. They are found in all areas of the brain and in cerebrospinal fluid. It has been suggested they are related to schizophrenia. Too little or too much is suspected (Verebey et al., 1978). So far the evidence is not persuasive for either idea. For awhile it looked as if dialysis might be useful in treating schizophrenics; Osmond and I, (1967) considered on theoretical grounds it might help. Recent reports do not support the earlier positive claims (Diaz-Buxo, Caudle, Chandler, Farmer and Holbrook, 1980).

Perhaps more thorough studies will isolate those schizophrenics who are helped by dialysis. Dialysis removes many molecules from blood so its therapeutic effect is not necessarily tied to any en-

dorphin idea. I find Dohan's idea (1978) more appealing. He suggests that the basic biological defect in schizophrenia is genetic impairment of the gut and other barrier systems which eases the passage of food-derived neuroactive (exorphins) polypeptides from gut lumen to brain cells.

The evidence is reviewed by Ross-Smith and Jenner (1980). (a) There is an inverse association between consumption of cereals and gluten and the incidence of schizophrenia. (b) Gluten and casein hydrolysates produce exorphins which act like endorphins. (c) Large molecules can enter the bloodstream from the gut and penetrate into the brain. (d) Schizophrenics do show an association with immune reactions.

The exorphin reaction may be a specific one, an example of what can happen with any food to which a schizophrenic is allergic. They may well belong to the cerebral allergies. There is little doubt gut and brain are somehow related (Bloom, 1980). Eight physiologically important gut hormones are known, another seven types of gut hormones are peptides also active in the brain. These are a vasoactive intestinal peptide, substance P, enkephalin, bombesin, somatostatin, cholecystokinin and neurotensin. It may take many decades before these relationships are explored fully.

Conclusion

The adrenochrome hypothesis accounts for the syndrome schizophrenia more accurately than do any of the competing hypotheses. The two main competing hypotheses are superfluous since they are accommodated by the adrenochrome or more accurately the aminochrome hypothesis. In the research developed by Dr. H. Osmond and me this hypothesis has been very successful in giving direction to our research which began about thirty years ago. It provides insight into the experiential world of our patients lead-

ing to several useful perceptual tests, i.e. the HOD test (Hoffer and Osmond, 1961; Hoffer, Kelm and Osmond, 1975), and the EWI test (El Meligi and Osmond, 1970). It helped originate the use of large doses of Vitamin B₃ for treating schizophrenia patients and for alleviating the symptoms created by LSD. It also predicted the therapeutic use of ascorbic acid, again in large doses. Both these vitamins are important components in orthomolecular treatment as applied to schizophrenics. Finally it helped point to the catecholamines as significant factors in the etiology of schizophrenia.

Unfortunately the many leads developed by the adrenochrome hypothesis have been neglected by research institutions for a number of reasons. The critical and hostile attitude of the professional associations and granting agencies discouraged scientists from entering this difficult but challenging field. Fortunately the climate of opinion is changing. I expect that for the next decade the adrenochrome hypothesis will receive more careful attention.

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The Future of Psychiatry

A. Hoffer, M.D., Ph.D.

Recently, in an orthodox medical journal, the question was discussed whether psychiatrists were still going to be needed. Basically, modern psychiatrists have two main treatment functions: they prescribe drugs - tranquilizers or antidepressants; and they may also do psychotherapy or counselling. It was suggested that general practitioners are just as capable of prescribing drugs, and that psychologists and counsellors are perhaps even more capable of doing psychotherapy and counselling. In other words, the family physicians could initiate the medical regimen, and the psychologists could take over the counselling function.

This was not a very radical idea as it has been happening for many decades. Psychiatrists themselves have started deserting the really seriously ill—the schizophrenics, the senile states, the personality disorders—and have devoted themselves more and more to the more benign forms of disease such as depression and mild anxiety conditions. And general practitioners have become more and more skillful at treating seriously ill psychiatric diseases. I know many physicians (MDs, osteopaths, naturopaths, chiropractors) who practice orthomolecular medicine, and who have a much higher cure rate when treating schizophrenics than do the psychiatrists in their area who work only with drugs. In Saskatchewan many years ago, a family physician was so effective local psychiatrists complained about him. Later he lost his license to practise medicine.

Over the past 100 years, psychiatric conditions that were treated almost exclusively in mental hospitals have disappeared from psychiatry because they were treated successfully by general practitioners. In a book on psychiatry written

about 1900, the four differential diagnoses for psychosis were pellagra, scurvy, general paresis of the insane and dementia praecox. The treatment for pellagra was dietary until niacin was recognized to be vitamin B₃ in about 1935. Pellagra has disappeared; at one time it made up as much as one-third of all admissions to mental hospitals in the southern U.S.A. It became the province of the early pellagrologists. But they were no longer needed when synthetic vitamin B₃ became available and was added to white flour in the U.S.A. and Canada. Most psychiatrists today would not recognize it if a patient with pellagra walked into their office. Scurvy severe enough to cause psychosis is no longer present. Syphilis responded to the physician and the needle, and is rarely found in mental hospitals.

But dementia praecox, the disease, did not disappear. It was simply renamed schizophrenia, and has remained the major problem for psychiatry. Freud recognized that psychoanalysis would have a short career, only until the physicians with their syringe (drugs) came along. Freud knew nothing about nutrition and nutrients when he practised.

The process of breaking the broad group of the schizophrenias into unitary syndromes still goes on. Arising from our work in Saskatchewan in 1960, Carl C. Pfeiffer was able to divide schizophrenias into three broad groups: those excreting kryptopyrrole, the high histamine group, and the low histamine group. Each group requires a different treatment plan, and when they are followed the results are very good. He recognized a fourth large group, the cerebral allergies. But orthodox psychiatry is not aware of this useful subdivision and looks upon each schizophrenic as a member of the same class,—a

class for which the only treatment is to be tranquilized.

If modern psychiatry did its job effectively, there would be no need to consider replacing them with their more biochemically oriented colleagues. The results of modern drug treatment are not very good compared to what was obtained before the tranquilizers were introduced. Thus, at a symposium held in Vancouver in the fall of 1995 sponsored by the Canadian Psychiatric Association, Dr. Alan Brier, Chief, Unit of Pathophysiology and Treatment, Experimental Therapeutics Branch, National Institute of Mental Health, Bethesda, Maryland, is quoted as saying, "Eighty-five percent of all people with schizophrenia who are treated with neuroleptic drugs are deriving suboptimal benefits. So it is clear that new and better drugs are needed". He should have said, more appropriately, that we need better treatment. Orthomolecular treatment is not new, but it is an awful lot better than merely allowing patients to vegetate on tranquilizers.

A fifty percent response rate is pretty good if there are no other treatments which yield a better outcome. In fact, in 1850, Dr. J. Conolly in England reported that fifty percent of his insane patients were discharged well. The early mental hospitals in the northeastern U.S.A. reported similarly good results. What did they use? Good food, shelter, sympathetic care, and respect. This fifty percent is probably the natural recovery rate if our schizophrenic patients were treated with the same sympathetic care, good nutritious food and decent shelter (not the city streets).

Modern psychiatry, with the huge expenditure of money for drugs, has in 150 years gone down to a 15% recovery rate. Yet its practitioners seem to be content with this very dismal response rate while they wait for the miracle,—the drugs which will cure their patients. Each

year we hear the announcement of new, ever more expensive drugs, with little evidence they have any major impact on the problem as a whole. I don't see reports that the schizophrenic homeless are no longer homeless, or that the suicide rate among young schizophrenic patients has gone down.

Recently, on Canada's news channel, Pamela Wallin discussed schizophrenia. For the first fifteen minutes a couple spoke about their schizophrenic son, still ill. For the next fifteen minutes the Honorable Michael Wilson, formerly Minister of Finance, described his son's illness culminating in his suicide. The first half hour, then, was devoted to demonstrating the failure of modern psychiatry. The third fifteen minute section was given to a modern psychiatrist who seemed quite cheerful with the present treatment of schizophrenia. He gave a good account of the nature of the illness, but was pleased with the tranquilizers and was cheerfully hoping for that ever new, better tranquilizer. It appeared to me that he had not seen the first half hour of this program. The last fifteen minutes was given to a schizophrenic patient who appeared well, and who created and edits a journal for schizophrenics. It is a good journal to which I have made several contributions which have been accepted, indicating a degree of broad-mindedness which does not exist in standard psychiatric journals. This TV production typifies the state of schizophrenia treatment today: tranquilize, be content, wait for the new, ever-better tranquilizer.

But how long can patients wait? A year in the life of a schizophrenic can be like an eternity. Patients and their families do not have the luxury of waiting for the day when psychiatry will at last start treating their patients properly. It does not provide much solace to the Wilsons and other parents who have lost their children to suicide. (The suicide rate for

schizophrenia is about 25 times that of the general population).

In sharp contrast, at the 25th anniversary conference of the Canadian Schizophrenia Foundation, held in Vancouver in May 1996, two chronic schizophrenic patients, who met and married after they had recovered, described their own illness and their recovery on the orthomolecular program. They had both failed to respond to previous modern psychiatric treatment.

Modern psychiatry has not been very good at treating schizophrenia. One need only glance over at the homeless people who live in the our city centers for the evidence. Is there any other disease, other than addictions, where so many sufferers are forced to wind up in the streets for lack of proper medical attention? Think what would happen if half the homeless suffered from tuberculosis. Tuberculosis is contagious, but in a social sense so is schizophrenia. In my opinion, many patients today are no better off than they would have been in 1950 when they were incarcerated in hopelessly overcrowded dungeons called hospitals. Perhaps they would have been better off then, for at least they had a few nurses and doctors to look after them.

Today patients are released early, after a short stay in hospital in order to start them on tranquilizers. They are discharged as soon as their major symptoms are partially suppressed, but long before they have regained enough health to permit them to live on their own, or with their families. Or, and this is becoming more frequent, their diagnosis is changed from schizophrenia to personality disorder, and they are discharged with the unhelpful advice that personality disorders can not be treated.

The reason why modern psychiatry has failed is that it has such a narrow vision of what to do. All psychiatry knows is to use tranquilizers, waiting for that distant day when they will have

a drug, the Holy Grail, which will cure schizophrenia. I do not know of a single xenobiotic chemical that has ever cured anything, even though some of them are useful in ameliorating the discomfort of the disease. The answer to schizophrenia will come from recognizing more clearly its causes and biochemistry and dealing with them, as is done in orthomolecular psychiatry.

Modern tranquilizer psychiatry has been struggling for the past forty years with the tranquilizer dilemma, which they are aware of but have not clearly faced. Very simply it is this: when one uses a tranquilizer, one converts one psychosis, schizophrenia, into another, the tranquilizer psychosis. I believe it was Dr. Mayer-Gross who first suggested, in about 1955, that tranquilizers converted one psychosis into another.

Tranquilizers alleviate many of the symptoms of schizophrenia, and make life more comfortable for the patient and for their families, as well as for the hospital and its staff. As the patient begins to recover, s/he becomes more normal. However, tranquilizers also make normal people psychotic—a fact proven by the Soviet practice of committing dissidents to mental hospitals and giving them tranquilizers. Therefore, we can assume that as treatment continues the patient becomes less and less schizophrenic, and more and more psychotic from the drugs.

The tranquilizer psychosis is characterized by the following features: fewer and less intense hallucinations, fewer and less intense delusions, difficulty in concentration, memory disturbances, indifference, increased self interest, moderation of moods and less agitation, social and behavioral deterioration, and physical side effects such as impotence, tardive dyskinesia, apathy, sluggishness, obesity, deterioration of teeth from lack of saliva. And perhaps most important of all, the inability to engage in productive

labor, i.e. to pay income tax. That is why the average schizophrenic patient will cost the community \$2 million over a forty year life span of disease, unless they are treated properly and become well.

Patients prefer to be normal, i.e. they do not prefer the tranquilizer psychosis over the schizophrenic psychosis, but they have no choice and have to accept elements of the tranquilizer psychosis in order to be freed of elements of their original psychosis. The modern solution is to keep them swinging between the extremes of schizophrenia and the tranquilizer psychosis. As they become more and more tranquilized, the dose of drug is decreased to try and halt this process, or the drug will be discontinued. In most cases the original schizophrenia returns. They are suspended in this uncertain world swinging between the two psychoses. They can not escape, and the only choice for these unhappy patients is to take to the streets where they can avoid taking the drugs.

But with orthomolecular treatment patients are offered a real choice, the choice of becoming and remaining well. The large doses of nutrients and the diet will maintain the patient in good health. One can combine the rapid effect of the drugs with the slow curative effect of the nutrients. As the patient begins to recover one slowly reduces the dose of the drugs, and this time instead of become psychotic from the drug they remain well as the nutrients take over.

There is no other answer to this tranquilizer dilemma. This is why acute patients treated for at least one year will reach a 90% recovery rate. By recovery I mean that they are free of signs and symptoms, they are getting along reasonably well with their family and with the community and they pay income tax. They are working, or they are graduating and getting ready to work.

I know of 17 young men and women

who became schizophrenic in their teens, were treated properly, recovered, went to college, became doctors and psychiatrists and are practising. A few years ago the father of one of them, a physician, was concerned about his son. His son had been offered an appointment as Chair of a large department in a medical school. His father wanted to know if I thought it might be too stressful for him.

Patients pay income tax because they are well enough to work. I challenge orthodox psychiatric to show me any cohort of patients who have been treated with tranquilizers alone of whom even ten percent are gainfully employed in responsible jobs.

Since modern psychiatry has failed its essential task of curing schizophrenics (in the same sense that insulin and diet cures diabetes mellitus), since modern general practitioners can give tranquilizers as skillfully as psychiatrists, and since counselling and psychotherapy can be given even more effectively by psychologists and social workers and nurses, does it not make sense to replace psychiatry with more efficient health workers? Psychiatry should be allowed to practice only if it is prepared to use the most advanced treatments, and can show that it can do a better job than could other physicians.

In Memoriam:
Harold D. Foster
1943–2009



A Selection of Tributes from www.orthomed.org.

Earl Staelin Colorado

I'm deeply saddened to learn of Harry's death. He was very helpful when I was searching for information on minerals in ground water for an article I wrote for the Well Being Journal in 2006. Then I discovered his work on AIDS, which he kindly forwarded and which I used for a talk. I asked the Well Being Journal to contact him and they published an article by him on selenium and AIDS. I was going to contact him for an AIDS update when I learned the sad news.

Karin Munsterhjelm-Ahumada, MD Finland

I met Harold Foster for the first time in Victoria BC, 2004, having dinner with him and Abram Hoffer after a consultation in Abram's office. Later I saw him many times in OMT conferences and admired especially his books, *What Really Causes Schizophrenia* and *What really causes AIDS*. His knowledge has been of immense help in my own work with orthomolecular medicine and I think he knew very well the importance of his brilliant research work! I am grateful and proud to have known him.

Rosalie Moscoe Toronto

I had the privilege of working with Harold on the board of the International Schizophrenia Foundation and will miss Harold's smile and fun personality. A brilliant, dedicated man to orthomolecular principles, he helped many through his books

and research, always looking to help heal the world. My sincere condolences to his family; know that his work will go on and on. He'll be sorely missed.

Sara Sochaczewski Montreal

It was my absolute pleasure in life to know you and I feel the loss of you tremendously. Rest in peace.

Dr. Brian Sparkes Toronto

This is a major loss. Harold was absolutely brilliant. He understood biochemistry better than many biochemists and being an outsider to this field he brought to it a clear vision without all the prejudices, taboos and false assumptions inherent in the minds of those who grow up as specialists in it. In the history of science, major breakthroughs are often made by outsiders to a field, and orthomolecular medicine has benefitted enormously from Dr. Foster's insights and scholarly proficiency.

Ray Pataracchia, ND Toronto

Harold's epidemiological slant on nutrients and disease provided a key contribution to the field of orthomolecular psychiatric treatment. Dr. Hoffer and Dr. Foster collaborated on mineral causation aspects of schizophrenia. The foundations of their work are profound enough that a new model of care for schizophrenia could easily be based on their contribution to science.

Gisella Colucci Toronto

He was a captivating speaker. So sorry to hear of his death. My deepest condolences to family and friends. May he rest in peace.

Bill Houston Thunder Bay, ON

I met Harold by email. We made a trade. I sent him a copy of my latest CD and he sent me a copy of the DVD he made about the orthomolecular program for AIDS in Uganda. Harold always answered my questions promptly. I will miss his intelligence and good humour. He was someone I wish I had known better. Like Abram Hoffer, Harold Foster will live on in my memory as a man who made the world a better place through his work, and who took time out from a busy schedule to befriend me.

Tom Lawless Kelowna, BC

What a loss! I will never forget his lecture where he stated, after much research and observation, that the perfect medicinal food for the condition of AIDS was a "cheeseburger...but, with a brazil nut bun." Quite a character, quite a life.

Joe Pittari Concord, ON

Harry was a tremendous teacher, supervisor and mentor. His passion and enthusiasm was contagious and lead me to study with him and under his in medical geography. He was and will continue to be a truly special man. we kept in regular contact - I will miss his friendship.

Ian Brown Barrie, ON

Dr. Foster will be missed! He truly cared for the planet and its inhabitants. He was always approachable at conferences and generous with his publications. RIP Harry!

Peter and Betty Homenuck Victoria, BC

Our condolences. Harold made a tremendous contribution to orthomolecular medicine. And we miss running into Harold on our walks at Willows Beach in Victoria. May God bless.

Merrily Manthey Florida

My deepest condolences to Harry's family. I will miss his genius and his delightful humor. His work is so outstanding that I have the utmost confidence that others will faithfully carry on Harry's projects.

Erik and Jinty Paterson Creston, BC

I admire Harold's work tremendously. He was a great inspiration. What I learned from him has been put to the service of both my patients and myself to good effect. He will be missed. He ought to have had much wider recognition for the service he performed for preventive medicine.

Andrew W. Saul Brockport, NY

When the history of civilization is written accurately, Dr. Harold D. Foster's name will be there as the man who stopped AIDS with nutrients. Millions will thank him and bless his life, as we do now.

Greg Schilhab Toronto

Harold Foster was a fascinating speaker and had a gift for synthesizing diverse, seemingly unrelated phenomena and showing us the orthomolecular whole. He will be missed by all of us, especially at the *Journal of Orthomolecular Medicine* where he contributed so many brilliant observational studies.

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