*Raw Energy—Nutrition of the Future?

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ABSTRACT

'Normal' life can be maintained on a diet incapable of producing high level health. Such high levels can, however, be achieved by the consumption of what McCarrison called 'the unsophisticated foods of Nature', when given in their natural state. The implications for contemporary society are reviewed. This nutritional value of foods is traced back to energy and to the two physical laws which govern energy. Schrodinger's examination of this problem highlighted the contrast between the entropy of energy in physical systems and biological order. Schrodinger spoke of neg-entropy, referring to the reversal of entropy in the affairs of living systems. This philosophical paradox is discussed.

INTRODUCTION

Experimenting with animals at the University of Rostock just before World War II, Professor Werner Kollath discovered an extraordinary phenomenon. He called it 'mesotrophy' which means "middle-nutrition". Kollath found that "normal" life could be maintained on a diet which was none-the-less incapable of producing high-level health. He took animals and raised them on a diet of purified, processed foodstuffs, devoid of all mineral salts except potassium phosphate and zinc and virtually empty of vitamins except a little thiamine. Despite the poorly nourished condition of these animals they showed no *clinical* signs of disease - not even of vitamin deficiencies.[1]

But by the time they reached adulthood, the animals showed numerous indications of biological degeneration similar to those which are commonplace amongst men in the civilised world. They had lots of dental caries, they suffered from dysbacteria in the colon and were constipated, and their bones had undergone demineralization. At autopsy these animals' organs revealed damage resembling that found in men suffering from degenerative diseases. No supplements with vitamins were able to reverse these changes. The only thing that would, provided it was given early enough, was an abundance of fresh raw food containing green leaves, cereal germs and vegetables. Kollath's findings were later confirmed by nutritionists working in Stockholm and Munich.[2]

Is it possible that a great many people in the civilized world are, like Kollath's animals, probably living in a state of "meso-health"-meso-tropy-induced by a long-term diet of devitalised and processed foods. By increasing the number of fresh raw foods in the diet and eliminating a majority of cooked and processed foods and high protein or high fat foods such as meat could we perhaps greatly improve not only the health of people already suffering from degenerative illnesses but also those of us in whom the subtle processes of degeneration had not yet shown themselves in clinical symptoms?

*McCarrison Lecture November 27, 1984

OUR CURRENT STATE OF HEALTH

Despite a sophisticated medical system based on potent drugs and high technology procedures such as coronary bypass surgery, kidney dialysis and prosthetic joints plus dramatic medical intervention designed to save lives, the state of health in Britain and America is poor. The diseases from which we suffer - cancer, arthritis, cardiovascular troubles, respiratory disorders including emphysema and bronchitis, diabetes and a pervasive incidence of depression - have shown little decline since the turn of the century. Indeed most of them, like cancer and mental illness, are steadily increasing.

In Britain some 200,000 cases of cancer occur each year. In 1981 the American National Cancer Institute predicted that one in every three Americans will get cancer before he turns 74. The situation with heart disease is little better. Director of the National Heart, Lung and Blood Institute, Dr Robert Levy has reported that some 35 million Americans suffer from high blood pressure which is a central cause of $1^1/_4$ million heart attacks and 500,000 strokes every year. Here in Britain more that 150,000 people die each year from the same conditions. Measured in monetary terms, the cost of running the British National Health Service each year is about 12 million pounds - three times as much in real terms as in 1949. In the United States in just over twenty years medical costs have risen from 27 billion to some 200 billion dollars a year. In short not only are we not getting any healthier, our sickness is costing us a small fortune. And that is quite apart from the suffering in human terms it causes which is impossible to put a figure on.[3, 4, 5, 6, 7]

"VOLKSWAGEN CONSCIOUSNESS"

As bacterial infections have come under control, thanks to widespread vaccination, improved public hygene and the discovery of antibiotics, the diseases to which we are prone in the West in the last quarter of the twentieth century have become largely degenerative in nature: heart disease, hypertension, circulatory ailments, cancer, diabetes, arthritis, obesity, hypoglycaemia, mental disorders. They are illnesses which, even the most orthodox physician will tell you are the result of how we live, our nutrition, the way we cope with stress, how much physical activity we get and what kind of environmental pollution - radiation, airborne chemicals and chemicals in our foods we have to cope with. High technology medicine with its dramatic interventions is of little use in the prevention and cure of such illnesses. As a first step towards doing something positive in that direction, we must stop treating our bodies with what Kenneth Pelletier, author of *Holistic Medicine* has wittily dubbed the "Volkswagen attitude" which is implicit in most current medical thinking. By this he means the notion which many people have that you can run yourself as long and hard as you like and expect your doctor to repair any damage with new parts.[8]

WE NEED AN ECOLOGICAL APPROACH TO HEALTH

We need to take a more ecological approach to health - an approach which will already be familiar to so many of you thanks to the pioneering work of Sir Robert McCarrison after whom this society was founded. We must acknowledge that the body, like the earth itself has finite resources to expend - that the condition we find ourselves in after twenty or more years of living depends primarily on *how* we have lived. More specifically, it depends on a number of variables in our lifestyle over which ultimately only *we* can exercise control. These variables include such things as how we cope with stress, how often and to what degree we subject our bodies to drugs, alcohol, and cigarettes, how much physical exercise we get and what levels of radiation, air and water pollution we allow our government to pass as "safe". But probably the single most important of all is nutrition.

Interest, even amongst Establishment doctors (who tend to have little information about how diet can protect against illness or be used to cure disease) is steadily growing as they attempt to cope with what has often been referred to as the current "crisis in health" in Western countries. But the notion most doctors have of nutrition is naive and incomplete. It is based on nineteenth century scientific models which assume a single-cause-single-effect between poor nutrition and disease. The standard academic notion of what kind of diseases occur as a result of poor nutrition confines itself to considering only those illnesses traditionally called "deficiency diseases" such as scurvy, beriberi, pellagra, rickets and kwashiokor. The list is short and the ailments include only those caused by the lack of one specific nutrient in a patient's diet. In reality, these gross manifestations of nutritional deficiency are rare in developed countries. However, sub-clinical deficiencies responsible for slow but inexorable physical decline are not.

It is also common for the average doctor-specialist or not-to insist that provided you get a "well-balanced" diet-which for most people includes considerable quantities of highly processed foods and is far too high in fat, protein and sugar-you are getting enough nutritional support for health. This is simply untrue, as has been shown in a number of well-conducted large scale studies both in England and the United States. The three year Health and Nutrition Examination Survey carried out on 28,000 people in America by congressional mandate is an excellent example. Even by *high conservative* estimates it showed that half of the women surveyed had too little calcium and that iron deficiency is widespread in the United States and crosses all bounds of race, class and culture and that more than 60% of the people studied had at least one symptom of malnutrition.[6,8]

WHAT IS GOOD NUTRITION

Between 50,000 and 100,000 different chemicals go into the making and the running of the human body. They interact with each other in ways so complex they make the world's most advanced computer look like an abacus. Nutritional science has so far isolated and identified some seventeen vitamins and co factors, twenty four minerals and eight to ten amino acids which it recognizes as essential to the health and reproductive abilities of the human body.[3] There are no doubt many more, and new substances are being discovered relatively often. The health and fitness of our bodies depend greatly on how good a supply of essential nutrients we eat for it is only through taking in these substances that it is able to build and maintain the elaborate machinery and the complex chemical transformations on which we depend for life. These nutrients, far from being isolated in their workings are synergistic-they need each other, they work together to carry out the complex interactions that make our bodies function. Our body has evolved to make use of the complex interactions and myriad substances which occur in foods as they occur in nature. And there are many similarities between the substances and fluids of nature and the blood of man. For instance blood serum is akin to the mineral-rich water you find in the sea and the haemoglibin in blood is close in molecular structure to the chlorophyll of plants. Foods in nature are highly complex-as the highly esteemed Russian researcher and winner of the Lenin prize for Science I.I. Brekhman says, such foods are *rich* in "structural information"[9] for health. (I'd like to talk a bit more about that later). Processing and cooking too many of our foods interferes with this complexity and destroys much of the structural information which we need. As biochemist Michael Colgan, author of *Your Personal Vitamin Profile* says:

> The multiple interactions of these essential substances is the basis of their biologial function. And the adequacy of that function depends on the substances being supplied to the body in the same mixtures and concentrations that occur in raw, unprocessed

foods. It was by use of these foods that genesis, over millions of years of evolution, developed the precise mechanism to deal with them.[3]

It is not surprising that following a way of eating which deviates too far from what our bodies have been genetically programmed over many thousands of years to expect leads to progressive malnutrition on a cellular level which in turn depresses the functioning of the body's immune system and eventually generates illness. Another of the West's most highly respected authorities on nutrition, the American biochemist Roger Williams, has said that cellular malnutrition is at the root of ten times the number of disease conditions as the clinically defined deficiencies. In this list he includes allergies, arthritis, atherosclerosis, coronary heart disease, emotional disorders, insomnia, peridontal diseases, infections, skeletal deformities, mental retardation and immune disorders.[10,11] If we are to overcome the current medical crisis, he says, we must find ways of eliminating this cellular malnutrition. In effect we must alter the focus of our attentions from that of treating symptoms and searching for outside causes for illnesses and look towards developing ways of raising the levels of overall health and vitality in a body and strengthening the immune system. And the easiest and most effective way of doing this longterm - as McCarrison knew better than anyone - is by improving the overall quality of a person's nutrition.

Tonight I would like to speak to you about the work of a number of other pioneers in the nutritional areas. Like McCarrison their commitment to an ecological approach to health was wholehearted and like him they believed in the importance of organically produced foods grown on healthy soils and eaten as much as possible in their entirety and in their natural state. But these people (Swiss physician Max Bircher, the famous, one could even say infamous, Dr Max Gerson and many others) were particularly fascinated by what fresh raw foods could do not only to protect and preserve high level health but even to cure serious disease - from cancer, arthritis and diabetes to hypertension and allergies and even resistant mental symptoms. I would like to tell you a bit about their work, how they came to use an all raw or high raw diet for healing and also a little about their research into the ways in which fresh foods appear to act upon the body. It is something I first came across about 15 years ago and which began rather to haunt me. My interest, unlike the fresh food pioneers whom I will be speaking about, was not so much in what a high-raw diet (one in which 50 to 75% of a person's foods are eaten uncooked) could do to cure illness but rather how it could be used to improve the health of those already well. Here let me define 'wellness'. It is a state of being in which one is not only not sick but experiencing an abundance of energy, a positive attitude towards life and where one has to worry very little about running out ot steam. It is a way of being in which you age slowly and, as an editorial in the American Medical Association Journal suggested recently, "you die young late in life." Before we take a look at the healing aspects of a high-raw diet and some of the possible ways we have of measuring its effects on the body, let me first briefly mention some of the ways a Raw Energy way of eating can benefit those of us who are already well.

1. A high raw diet has been successfully used to improve athletic performance and to diminish the aches and pains that are such a common experience of not only top athletes but also amateur runners.
2. This way of eating has a powerful and positive emotional and mental effect on many people. It helps counter fatigue, improves allergies and addictions, increases one's resistance to stress, helps counter jet lag, and increases mental awareness.
3. A diet high in fresh foods is potentially an excellent diet for longevity and slow aging because it is high in anti-oxidant nutrients, it bolsters the immune system, it is low in calories and fat, it tends to be moderate in protein, and is rich in all kinds of unprocessed fibre.

4. The raw energy way of eating is excellent for anyone wanting to slim thanks to the ability of high-fibre fresh foods to stabilize blood glucose and eliminate hunger, because it minimizes the kind of allergic addictive cravings which lead many people to overeat, and because it seems to provide the person eating it with a kind of "automatic willpower" which many have never experienced before.
5. Such a way of eating is particularly useful for women in a number of ways. For instance it often dramaticaly improves menstrual and premenstrual problems, decreases lumps and bumps on thighs which are very difficult to get rid of and improves the quality and texture of skin.

Now let's talk a bit about how the raw food potentials for healing were discovered or at least re-discovered for it appears they were known as far back as ancient Greek times. But in our own time they are part of a European tradition of natural methods of healing which my own research has led me to believe goes back about 100 years.

TRIAL BY SICKNESS

Oddly enough, many of the most enthusiastic pioneers for raw foods discovered their health-promoting qualities as a result of their own personal health problems - illnesses which only raw eating appeared to cure. The Swiss physician Max Bircher, one of the great European pioneers of nutritional science, came upon the potential of uncooked foods when, as an over-worked young doctor, he was siezed with an attack of jaundice. It sent him to bed for several days and made it impossible for him to eat anything. His wife, while peeling apples for dinner one day slipped a small piece between his lips. He found it pleasant and, unlike all the other foods which had been offered him, edible. Many well-chewed apples and several days later Bircher-Benner found himself well again.[12]

Soon after he had a patient who was seriously ill - not far from death - but who simply could not digest anything. She was therefore slowly starving. He mentioned the case to a colleague who happened to be a student of ancient history. This friend told him that some 25 centuries before, Pythagoras wrote of curing such an ailment by giving nothing but mashed raw fruit, a little honey and goat's milk. Bircher-Benner was surprised, despite his own experience with raw apples, for such a notion about diet broke all the rules. He had been taught (as are most health professionals today) that raw foods are far too hard on the intestines for anyone who has a digestive problem to cope with. But as everything else had failed, he decided to try Pythagoras's therapy on his patient. To his amazement she not only ate the raw foods he offered, his tests the next day showed that all these foods had been well digested. The same lady who couldn't handle cooked fruit, honey and goat's milk thrived on them when they were given raw. She was soon well. Bircher Benner began to investigate the special properties of what he called "living foods" - to use them on patients with other illnesses. He had enormous success regardless of the type of seriousness of the sickness.

COUNTERING THE AFFLICTIONS OF CIVILIZATION

Aware of the growing incidence of degenerative diseases even in the late thirties Bircher-Benner predicted the epidemic proportions which chronic illness would reach unless medicine took proper steps to prevent it. We are now living out his predictions. In fact much of what he wrote seems even more appropriate now with the enormous increase in what has been called the "afflictions of civilization" that modern medicine has been unable adquately to cope with. Not long before his death in 1939 he wrote:

> "...we are oppressed by an overwhelming burden of incurable disease which hangs over our lives like a dark cloud. It is a burden which will not disappear until men become aware of the basic laws of life. As it is we doctors have to concentrate so much of our

attention upon the task of keeping the incurable alive with the aid of artificial "crutches" that the divinely-ordained role of our profession - the healing of the sick and the prevention of disease - is forced more into the background. Neither the profession nor the public seems to see the tragedy of this situation. It is time someone called their attention to the reality."[13]

Bircher-Benner took an approach to medicine that today would have been called holistic and praised for its wisdom and sophistication. He insisted that a patient be treated as an indivisible whole - a psychophysical personality - with the end in mind not only of curing an illnes but also of promoting the realisation of the person's full potential. He saw each human being as unique - as having been born with a "blue print" that had to be realised. And he found that a diet high in uncooked foods along with regular exercise played a central role in this self-realising, self-healing process. The clinic which he founded in Zurich on these principles - one of the most highly respected centres for healing in the world - still bears his name and still has a fine record for curing even the most serious of illnesses.

THE MEDICAL GENIUS

Albert Schweitzer called Dr. Max Gerson "one of the most eminent geniuses in medical history." Gerson's success in the treatment of cancer and hundreds of other complaints based on uncooked foods has become world famous. Like Bircher-Benner he discovered the power of raw eating because of his own "incurable" illness. He came from a family with a genetic background of severe migraines. So bad were these headaches and the nausea which accompanied them that the young German physician was virtually sentenced to lying in darkened rooms doing nothing for three days a week. When he went to the medical experts of his day they told him (as most contemporary physicians still do) that there is no cure for migraine. Then they reassured him that when he was 45 or 50 these headaches would probably disappear.

The energetic and impatient young Gerson was unwilling to wait that long for relief. He thought he would experiment with changing his diet to see if that would help. He reasoned that since milk was a perfect food for babies it might be easy to digest and offer him some healing. But on a milk diet he felt sicker than ever. Then he looked backwards to the diet of man's predecessors on the evolutionary ladder. Monkeys, he reasoned, live on fruit and nuts and green vegetables. So he experimented with a diet of apples gradually adding other fruits to it. Soon he was free of migraine - that is until he added something to his basic regime which did not agree with him. Everytime he did, a headache would follow in its wake. He therefore remained on a fresh fruit and vegetable diet, and remained well, throughout his life.

In the course of practising as a specialist in internal medicine and nerve disorders in Germany, Gerson had a young man come to him also complaining of migraines. He explained to his patient that there were no known textbook cures for migraine, but he suggested that, since this diet had cured his own migraine, the patient might like to try it and see if it offered him any relief. Then he apologised for being able to help so little. The patient did try it. When next he returned to Gerson's office the headaches had vanished. But he had something else to report too. Another ailment from which he had suffered, a kind of tuberculosis of the skin called Lupus, had also disappeared. Gerson insisted that this was impossible. Lupus was, after all, completely incurable. Nobody in the history of medicine had ever reported a Lupus lesion healed. And yet...

CURING THE INCURABLE

The same patient sent some other Lupus sufferers (though people *without* migraine) to the doctor. Gerson offered to treat them all free just to see what might come of it. On the diet of raw fruits and vegetables they too got well. Then in 1928 Albert Schweitzer's wife who had a very severe case of lung tuberculosis was sent to Gerson. To Gerson's amazement (as everyone else's) she too made a complete recovery on his "migraine diet". What was rapidly becoming apparent was that this dietary treatment which he had thought of as a migraine diet was something much more. It was a way of eating that restored an ailing body's ability to heal itself - not just of one complaint such as migraine or skin troubles, but of many diverse ailments, recognized or undiagnosed, which happened to be present.[14]

Like Bircher-Benner, Gerson went on to use uncooked fresh foods and raw vegetable and fruit juices to heal everything from arthritis to coronary heart disease, from mental and neurological disorders to diabetes. But he finally became most famous for his treatment of cancer. His book *A Cancer Therapy: Results of Fifty Cases*[15] has become the classic work to which physicians using natural and metabolic treatments refer. Gerson believed that the starting point for all illness is a disturbance in the sodium-potassium balance in the body and that only when you detoxify the system, add oxygenating enzymes from raw foods and juices, and provide essential potassium salts - thereby restoring normal functions to a body - is it possible for the patient to mobilize the lymphocytes necessary to destroy malignant cells. This, through his dietary regime, he was able to do even for many so-called "terminal" cancer patients. His reputation, like Bircher-Benner's, became world-wide. And although both of them suffered a great deal of criticism from colleagues whose medical training made it impossible for them to accept the idea that a single dietary treatment could heal many different illnesses, their work and the legacy of treatment they left behind them has brought high-level health of many previously sick people. It has also inspired scores of doctors and healers to investigate further why uncooked foods appear to have this potential for healing.

MANY HEALERS, MANY CURES

The list of physicians and healers who, having themselves been cured of serious illness by eating uncooked foods have then gone on to teach others of their healing properties is long. Another highly respected proponent of a high raw diet was the American dentist Weston A. Price. Price carried out research in nutrition and its relationship to health and disease in the thirties. From 1920 to 1940 Price travelled the world studying primitive societies - examining the development of teeth and bones, the incidence of dental caries, and the general physical and mental health of isolated cultures. He examined the dietary patterns of many different peoples - from the Loetschental Valley people in the heights of the Swiss Alps to the rugged Gaelics on the Isle of Harris. In a fascinating book, *Nutrition and Physical Degeneration*[16] he carefully documented his findings, complete with numerous photographs and statistics. He came to the conclusion that the use of processed foods has created appalling dangers to man's health. Like Sir Robert McCarrison, who pioneered studies into the relationship between nutrition and health, Price showed from his studies that human health is related to the wholeness and the freshness of the foods we consume, and that a high level of health is almost impossible to achieve without a diet rich in uncooked foods.

THE PRIMITIVE VS THE MODERN DIET

Price discovered that, despite great differences in the specific foods they ate, the diet of peoples who were largely free of mental and physical diseases, had good skeletal structures and few, if any, dental caries, had many things in common. It was what he called a 'primitive diet' - that is a diet of simple, fresh and largely uncooked, foods which were usually gathered and used immediately. These peoples only spread natural fertilizers on their crops and knew nothing of fungicides or insecticides.

By contrast, because of the complexity of our food production and transportation, the modern diet in the industrialized world is made up of an enormous variety of foods many of which are tinned, frozen or preserved. Even most of our fresh foods are adulterated – lettuce is plunged into chemicals such as N-6 Benzyladenine to preserve it, for instance. Some foods, such as apples, which we buy in our local supermarkets have been sprayed with as many as 18 chemicals before we eat them. Also the main staples of the standard Western diet are the protein foods – meat, fish, poultry and dairy products made from pasteurized milk together with refined flour and sugar. They are not fresh vegetables and fruits. Finally we take in several pounds of chemical food additives each year the effect of which on man's health has been strongly questioned even by those professionals who still advocate the standard 'well-balanced' British or American fare of 'meat and two veg.'[16,22,23]

FRESH FOODS BRING MENTAL BALANCE

The mental and emotional differences in the peoples Price studied compared to those living on the modern diet in the so-called civilized world fascinated him as much as the differences in the physical manifestations of disease. These he found singularly lacking in his 'primitive-food-cultures'. When he visited the isolated Loetschental Valley, the 2000 inhabitants of the area had contact with the outside world only through a single railway which wound through the mountains. On examining their historical records (which went back some 200 years) Price found there had never been a case of tuberculosis recorded amongst them. They had no policeman and no jail, neither was there a doctor or a dentist in the community simply because there had been no need for one. The incidence of caries in the teeth of children was less that 0.3% compared to the children of St. Moritz a few miles down the track who were eating a 'modern' diet. (Out of every hundred teeth of St Moritz children Price examined he found 20 with dental caries requiring treatment.) Price also showed through his studies that nutrition significantly affects both reproductive capacities and child-bearing and demonstrated that dietary effects are behavioural and environmental as well as physiological.

Twenty years of such research led him to advocate a return to a diet of simple fresh foods grown on organically fertilized soils. He returned to America to teach others about his findings only to find (as have many advocates of dietary change) that his colleagues ostracized him. His approach was simple and holistic in a scientific community committed to the single-cause-single-effect theory of disease which emphasized fragmentation and valued high technology proceedures. Like the work of McCarrison, in the past 40 years, the assertions of Price have been increasingly confirmed by the studies of epidemiological researchers the world over. By and large however, they are still ignored.

THE THEORY OF NEGATIVE ENTROPY

The first principle of thermodynamics states that the quantity of energy in the world remains constant. The second is best formulated in terms of entropy – a measure of disorder at molecular and atomic levels. It states that energy tends to be constantly degraded from a higher to a lower order. In any system all motion eventually comes to a standstill, differences in electric or chemical potential are equalized and temperature becomes uniform by heat conduction until finally a permanent state is reached – the whole system fades until it becomes an inert lump of matter. This state of thermodynamic equilibrium is what the physicist calls 'maximum entropy'.

But living systems are different. So long as the human body is alive it avoids decaying into this inert state of equilibrium, apparently through metabolism—

eating, drinking and assimilating energy from outside.

Bircher-Benner claimed that since a very high order of the sun's energy was converted by plants through photosynthesis and then stored in them, and since the quality of this energy is degraded by all kinds of physical and chemical processes such as wilting, cooking or processing when man eats the fresh raw plants themselves he receives the very highest order of energy possible direct from his foods.[12,18]

DRINKING ORDER

Some 40 years later, Austrian physicist and Nobel Laureate Edwin Schrodinger, confirmed Bircher-Benner's hypothesis with his own theory. But he tried to state it in terms more acceptible to physicists:

> What is that precious something contained in our food which keeps us from death? That is easily answered. Every process, event, happening–call it what you will; in a word, everything that is going on in Nature means an increase of the entropy of the part of the world where it is going on. Thus a living organism continually increases its entropy or as you may say, produces positive entropy–and thus tends to approach the dangerous state of maximum entropy, which is death. It can only keep aloof from it, i.e. alive, by continually drawing from its environment negative entropy. What an organism feeds upon is negative entropy . . . which is in itself a measure of order. Thus the device by which an organism maintains itself stationary at a fairly high level of orderliness (a fairly low level of entropy) really consists in continually sucking orderliness from its environment.'[17]

Bircher-Benner believed as did Schrodinger that to stay healthy the body has to 'drink order'. We need to take into our bodies fresh living matter or foods which have the highest quality nutritive energy–energy which has not been debased by the oxidation or spoiling processes or by heating. Another scientist Fritz A. Popp found that when a plant cell is about to die the energy output from it increases dramatically and then drops off. This may mean that by eating raw food you reap the benefits of this high order energy as the cells are destroyed within your own body–in the stomach or intestines. The cells in cooked food have already had their energy degraded to a lower order.

Although a number of scientists, have noted the importance of Schrodinger's concept of living organisms feeding on negative entropy and it is mentioned in textbooks on biophysics and biochemistry such as Bray and White's *Kinetics and Thermodynamics in Biochemistry* and *Metabolic Pathways* by Pardee and Ingraham, it is still largely ignored in orthodox nutritional teaching and has been little investigated in Britain and America.

STRUCTURAL INFORMATION IN FOOD

Schrodinger's insistence on drinking order and the idea that when we cook or process our foods or allow them to wilt we debase their natural energy order has been taken up and expanded in in the recent work of several Russian scientists such as I. Brekhman at the Far East Scientific Centre Academy of Sciences of the USSR in Vladivostock. Brekhman coined the phrase 'structural information'[9]. By this he means something very close to Schrodinger's 'order'. He claims that not only are the nutrients which can be measured chemically – vitamins, minerals, protein, etc.–important for health, so is the complexity of the way they and other as yet unidentified factors are combined in a particular food and the quality of energy the food carries. The processing of foods which we carry out limits the structural information which they bring to an organism and thus their health-supporting properties. Fresh foods contain more structural information than cooked or processed foods. They are in effect, more biologically active.

In experiments Brekhman has shown that foods high in structural information enable animals to carry out physical tasks for significantly longer periods than processed foods low in structural information even when the foods compared are equal in calories and therefore, by orthodox biochemical standards, would be supplying an organism with the same amount of energy. Brekhman is particularly interested in certain natural pharmocological substances which appear to supply a high degree of structural information to an organism and therefore to help support a high level of health and energy. He quantifies the action of a plant substance or food on the body in terms of what he calls significant units of action (SUA) - a way of measuring how long an animal can continue to carry out a piece of work when fed a particular food.[9]

THE TROPHIC VALUE OF FOODS

American biochemist Roger Williams, famous for his discovery of pantothenic acid, seems to echo some of Schrodinger and Brekhman's ideas when he insists that it is time we stopped measuring the value of foods in calories alone and believing that, because we can identify and reproduce chemically all known nutrients and feed them to an organism, we can reproduce the actions of the original food. He says,

> In our laboratories we have recently studied an alternative criterion for judging food values. This is by measuring what we call the 'trophic' or beyond-calorie value. Experimentally we ascertain how much new tissue the food in question can produce, beyond that produced in control animals where carbohydrate is supplied in place of the tested food. This method, which inevitably involves biological testing, measures the effective presence of the entire team of nutrients necessary for tissue building and repair, including the unknown if they exist.[10]

But Williams appears to know nothing of Brekhman's work and, although he is always careful to stress that cooking and processing of foods destroys nutrients, he tends, as do the majority of nutrition experts in Britain and the United States, to dismiss the idea that a special quality of energy, found in raw foods can significantly improve health. Meanwhile in some thoroughly fascinating and highly controversial experiments other scientists have been busily engaged trying to quantify that energy.

SUBTLE ENERGIES AND THE IMPLICIT ORDER

If Schrodinger and the rest are right, if an organism has to 'drink order' to stay alive and the reason why raw foods are such powerful forces for health is that the structural information they carry is particularly clear and appropriate to the purposes of the living body (full health, vitality and clear awareness), then we need to ask two questions. First, what is the nature of that order? Second, in what form is it conveyed through the foods we eat - or at least, how can we measure it?

These are questions which made orthodox biochemists and nutritionists very uncomfortable indeed. For their answers are not to be found in a chemical analysis of these foods. When you enter the realm of microbiology and speak of electron transfer and the 'aliveness of cells' you may be coming closer. You do indeed point up some extraordinary properties which uncooked foods have but still you are only describing the shadows on the wall. Few scientists are comfortable with the sense that it is not the nature of reality they are delineating but merely its phantasmagoric everchanging forms frozen for a moment in time. They mistake the shadow for the thing itself. They assume that since we know a carrot or a slice of calves' liver contains such and such nutrients and so many calories, and since we can produce those nutrients chemically in a laboratory, then by adding a little simple carbohydrate to supply the calories we can make a food that is just as good as the one we are copying. For, despite revolutionary developments in high level physics, most biochemists are still committed to the traditional atomistic notion that the universe is built out of elementary particles and that all of life can utimately be understood by taking them apart and putting them back together. But before any scientist can begin to answer either of these questions he must first examine the underlying assumptions on which his methodologies are based and ask if these assumptions are still appropriate for what he is trying to discover.

CLASSICAL DUALISM IS NOT ENOUGH

The approach to health of physicians who strongly emphasize a diet high in uncooked foods in many ways parallels that of scientists working in high level physics. Both replace the Newtonian reductionist view of reality with a quantum perspective of a dynamic universe. The Newtonian view is based on a classical dualism which not only underlies the methodologies of biochemistry and nutrition; it became an important premise on which modern medicine is based when it was formalized in Descartes's philosopy.[8]

Descartes divided reality into two separate and independent realms - that of mind and matter - *res cogitans* and *res extensa*. This Cartesiam dualism made it possible for scientists to treat matter objectively - as something completely separate from themselves to be taken apart, analysed and categorised. And indeed such a paradigm of reality has been enormously *useful*. It has made possible the isolation and control of microorganisms behind much widespread disease in the late nineteeth and early twentieth centuries - from tuberculosis to typhoid fever and smallpox.

In the realm of biochemistry and nutrition this dualistic thinking has enabled scientists to establish the nutritional causes of diseases such as beri beri and scurvy and to isolate the 'missing' substances without which disease symptoms appear. And following such an assumption about the nature of reality, biochemists have been able to isolate, quantify and catagorize the 50 or more nutrients so far known to be necessary for life.

But every dominant paradigm has its limitations: In the realm of biology and physiology such thinking has also led to the notion that the human body is little more than a machine made up of a lot of different parts which could be analysed into a collection of cause-and-effect relationships. From this world view comes the notion of disease as an outside entity - a cruel act of fate caused by some external threat like a microbe-something for which the person himself is neither responsible nor is he able himself to heal.

WANTED: A SCIENTIFIC REVOLUTION

Thomus Kuhn in *The Structure of Scientific Revolutions*[19] says that every dominant paradigm eventually expands to the limits of its methodologies and becomes no longer useful. That I believe, is just what is happening at the moment in the field of biochemistry, nutrition, and medicine. Newtonian physics and Cartesian dualism, useful though they have been in the research which led to the control of epidemic diseases and illnesses caused by gross malnutrition, are inadequate to deal with the kind of chronic illnesses which have been called the 'diseases of Western Civilizations' - coronary heart disease, cancer, diabetes, arthritis, gastric ulcers, emphysma, etc. They are also practically useless if science is to discover ways of helping men and women to live at a state of high level health - not just free of overt symptoms of disease but in a state in which you feel really good and have a high resistance to the process of aging. The achievement of these goals appears to involve many interrelated considerations - your relationship to stress, your psychological orientation, social and environmental factors and, perhaps most important of all, your nutrition. These influences are all too diffuse and far too complex to fit neatly into any world view based on Cartesian dualism. If we continue to try to make them fit our search for answers - for means of improving human health - our efforts will not only falter amidst masses of interesting but unconnected facts; they will be (indeed in many ways they have already become) counter-productive.

I believe that to discover the underlying reasons why biochemistry, medicine and nutrition will need to expand their atomistic notions, they will need to move beyond the limitations of Newtonian-Cartesian world view and to discover a new dominant paradigm. They will need to acknowledge that the 'bits' which they continue to treat as separate entities are not discriptions of reality as it but, as physicist David Bohm says, 'ever-changing forms of insight,' which can only 'point to or indicate a reality that is implicit and not describable or specifiable in its totality.'[20] Finally, they will have to develop an awareness-however subtle or oblique-of that implicit reality.

BOHM'S IMPLICATE ORDER

David Bohm is one of the world's most highly respected physicists. A protégé of Einstein, he has written the classic textbook in quantum theory used in English-speaking universities. In another of his books, *Wholeness and The Implicate Order*, Bohm points the way towards a new dominant paradigm that could be more helpful in seeking these answers when he says:

> . . . Most physicists still speak and think with an utter conviction of trust, in terms of the traditional atomistic notion that the universe is constituted of elementary particles which are 'basic building blocks', out of which everything else is made. In other sciences, such as biology, the strength of this conviction is even greater, because among workers in these fields there is little awareness of the revolutionary character of development in modern physics. For example, modern molecular biologists generally believe that the whole of life and mind can ultimately be understood in more or less mechanical terms through some kind of extension of the work that has been done on the structure and function of DNA molecules . . .
>
> People are led to believe that this fragmentation is 'the way everything really is' and therefore do not look for alternatives. But it is not in fragmentation, nor in that thought form that the understanding of life is to be found, as life is the flow of that implicit order that animates the dead forms of the objective world, and such a life is both whole and never identical to any of the forms of existence. Therefore there is no use looking for it among the bits and pieces of those forms.[20]

To penetrate the mysteries of raw energy, biochemists and nutritionists will need to acknowledge that the healing powers implicit in raw foods are greater than the sum of their parts as measured in terms of nutrients and calories. They will also have to recognise that foods interact with the human organism as part of an *unbroken wholeness* before they can even begin to seriously tackle the issues involved. Again in the words of Bohm.

> Parts are seen to be in immediate connection, in which their dynamical relationships depend in an irreducible way, on the state of the whole system (and, indeed, on that of broader systems in which they are contained, extending utimately and in principle to the entire universe.) Thus one is led to a new notion of *unbroken wholeness* which denies the classical idea of analyzability of the world into separately independently existing parts . . .[20]

There are scientists who work within this new dominant paradigm. They range from physicists to soil chemists concerned about how to grow stronger and more successful crops and many very important physicians. They acknowledge an interrelatedness that under the influence of Cartesian dualism and Newtonian physics we have long ignored. And in their laboratory experiments, some of them still formative, valuable new techniques and approaches for studying the raw energy phenomenon might be found.

For unlike the 'atomists' who believe that truth is only to be found by pulling something to pieces and viewing it as nothing more than a collection of 'bits', they postulate the existence of an energetic principle which underlies life and health and which suggests to them a subtle but pervasive interconnection between mind, a man's body and his environment. The famous German soil-chemist E. Pfeiffer insisted that as Goethe said 'The whole is more than the sum of its parts. In a booklet which he wrote before his death he wrote:

> One can . . . take a seed, analyse it for protein, carbohydrates, fats, minerals, moisture and vitamins, but all this will not tell its genetic background or biological value . . . a natural organism or entity contains factors which cannot be recognized or demonstrated if one takes the original organism apart and determines its component parts by way of analysis.[21]

Until these factors are taken into account explanations about why raw foods have such extraordinary capacities to promote high level health will, at best, remain frustratingly inadequate. Once they are, research into the why's and wherefore's of healing with uncooked foods could lead to the expansion of other areas of consciousness not even directly related to nutrition or health. That I believe was McCarrison's message as well. It is a message which needs to be spread again and again in whatever language one can use whether the language of science of the commonsense language of a mother explaining to her small child how the world which is seemingly so confused is part of a greater whole. And it is a message which is beginning to come through to us all loud and clear not only in the field of health but also in relation to the ecology of the earth itself.

In the meantime, used wisely, these simple foods - fresh fruits and vegetables from the greengrocer or the garden, home grown sprouted seeds or grains, natural unheated dairy products, nuts and seeds - which are available to everyone and can be chosen for their very low cost if necessary, might alleviate a great deal of human suffering and make possible the good use of a lot of dormant human creative energies. You don't need to understand the theories of raw energy to apply its practical benefits to your life.

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Nutrition and Health, 1985, Vol. 4, pp. 37–50