The Nutritional Approach to the Prevention of Disease

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This article will stimulate thought, and we hope, discussion and research.

All who read it will not be convinced immediately that the authors are entirely correct in their conclusions. There is ground for opposing opinions. But right or wrong, the matters considered here are important enough to deserve the careful consideration of everyone concerned.

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Louis Pasteur, the famous French scientist, established the now well known doctrine that certain bacteria or other microörganisms known as pathogens are the immediate cause of disease. From this knowledge developed the method of destroying the microörganisms by pasteurization, which is equivalent to the destruction by heat of certain lower forms of life. Practically no living organism, including man for instance, can exist in water that is brought to a boiling temperature, but each form of life is killed at different degrees of temperature. Temperature can be thought of as the universal cure for disease by its ability to destroy disease germs. It would be ridiculous to practice this. The general public now seems to rely entirely on pasteurization to prevent the spread of disease, as far as milk or other beverages and food are concerned.

It should be pointed out that pasteurization is neither a cure for, nor a prevention of disease, but only an expedient to destroy the disease germs that already exist in foods, particularly milk. Pasteurized liquids are expected to be consumed promptly for fear that bacteria not destroyed at a temperature of 145° F. will multiply and occasionally cause infection. The public has furthermore come to believe that "bacteria are the primary cause of disease." It is high time that alongside of this concept there is stated another important doctrine; viz: — **Practically all disease is preceded by malnutrition,** and that the absence of any one essential element will lead to disease. Malnutrition is followed by disease and often accompanies the progress of disease. A growing number of diseases are frankly and almost universally recognized as resulting from nutritional deficiencies.

Modern bacteriology has gone a step further and developed Pasteur's other method, namely to counteract or destroy bacteria by vaccination and the use of antibiotics. The principle of vaccination is probably known most generally from the fact that by the inoculation in a more or less modified form of the pathogen that apparently causes the particular disease, a variable degree of immunity to the disease is created in the animal body.

When live or dead organisms are injected, or enter the body in the course of a disease, a variable degree of active immunity is created through the development of antibodies by the blood of the host. The antibodies are formed from the globulin normally present, and they serve to enhance the effect of natural defense mechanisms. This protection process is one phase of a broad physiologic natural function of the body directed toward the elimination of both animate and inanimate particles foreign to the body. Many believe that these natural mechanisms of the body were originally related in the evolutionary process to the ability of the body to absorb and assimilate material for nutritional purposes.

The normal blood serum contains substances called opsonins that also act upon bacteria and prepare them for ingestion or *phagocytosis* by normal leucocytes. Phagocytosis is not an individual activity but one in which many of the different body fluids take part. Normal blood sera also possess the power in the presence of the complement to cause *lysis* or disintegration of some species of bacteria. The active immunity for certain diseases resulting from immunization with antigen, or from natural recovery from certain diseases, usually persists for a considerable time. A second type of immunity is called passive and is of short duration. Antigens injected into animals also produce antibodies, and when such immune serum is injected into individuals the protection conferred is temporary since it was made in an animal body, and not actively produced by the individual receiving it. Hereditary factors also influence an individual's resistance to certain diseases. This has been demonstrated with mixed-bred and inbred races of test animals.

When the nutritional needs of a person have been inadequate, the various kinds of bacteria that may initiate disease processes under such conditions will be found to differ widely in their toxicity and in their ability to break down the body defenses. The qualities of toxin production and invasiveness, that vary from excessive amounts to none with the different species of organisms, will also differ among different strains of the same species. Some of these toxins are extremely poisonous even in small amounts. Radical changes in an organism can be brought about simply by altering the conditions of growth and the environmental factors. Bacteria have a wide range of adaptation that affects their ability to survive in different environments.

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A vast amount of experimental work has been carried on in the field of bacteria versus antigens and antibodies as they may affect immunity and resistance to disease. Only recently have investigations been initiated to determine the part that nutrition plays in relation to resistance to infection. Studies of this kind all strongly indicate that not only the inorganic nutrients, commonly called "minerals," that include trace elements and more abundant inorganic chemical compounds, but also the organic nutrients referred to as amino acids, vitamins, and hormones, have a most important and fundamental bearing upon the health and disease resistance of both animals and man.

Scientists have been almost entirely preoccupied by the concept that bacteria cause disease, rather than by a much more important concept that adequate nutrition causes good health and relative freedom from disease. It is certainly more logical to prevent disease from occurring insofar as this is possible, rather than to concentrate exclusively on ways to repair the damage after it has occurred. The first concept has been greatly overemphasized, and the latter has been greatly minimized and neglected. Is it better to have a relatively stable natural nutritional immunity, or a sporadic, irregular, synthetic, specialized type of artificially induced immunity?

A still more modern phase of science concerns the use of *antibiotics*. This refers to the employment of certain drugs, products from molds, or anything that acts as a poison to the disease organisms, in the hope that it will do no other damage to the host itself. It must be remembered that in all these measures there is to begin with, an animal or human body that is often weakened by malnutrition, and therefore favorable to the invasion of the disease organisms which as stated,—are also referred to as pathogens. We therefore deal with a situation in which a poorly constituted body, unable to resist the invasion of disease, has introduced into it by vaccination modified forms of the very disease organism it is calculated to destroy. A bad situation is made worse. In the case of milk, pasteurization destroys both disease organisms and beneficial organisms, as well as some of the vitamins and hormones, anything that is weakened or destroyed at the temperature reached by pasteurization. We therefore end up by consuming milk that is partly pasteurized "bug juice," or eat meat that contains dead bacteria in a "cooked" condition. That these dead germs can sometimes be toxic to an unsuspecting public that likes its milk pasteurized, and its meat cooked in the form of "hot dogs" and "bologna," is nowhere stressed. Then we wonder why such degenerative diseases as "rheumatism," "arthritis," "gastro-intestinal disorders," "nervous and mental diseases," "cancer," etc., are on the increase and defy treatment. Most of us are consuming substandard foods, and consequently have substandard health in a more or less indefinable manner.

Now let us look at the other side of the picture and ask why there are some people and animals in apparently perfect health? Surely not by the use of medicines because a healthy body rarely if ever, requires any. Nor by first allowing disease germs to invade a body that is in a weak condition, then to destroy them therein with more disease germs under the heading of vaccines, drugs, or other poisons on the theory that we "cure" disease. Surely it can be seen that vaccination and the use of antibiotics at best have merely counteracted an already bad situation. It hasn't changed a poor and diseased body into a strong and healthy one!

Where then do healthy bodies come from? There can only be one answer, viz: from correct, adequate and suitable nutrition. This may have its roots in prenatal care, viz: the nutrition supplied to the foetus by the mother. From birth on, the quality of the total food ingested determines good health or poor health. The quality of the food is again determined by the quality of the nutrients, and all pertinent factors in the soil on which it is grown, or in any and all other sources of origin such as the sea and the atmosphere.

The biochemical composition of healthy animal bodies, those that are naturally in optimum health, production and reproduction, is ascertainable by various analytical methods. It will be found that the composition of healthy bodies is relatively constant, and that the standards thereof can be adopted. The deviations from such standards of *animals on a high plane of nutrition*, can be ascertained by using the same methods of analysis on the bodies of animals that are on a relatively *low plane of nutrition*: those that are sent to slaughter because sick, unthrifty, sterile or aged. The differences between the two are the true primary causes of disease, because they take precedence over the invasion of the pathogens. Disease germs almost always invade bodies that are unfit, and therefore are a secondary cause of disease.

The purpose of disease may be said to be the removal of the unfit. Remove the true underlying cause of disease, *malnutrition*, and it will usually be found that the disease germs cannot exist or propagate in an animal body that is healthy. Germs are never entirely eliminated, only counterbalanced, depressed or inhibited in their growth and reproduction. Therefore the inhibitors, whatever they are, concern the control of disease. We must learn to activate the beneficial microorganisms in the animal body so that they will outnumber and therefore tend to subdue the detrimental organisms, those that many people assume are the one cause of disease and that are known as pathogens. Beneficial organisms are those that stimulate enzyme reactions which function in the formation of balanced proteins, blood pigments, respiratory pigments, and finally aid in the production of vitamins and hormones.

In regard to brucellosis and mastitis, there was undertaken in Cleveland in 1939 spectroscopic analytical work, comparing the composition of the blood and the pituitary of cows sent to slaughter as Bangs reactors, with the composition of healthy cows. This led to the discovery that the diseased animals had less manganese, copper, cobalt, and zinc than the healthy animals. To prove these analytical findings in a practical way, compounds of these trace elements, which fall in the category of heavy metals, were fed to Bangs reactors,

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which thereupon became negative in the cases observed. Iodine was included in the feed supplements because northern Ohio is in the goiter belt. Subsequent developments showed that humans who had undulant fever also responded to the same therapeutic treatment. To date, positive results have been secured in the Ozarks on well over two thousand human brucellosis cases, and on the dairy herds of over one thousand farms. These have been described in various articles by the author and others in a number of trade journals over the past three years.

The remedy in all cases is a feed or food supplement of manganese, copper, cobalt, and zinc in doses designed to adjust the difference between the quantities of these trace elements in healthy cows, as compared with the quantities in cows that have Bangs disease and mastitis. In other words wherever Bangs disease and mastitis prevail, it may be assumed that not only the animal and human body, but also their feed and food supply is deficient in these elements. A supplement to the feed and food is therefore a daily requirement. The necessary dosage for the average cow weighing one thousand pounds is one ounce daily of a trace element mixture that consists substantially of the following:—

200 parts manganese sulphate 65% feed grade
20 parts copper sulphate, anhydrous
5 parts cobalt sulphate, anhydrous
3 parts zinc sulphate, anhydrous

Potassium iodide or other suitable forms of iodine at the rate of one and one half grains of potassium iodide should also be furnished, but separately, as it is not compatible with copper sulphate. Iron and magnesium, although never found deficient by the Cleveland investigators ten years ago, may to good advantage be included in the above. They appear immaterial to the diseases in question, so that the dosages likewise are immaterial. They may equal the amount of manganese, double or half it, but of course if equalled or doubled, the total dose of the combination should be commensurately doubled or trebled too.

For humans the dosage was published in the *Merck Report* for July, 1949, in an article "Brucella Infection" by Ira Allison, M.D., F. M. Pottenger, Jr. M.D., and Wm. A. Albrecht, Ph.D., whose book of the same title will soon appear in print.

This story would be incomplete without another reference to phagocytosis and lysis mentioned earlier. The brucella organism, which is the immediate manifestation of brucellosis, has been seen under the electron microscope, which magnifies objects up to 100,000 times. The bacterium was found to be enveloped by a membranous capsule, that is, it was protected by a shell, similar to the way a turtle is protected. In some other diseases such as pneumonia, the organism also has a capsule and in treating this disease, an antitoxin or immune serum prepared by injecting animals with the particular type of germ involved, can be given the patient. This gives only a temporary immunity that enables the blood of the patient to destroy or cause lysis of the capsule and thus permit the white cells to remove or carry away the rest of the germ. This method is no longer used since the antibiotics are more convenient and practical. Immune serum has not been found suitable for brucellosis. None of the many undulant fever patients of Dr. Ira Allison obtained any but quite temporary relief from vaccination.

In regard to cattle, many doubtful claims are now advanced for the use of antigen, a suspension of modified or special strains of live brucella organisms, in the treatment of this disease. In this connection it should be strongly emphasized that the injection of live or dead organisms into the animal will not usually develop the large amount of antibodies anticipated, nor stimulate the natural defense mechanisms of the animal to the extent needed to destroy the germs and eliminate them from the body, unless there is already present in the blood of the animal a plentiful supply of the natural globulin essential for this purpose. If the nutritional requirements of the animal in terms of inorganic essential elements, proteins, and vitamins have been well satisfied, the globulin naturally present in the blood will normally be sufficient to ward off an infection. It has been repeatedly shown that animals with poor nutrition develop much less antibody when germs are injected than is the case in similar animals with good nutrition.

The brucella germ has relatively good power to invade poorly nourished body tissues but it also produces a low grade of chronic infection that rarely causes death. It is this combination of good invasive power and low virulence that creates a situation where the disease is widespread, chronic and rarely fatal. The same may be found to be true of widespread mastitis infections. In this case the streptococcus germ usually involved has low invasiveness but the relatively small amount of trauma induced by the continuous daily milking process eventually permits the germ to invade poorly nourished udder tissues. Limited experimental work has already shown that a few herds with extensive mastitis infection have greatly improved when a good trace element supplement and protein supplement is used.

At present, no one knows fully what actually happens when trace elements are used, but the best explanations so far have been advanced by two eminent authorities identified with this subject, F. M. Pottenger, Jr. M.D., Monrovia, California, and Wm. A. Albrecht, Ph.D., University of Missouri, who believe these metals function as coenzymes in the formation of proteins or other body colloids, which inhibit the growth and propagation of the various types of brucella organisms. Since the blood of Bangs reactors and of

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mastitis cows was found low in manganese, copper, cobalt, zinc, in rather definite proportions, and since the blood possesses well known bactericidal properties, it may be assumed that the composition of blood protein is an index to either the resistance, or the susceptibility of all warm blooded animals to brucellosis and mastitis.

To those who may disagree with the ideas expressed here, it may prove enlightening to make the tests necessary to ascertain the blood protein composition of healthy animals in comparison with the blood protein composition of diseased animals, and check with the findings of Dr. I. Levis as published in the *History of Randleigh Farm* fourth edition, William R. Kenan, Jr., Lockport, N. Y. 1942. ●

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