

Thank you for sending the information on the books, *Pasteur Exposed* and *Vaccination and Immunization*. When you called me on the telephone the other day, you were inquiring in to the medical research of my father, Dr. William F. Koch and his book: *The Survival Factor In Neoplastic And Viral Diseases*. This was the last book that he wrote in his Natural Immunity series of books which date back to 1929 when he wrote *Cancer And Its Allied Diseases*. The Journal of the American Medical Association, Vol. LXI, No. 13, in its editorial, reported on the very early basic research of Dr. Koch. This research opened the door to his theories on the chemistry of natural immunity and the cause and treatment of cancer and its allied diseases. My letter will give you some background information on Dr. Koch's life, his research and scientific support for his research.

The cause and treatment of cancer and its allied diseases is of vital importance to all of us. In one's search for answers to these matters one might consider the independent research of Professor Joseph Henri Maisin, M.D., Director, Institute du Cancer, Louvain University, Belgium, who conducted research with the Peroxide of Diformaldehyde and Organic Un-saturated Compounds just prior to World War II. Unfortunately, too much independent cancer research of yesterday has been put on the back shelf by today's researchers. Researchers should once again given a second look at this information if we can expect to resolve the mystery of the causes and treatment of these serious diseases.

Since CANCER is a disease of the worst kind, I thought you might be interested in what Albert Szent-Gyorgyi, Ph.D., M.D., N.L., wrote in one of his last articles on "The Search For A Natural Cure For Cancer". In this article he said:

"Carbonyls arrest cell division and my laboratory was led to the conclusion that it is still the carbonyls which arrest cell proliferation and it is the carbonyls which make the cell return to the resting state, after it completed division. If the carbonyls are missing, proliferation has to go on, and cancer results. We were not the first to be led to such a conclusion. A decade ago a very intuitive researcher, W. F. Koch, came to the same conclusion.

Unfortunately, he did not leave us enough information to enable us to follow his trail." (emphasis added)

The Food and Drug Administration, in 1941, under the misinformation of a certain editor of the Journal of the American Medical Association, brought a criminal indictment against my father, William F. Koch, Ph.D., M.D., attacking his theories on the cause and treatment of Cancer and Its allied Diseases. The first jury trial in 1943 ended after 5 months of testimony. This jury was unable to come to a decision and they were dismissed after a long deliberation of this case. Between 1943 and 1946 Dr. Willard Dow and Dr. William Hale of the Dow Chemical Company became interest in Dr. Koch's research. With the held of the Dow Research Laboratories, Dr. Koch was able to prove the chemistry of the chemical product he had developed over the years. The Dow experts, during the 1946 five month jury trial, testified in support of the correctness of the chemical structures of the Glyoxylide and Malonide, two of the drugs that had been developed and used by Dr. Koch in the treatment of diseases. This jury was also dismissed, when a juror became ill, after prolonged deliberations in which the jury panel had failed to reach a verdict. On August 18, 1948, the FDA dropped their unfounded charges against Dr. Koch and The Koch Laboratories. It was through the humanitarian help of Dr. Dow, Dr. Hale and the Dow scientist that Dr. Koch was able to prevail in this matter. You might ask: Who was Dr. Koch?

The medical research of my father, Dr. William F. Koch (1885-1967), was from the point of view of the physiologist. This research started with his early medical research at the University of Michigan, which research opened the door to his understanding of diseases and how the chemistry of the natural immune system of the body functioned to ward off disease.

Dr. Koch entered college at the U. of M. in 1905. It was through his chemistry professor, Moses Gomberg, Ph.D. (1866-1947), that Dr. Koch learned the importance of the chemistry of free radical. As a physiologist, he applied this information in his study of cellular chemistry and its relationship to the chemistry of natural immunity. At that time, while he was a student and subsequently an instructor of histology at the U. of M., the U. of M. had both a College of Medicine and a School of Homeopathy. It was through Professor W. A. Dewey, Dean of the School of Homeopathy, that Dr. Koch first learned about the theories of homeopathy and thus make it possible for him to able apply this knowledge in his research in enzyme chemistry and in his practice of medicine. Since then, the college of Homeopathy was closed (about 1920) and homeopathy became an overlooked subject at the U. of M.

On April 24, 1998, at the University of Michigan's College of Pharmacy's Continuing Education Program on Alternative Medicinals, I heard for the first time a doctor speak on Homeopathic Medicine. [It should be noted that Section 390.5 of the current Michigan Compiled Laws, Annotated, states in part: "That there shall always be at least 1 professor of homeopathy in the department of medicine." This law dates back to P.A. 1851, No. 151, Section 5, Eff. July 5. Today this position is vacant.] As I recall, Dean Charles H. Stocking's textbook, Fundamentals Of Pharmacy, Theoretical And Practical, 2nd. Ed, 1949, did have a chapter on Homeopathic Pharmacy (Ch. XXXVI), however, this subject was not covered in a lecture.

At the U. of M., Dr. Koch's research project was on the function of the parathyroid glands. While at the U. of M., he published three papers: 1) On The Occurrence Of

Methyl Guanidine In The Urine Of Parathyroidectomized Animals, Journal Of Biological Chemistry, Vol. XII, No. 3 (1912); 2) Toxic Bases In The Urine Of Parathyroidectomized Dogs, Journal Of Biological Chemistry, Vol. XV, No. 1, July, 1913; and 3) The Physiology Of The Para-thyroid Glands, The Journal Of Laboratory And Clinical Medicine, Vol. I, No. 5, Aug. 14, 1916; [A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at the University of Michigan]. His fourth paper, Tetany And The Parathyroid Glands, Medicine and Surgery, Jan. 1918, was published while he was Professor of Physiology at the Detroit College of Medicine. It was his second publication that alerted the interest of the editor of the Journal of the American Medical Association that Dr. Koch had come upon a new approach to the understanding of the function of the parathyroid glands, their relationship to toxicity and to disease. Through this research, he was able to understand how the natural immune system of the body worked and thus treat a disease condition, from the point of view of a physiologist, by working with the natural immune system of the body.

This parathyroid research of Dr. Koch was subsequently confirmed by the research of Professor Patton (and his staff) three years later. In Part IV., The Parathyroids:-Tetania Parathyreopriva, Professor Patton said: "Lastly, the observation of Koch that methyl-guanidin appears in the urine of dogs after parathyroidectomy seemed also to hint at the connexion of such compounds with the onset of tetany." In his conclusions to Part IV, he said: "The symptoms of tetania parathyreopriva are not primarily due to decrease in any constituent of the body, e.g. caladium ions;" and "The Symptoms are identical with those produced by the administration of salts of guanidin and methyl-guanidin." In Part V, they go on to say: "W. F. Koch in 1912 and 1913 recorded the presence of increased amounts of guanidin, methyl- and dimethyl-guanidin, along with other bases in the urine of dogs after parathyroidectomy. " At the end of Part V, their conclusion was: "There is a marked increase in the amount of guanidin and methyl-guanidin in the blood and urine of dogs after removal of the parathyroids and in the urine of children suffering from idiopathic tetany." (Department of Physiology, University of Glasgow - September 11th, 1916) Subsequently, Professor Patton, received the Triennial Prize in Medicine from Harvard University for his research on the function of the parathyroid glands.

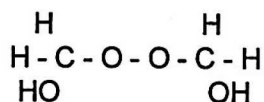
Professor Meyer Bodansky, Ph.D., in his text-book "Introduction To Physiological Chemistry " (1927) stated: "Certain physiologist (Koch, Noel Patton and other) have attributed the symptoms of parathyroid tetany to guanidine or methyl-guanidine, which Koch found to be present in the urine of parathyroidectomized dogs. According to this view, the parathyroids control in some way the metabolism of guanidine. In the normal animal, guanidine is presumably detoxified by these glands. Certain of the symptoms, such as muscular hypertonus, that are obtained on injecting guanidine and its derivatives, resemble those of parathyroid tetany. Many investigators do not regard this, however, as adequate evidence of a relationship between guanidine and tetany. Collip and Clark have recently studied the question anew and reached the conclusion that guanidine tetany is not identical with parathyroid tetany, although they admit that guanidine-intoxication theory has not yet been definitely disproved." p 327.

You might ask: "What was Dr. Koch's educational back ground and research experiences?" A brief summary is:

Dr. Koch had received his B.A. in 1909, M.A. in 1910, and Ph.D. in 1916 from the University of Michigan where he also studied medicine. While in graduate school at the U. of M., Dr. Koch was an instructor in histology. In 1914, he was appointed Professor of Physiology at the Detroit College of Medicine. He completed his medical training there and received his M.D. degree in 1918 while at the same time he was Professor of Physiology and chairman of that department. In the early 1930's, Professor Joseph Henri Maisin, Director, Institute of Cancer, Louvain University, Louvain, Belgium, learned about Dr. Koch's research through two Belgian priest who had been treated by Dr. Koch. They had become interested in his research and work, and through them, in 1934, a meeting was arranged between Dr. Koch and Dr. Maisin. At this meeting, Dr. Koch discussed his theories and the results that he had had, in the treatment of patients. For about nine months, Dr. Koch remained in Europe teaching Professor Maisin and his associates the technique of compounding certain Koch drugs. They conducted experiments on animals, and used this treatment on their patients. Their first paper was published in the C. R. de la Soc. Biol., Vol. 120. P. 106, 1935. The experience at this institution was sufficient to cause them to adopt these remedies and use them in their hospital. During Dr. Koch's trips to Europe, prior to World War II, he met many eminent European physicians who adopted his method of treatment. Among them were Professor Auler, of Berlin University, who reported to Dr. Koch that he (Professor Auler) had successfully used this material in treating cancer and infectious diseases. Based upon their research, Professor Maisin and his associates published additional articles on their work with the products that Dr. Koch had taught them how to make. This research continued up to the time of World War II, when the German's took over their country. One of the papers that they published was: "The Use of Peroxide of Diformaldehyde and Organic Unsaturated Compounds in the Treatment of Anergy and Hyperergy", by Joseph Henri Maisin, M.D., where he describes the Koch products that they were using and the homeopathic dilutions of 10 X - 9 to 10 X - 18 that they used in their experiments in 1938,

"The substances in question are of very simple chemical compensation and are easy to prepare.

"The first group of products comprises the organic peroxides, of which several have been used with a measure of success. We will describe here one only, the peroxide of diformaldehyde, since it has been particularly studied and is very efficacious. "The formula of this peroxide is:



"It is readily prepared by allowing a saturated solution of hydrogen peroxide in anhydrous ethyl ether to react with a saturated solution of formaldehyde in anhydrous ethyl ether,

"The second group of compounds comprises certain highly unsaturated chemical substances, of which we do not know the exact formula, but which may be prepared by the action of phosphoric acid on malonic acid, or by the action of sulphuric acid on ether, or also by the action of sulphuric acid on a solution of acetaldehyde in ether. The first

reaction should theoretically give as a final product, malonic anhydride, having a formula of $OC=C=CO$. We have reason to believe that the general formula of those active products would correspond with the structure $R=C=C=R$."

"These researches have shown, as did those with experimental cancer, that only very dilute solutions were efficacious. It is necessary to use the peroxide of diformaldehyde, or the unsaturated compounds in a dilution of the order of 1×10^{-9} at least. Actually, our best results have been obtained with dilutions from 1×10^{-9} to 1×10^{-18} . These very high dilutions (1×10^{-18}) still contain several thousand molecules per cc." (Emphasis added)

In May of 1941, Dr. Koch took a trip to Uruguay and Brazil where he started to do research with local doctors and the Brazilian Government. In 1944, under the direction of Dr. Koch, arrangements were made by Dr. David Arnott with Minister of Agriculture for the Province of British Columbia, Canada, for an investigation of the Koch Treatment in the treatment of mastitis and other diseases of dairy cattle. Favorable reports on this investigation appeared in the annual reports of the Department of Agriculture for 1944 thru 1949. Also, S. N. Wood, B.S.A., D.V.M., Professor Animal Pathologist, The University of British Columbia presented a paper on his research with the Koch Treatment for cattle to the Washington State Dairymen's Association at their Annual Meeting on January 30, 1950.

A New And Successful Treatment And Diagnosis Of Cancer, (Detroit Medical Journal, July, 1919, Vol. No. 7, p 244-248) was the first paper that Dr. Koch published on his cancer research. On September 7, 1919, the Sunday Edition of The Detroit News, gave a full reported on this cancer research paper. At the time of this research, Dr. Koch had the full cooperation of Dr. Carsten, Dr. Judd, Dr. Paterson, Dr. Irvine, Dr. Palmerlee, Dr. Palmer, Dr. Blain, Dr. Watkins, Dr. Hewitt, Dr. Friedlander, Dr. Hackett, Dr. John Burleson, Dr. Ash, Dr. Van Baalen and Dr. Hurst who made it possible for Dr. Koch to treat their terminally ill cancer patients. while at the same time he was Professor of Physiology and chairman of that department at the Detroit College of Medicine. He also was pathologist on staff at Woman's Hospital and St. Mary's Hospital .

In this September 7th article, Dr. Alexander W. Blain said:

"Dr. Koch is one of the most brilliant physiological chemists in the country....what he has done is this: 'He has made people well who were so far gone with cancer that they had only a few weeks to live. Several patients he treated for me are working hard and enjoying life a year after they should have been dead...I believe—even if he has not discovered an absolute cure for cancer, he has added years to the lives of cancer victims....What he has already done is a boon to humanity and a great step forward in physiological chemistry'."

Dr. Walter L. Hackett said: "There is no question of Dr. Koch's sincerity and ability....I have enough confidence in his treatment to let him inject his serum into any cancer patient of mine. I had, as a patient, an old woman who was very far

gone. At Koch's suggestion, I operated on her and took out such cancerous growths as were apparent. Later, the cancer grew again. Dr. Koch gave her four injections and she is now apparently entirely well. I have seen some excellent work done with radium, but never anything so remarkable as this. Dr. Koch should be given every opportunity to prove the value of his treatment."

Dr. C. Hollister Judd, president of the medical board, Women's Hospital said: "When we stop to consider that one woman in every seven and one man in every 12 have cancer, the importance of the work Dr. Koch is doing can not be overrated, though it is too early to say that he has a cure for cancer. He has been working under many handicaps. The cases given him have been the 'hopeless' ones, where the surgeons saw the uselessness or impossibility of further operation, and his treatment has shown remarkable results." (Emphasis added)

"The Function of Cancer", a paper written by Dr. Koch, appeared in the "Cancer Journal" (Phil.), October 1924. This paper was written from the point of view of a physiologist to reveal something about the purpose and value of this deviation from the normal that is so commonly rated as turmoil and disorder. Dr. A. R. Mitchell (who was then on the Board of Trustees of the American Medical Association), after reading this paper, wrote in his letter of Nov. 12, 1924 to Dr. Koch the following:

"I had the pleasure of reading your article in the October number of 'Cancer' and it is certainly the most intelligent and enlightening discussion of the subject I have ever read. For years I have been convinced of the utter uselessness of surgery in true cancer cases and have made myself disliked somewhat by my opposition to surgeons going about the country lecturing upon a subject of which they themselves know nothing. I hope that a little more time will prove that your work is really an epoch making work and that you will ultimately secure the full credit and profit to which your service entitles you."

Dr. Koch, in December 1941, presented a paper before the American Association for Medico-Physical Research. In this paper he said the following about the method he had developed over the years for the treatment of diseases.

"The treatment material consist of catalytic dilutions of the carriers of aerobic oxidation which we have described in the past elsewhere. (The Chemistry of Natural Immunity, American Printing Co. 1936, p. 155-163). These substances are 1:4 Benzoquinone and its transition products Glyoxylide, ($O=C=C=O$), and Malonide, ($O=C=C=C=O$) and also Ketene. Their chemical structures conform to the rules we have laid down as requisite to the production of immunity against disease; namely, they possess the smallest molecular weight possible: they possess carbonyl groups that share ethylene linkages or carbonyl groups that are conjugated with ethylene linkages in molecules that can yield carbonyl groups sharing ethylene linkages. (Lecture, The Laws of Chemical Structures that Determine Immunity to Diseases, 1939, p. 4.)....

"Substances of this type can be extracted from heart and brain. Such extracts demonstrate the same curative results as the synthetic products, and like them correct a definite blood coagulation deficiency. Because of this physiological property, I named them 'Tissue Thrombin' and showed that they are able to cure cancer, in a paper published in the New York Medical Record in October 1920. The synthetic product can be used with good control while the tissue extracts are very

our interest, he began to concentrate a great deal of his attention in this neighborhood.

"His recent trial in connection with the Pure Food and Drug Administration has brought him the support of some of our technical people on the basis of submitting technical information that is available here and has been proved up and which the government had attempted to misrepresent. Our intention all the way through has been to try to get at the truth of this whole matter, and whether it is Dr. Koch or somebody else, we would take the same attitude to try to prevent an innocent man from being crucified. We cannot understand what the Food and Drug Administration is driving at for the reason that all our information to date would indicate Dr. Koch has been exonerated from illegal practices as far as the Administration is concerned, and as for the mislabeling of packages, like everyone else it is merely a matter of interpretation rather than willful violation of the law. Before the present trial came up, Dr. Koch had appeared before the Washington representatives of this department and thought the whole matter was straightened out to their satisfaction, but apparently not so. It is strange, because the same procedure is run into time and time again by industry when it is necessary to get a label properly approved before it goes to the public, but in his case it does not seem to be possible without a trial. He has had no trouble in proving his points, but the government has spent a tremendous amount of money to try to prove he is wrong. It almost sounds as if a certain group is attempting to persecute him unjustly.

"I am replying to your letter in some detail to give you the benefit of our background and our interest in Dr. Koch's work. He is not a representative of our Company in any sense of the word. We have no control over his treatments....As far as I am personally concerned, I consider him one of the outstanding scientist in the medical profession, and he is so far head of the thinking of his profession that he is naturally being ridiculed somewhat....The mere fact that Dr. Koch has a treatment definitely affecting virus diseases is of itself sufficiently important that it ought to be analyzed from every angle by the medical profession....I think we all have an opportunity to see something new aborning in Dr. Koch's work....I sincerely hope some day the public will recognize him for his ability."

William J. Hale, Ph.D., retired, Research Chemist for Dow Chemical Company, wrote about the relationship of "Glyoxylyde" [(O:C:C:O), which is a polymer], and Triquinoyl [which is a trimer of (O:C:C:O)] and he showed the chemical relationship of inositol to rhodizonic acid to tri-quinoyl in his book "Farmer Victorious, Money, Mart and Mother Earth" (Coward-McCann, Inc., N.Y., 1949), Chapter XVIII – "Chemotherapy". It should be noted that Inositol, which can be made by the body and intestinal bacteria, has been recognized as a component of food and was accepted as a vitamin in 1940. It should be further noted that Dorland's Illustrated Medical Dictionary, 23rd. (1957), p. 679, defines "Inositol" as follows: "Acryalline substance, hexahydroxycyclohexane, resembling a sugar, that is found in muscle, urine, the viscera, and various plant substances. It is a vitamin of the B complex concerned in the growth of yeast, and curative of mouse alopecia and said to inhibit tumor growth." (emphasis added)

Dr. Hale wrote:

"In practice triquinoyl has been found to act almost identically with "Glyoxylyde" (O:C:C:O), a compound that Dr. Koch had prepared by dehydration of glyoxylic acid (CHO-COOH). In brief, this so-called glyoxylyde, which has proved

so efficacious in the hands of Dr. Koch against diabetes, arthritis, poliomyelitis and even cancer, undoubtedly polymerizes under many conditions to 3(O:C:C:O) or triquinoyl, in which an oxygen atom is doubly linked to each of the six carbon atoms of the reduced (or saturated) benzene ring carbon structure, and plays a most effective role in the treatment of disease. In the likely dehydrogenation of inositol within the body we can now interpret the phenomenal action of inositol in replacing insulin for diabetics." pp. 159-160.

"Now the role of these polyketocompounds is definitely oxidative. By their presence a higher level of metabolism is made possible in the system, and, like a passing wave over a golden wheat field, this wave of oxidative influence continues unabated for months upon months-sufficient, indeed, to heal improperly nourished organs and slough off decadent tissues. All of this is in accordance with findings of H. Wieland proving first the hydration of an active carbonyl group in body fluids into :C:(OH)₂ and its subsequent dehydrogenation by enzymes into a peroxide type, :C:O:O, whereupon nascent oxygen is liberated and the carbonyl group (:C:O) regenerated to repeat the process. Just as Pasteur identified the microscopic organisms that led to plant disease, so Koch identifies the chemical agents that are capable of combating microorganisms." p. 161.

In order to better understand Dr. Koch's theories on the causes and treatment of diseases and the application of his theories to the treatment of cancer and its allied diseases; it is important to consider, at the same time, the contributions of other researchers of his day and their contributions to modern medicine. The importance of knowledge about the physiology of normal cells and how this physiology is changed under the influence of toxins, viruses, etc has to be understood first, if one wants to find ways to assist the body's natural immune systems to overcome these disease conditions and bring about a restoration of normal cellular function.

Linus Pauling, Ph.D., N.L., in his book, "How To Live Longer And Feel Better" (1987) discusses the reversible chemical reaction between ascorbic acid, a strong reducing agent, and dehydroascorbic acid, a strong oxidizing agent, and the importance of this reversible reaction to physiological properties of Ascorbic Acid. It should be noted that dehydroascorbic acid contains a di-carbonyl ($O = C - C = O$) group and that free radicals are formed during this reversible reaction in the cell. Dr. Pauling was of the opinion that some of the physiological properties of vitamin C are likely due to the reducing power of ascorbic acid and the oxidizing power of dehydroascorbic acid. (pp. 89-90) It should also be noted that para-benzoquinone (BQ) has a similar oxidation-reduction relationship with hydroquinone where hydroquinone is a reducing agent and para-benzoquinone (BQ) is an oxidizing agent and that during these reversible reactions, free radicals are formed. In Dr. Pauling's book on General Chemistry (Dover Ed., 1988, p. 279) he points out that free radicals are usually highly reactive and that they are difficult to prepare except in low concentration.

In their book, "Cancer And Vitamin C", Dr. Linus Pauling and Dr. Ewan Cameron, Linus Pauling Institute of Science and Medicine, 1979, discuss the cause, prevention and treatment of cancer and that an important role is played by vitamin C in this matter; that nutrition and environmental changes for the patient play a part in the stimulation of the natural protection mechanism of the body to overcome cancer and that large doses of ascorbate are an important nutrient. (pp. 47-9) For the control of cancer, the most

important nutrient may be Vitamin C. (p. 99) Ascorbic acid, a weak acid, is a chemical reducing agent and can react with oxygen. (p. 208) When ascorbate reacts with molecular oxygen, free radicals can be formed. (p. 192) High doses of vitamin C are important not only to the body in the protection against cancer, but also in the protection against viral and bacterial diseases. (p. 107) And supplemental ascorbate will play a part in all future cancer treatment programs. (p. 196) For progress to be made in the fight on cancer, organizations such as the American Cancer Society and the National Cancer Institute must open their minds to new ideas. (p. 86) I believe that the independent research and the advanced ideas in cancer research, as illustrated by scientists such as Dr. Linus Pauling and Dr. Ewan Cameron, are of up most importance in the present day fight against cancer and viral diseases.

In the October 15, 1936 letter, from R. G. Hoskins, Ph.D., a member of the Board of Trustees for The Memorial Foundation for Neuro-Endocrine Research, Harvard Medical School, to Dr. Koch, Dr. Hoskins stated:

"The Warburg (chamber) work is looking quite favorable. The initial experiments indicate definitely that the glyoxylide makes an immediate difference in the oxidation rate of living tissue,—using liver as the substrate. We want to make a few more runs before saying anything definite but the present indication is that after a seven minute lag the first effect is a depression in the oxidation rate. This lasts, however, only a short time after which the oxidation picks up again. This of course is not the phase of the reaction that is of the most interest but it serves to show at any rate that the material has a real effect in an oxidation-reduction system. There are skeptics I suppose who would not have conceded even that."

In a subsequent letter, dated January 5, 1937, to Dr. Koch, Dr. Hoskins made the following report on their research:

"...our results in the Warburg have been consistent in showing that tissue oxidation is at once increased by the material. Control studies indicate that the effect is not to be ascribed to any associated materials. Dr. Nickerson has become very much interested in the chemistry of the effect and we should like to study it further in connection with the oxidation of pyruvic and other acids that seem to be involved in the biological oxidation cycle. In particular, we want to see what it will do in removing the block that seems to be characteristic of the distorted cycle of cancer tissue. We hope before a great while to have cancer tissue available and to study the oxidations of this as influenced by the glyoxylide in the Warburg chamber."

In the article published in Science, February 24, 1956, Vol. 123, Number 3191, "On the Origin of Cancer Cells" which was based on a lecture by Otto Warburg, Ph.D., N.L., he said in his summary:

"Cancer cells originate from normal body cells in two phases. The first phase is the irreversible injuring of respiration. Just as there are many remote causes of plague—heat, insects, rats—but only one common cause, the plague bacillus, there are a great many remote causes of cancer—tar, rays, arsenic, pressure, urethane—but there is only one common cause into which all other causes of cancer merge, the irreversible injuring of respiration.

"The irreversible injuring of respiration is followed, as the second phase of cancer formation, by a long struggle for existence by the injured cells to maintain their structure, in which a part of the cells perish from lack of energy, while another part succeed in replacing the irretrievably lost respiration energy by fermentation energy. Because of the morphological inferiority of fermentation energy, the highly differentiated body cells are converted by this into undifferentiated cells that grow wildly—the cancer cells.

"To the thousands of quantitative experiments on which these results are based, I should like to add, as a further argument, the fact that there is no alternative today. If the explanation of a vital process is its reduction to physics and chemistry, there is today no other explanation for the origin of cancer cells, either special or general. From this point of view, mutation and carcinogenic agent are not alternatives, but empty words, unless metabolically specified. Even more harmful in the struggle against cancer can be the continual discovery of miscellaneous cancer agents and cancer viruses, which, by obscuring the underlying phenomena, may hinder necessary preventive measures and thereby become responsible for cancer cases." p. 312. (emphasis added)

In Warburg's paper, "Prefactor Chapter" he identifies benzoquinones and naphthoquinones (the latter compounds occur in nature as ubiquinones and vitamins K) as oxidants. In this paper he reports that through mouse cancer experiments it has been shown "that living animals tumors tissue alone lives anaerobically, as was expected since the discovery of the fermentative metabolism of cells...Very likely this great difference in the life of normal and cancer cells will be the basis of a future selective cancer chemotherapy." (p. 11, 1963) (emphasis added) Dr. Warburg continues:

"Owing to their anaerobiocity, and because anaerobic cells contain less catalase than aerobic cells, hydrogen peroxide acts selectively on cancer cells.... To produce H_2O_2 in living cells we injected into mice quinones which produce H_2O_2 by alternate reduction and oxidation, in a way similar to that by which H_2O_2 is produced today in the chemical industry. Small curative effects were obtained, but the quinones were too toxic to be of practical value.

"More encouraging were experiments with glyceric aldehyde, which as has been known for a long time, inhibits fermentation of cancer cells at a concentration of 0.01 N."

Dr. Warburg goes on to explain the limitations of using the aldehyde in his experiments. At the end of his paper he added the following paragraph (c):

"Since this article was written, we observed that glyceric aldehyde and cysteine react very rapidly at room temperature, at physiological pH. The compound contains one molecule of the aldehyde to one molecule of cysteine and is a relatively stable thio-hemi-acetal of the aldehyde. Other SH compounds react much more slowly, for example, glutathione and coenzyme A; yet it may be that a reaction with an SH group is the cause of the rapid killing of cancer cells by the aldehyde. (p. 14) (emphasis added)

Dr. Warburg in his lecture at the meeting on June 30, 1966 at Lindau, Lake Constance, Germany, and in the revised editions of this lecture (1969), came to the conclusion that anaerobiosis is the prime cause of cancer and that this (anaerobiosis)

meets the demands of Pasteur. (p. 14) In the preface to the Second Revised German Edition of the Lindau Lecture, "The Prime Cause and Prevention of Cancer, he wrote:

"Since the Lindau lecture of June 1966 many physicians have examined - not unsuccessfully - the practical consequences of the anaerobiosis of cancer cells....The cure of human cancer will be the result of biochemistry of cancer and of biochemistry of man.

"There exists no alternative today to the prevention of cancer as proposed at Lindau. It is the way that attacks the prime cause of cancer most directly and that is experimentally most developed. Indeed millions of experiments in man, through the effectiveness of some vitamins, have shown, **that cell respiration is impaired if the active groups of respiratory enzymes are removed from the food; and that cell respiration is repaired at once, if these groups are added again to the food. No way can be imagined that is scientifically better founded to prevent and cure a disease, the prime cause of which is an impaired respiration.** Neither genetic codes of anaerobiosis nor general cancer viruses are alternatives today, because no such codes and no such viruses in man have been discovered so far; **but anaerobiosis had been discovered.**" (emphasis added)

"It has been asked after the Lindau lecture why the repair of respiration by the active groups of the enzymes was proposed as late as 1966, although the fermentation of cancer cells was discovered as early as 1923. Why was so much time lost?

"He who asked this question ignored that in 1923 the chemical mechanism of enzyme action was still a secret of living nature alone. The first active group of an enzyme, 'Iron, the Oxygen-Transferring Part of the Respiratory Enzyme' was discovered in 1924. There followed in two decades the discoveries of the hemoproteins, the flavoproteins and the pyridinoproteins, a period that was concluded by the 'Heavy Metals as Prosthetic Groups of Enzymes' and by the 'Hydrogen Transferring Enzymes' in 1947 to 1949.

"Moreover, during the first decades after 1923 glycolysis and anaerobiosis were constantly confused, so that nobody knew what was specific for tumors....Anaerobiosis of cancer was an established fact only since 1960, when methods were developed to measure the oxygen pressure inside of tumors in the living body.

"This abridged history shows that even the greatest genius would not have been able to propose in 1923, what was proposed at Lindau in 1966. As unknown as the prime cause of cancer was in 1923 was the possibility to prevent it.

"Life without oxygen in a living world that has been created by oxygen was so unexpected that it would have been too much to ask that anaerobiosis of cancer cells should be accepted at once by all scientists. But most of the resistance disappeared when at Lindau it was explained that on the basis of anaerobiosis there is now a real chance to get rid of this terrible disease, if man is willing to submit to experiments and facts. It is true that more than 40 years were necessary to learn how to do it. But 40 years is a short time in the history of science." (pp. 1-3) (emphasis added) (August 1967) Otto Warburg

At the end of Dr. Warburg's lecture in 1966 he said:

"But nobody today can say that one does not know what cancer and its prime cause is. On the contrary, there is no disease whose prime cause is better

known, so that today ignorance is no longer an excuse that one cannot do more about prevention. That the prevention of cancer will come there is no doubt, for man wishes to survive. But how long prevention will be avoided depends on how long the prophets of agnosticism will succeed in inhibiting the application of scientific knowledge in the cancer field. In the meantime, millions of men must die of cancer unnecessarily." (p. 16) (emphasis added)

Dr. Warburg has shown through his work on cell metabolism that normal respiration (aerobic metabolism) of a healthy cell is changed to anaerobic metabolism in cancer cells. That viruses, chemical agents, etc are remote causes that lead to anaerobiosis and it is this anaerobiosis that is the primary cause of cancer. Dr. Warburg believes that once anaerobiosis occurs, this process cannot be reversed.

In 1963, Dr. Koch wrote:

"Warburg credited anoxia with the power to produce cancer, and while anoxia is essentially provocative, we have found that in addition two carcinogenic agents are also necessary. They are the initiating and sustaining carcinogens. One and the same chemical structure may serve in both capacities....However, the initiating carcinogen or allergen may be a virus, a product of germ activity in the intestine, a mercaptan or other structure carrying a sulphidryl group, or a free radical produced by the sun's rays on a ripening pollen, or present in some plastic material. The sustaining allergen or carcinogen is in our experience a product of germ activity. It is brewed in an old scarred in focus of silent infection where enough oxygen is not admitted to burn the free radicals produced in its slow metabolism, thus giving them a chance to polymerize. Both are joined to the energy receiving mechanism of the host cell by free radical addition, and hence by a single covalent bond. The integration of a virus is with the energy producing mechanism, likewise by a single covalent bond and so the phenomena associated with viral infection and allergy including cancer producing as well as their reversals are of the same pattern and may be discussed together. "Though the single covalent bond is well known for its easy rotation under environmental influences, it appears fixed for each disease entity, a fact that gives a good clue to the nature of the critical atomic groups both of the pathogen and of the host cell energy producing and receiving mechanism." (Neoplastic And Viral Parasitism, Their Basic Chemistry And Its Clinical Reversal; p. 7, 1963)

Dr. Koch has shown how the cell can be injured to produce Warburg's anaerobiosis and how the resulting anaerobiosis can be reversed. This can be corrected by the removal of the injure causing agent (carcinogen, etc) and by restoring the cell to its normal aerobic chemistry. Thus, through the use of the proper oxidation catalyst, by removal of all toxins from the body and by following a proper diet, the reversal of the disease process becomes possible.

In 1993, Yannis Gounaris, Ph.D., a research molecular biologist, did an electron spin resonance (ESR) test on a product made from the oxidation of inositol with chlorine under ultraviolet (UV) light and then precipitated it with barium chloride (a process developed by Dr. Koch in the 1940's). His test showed that this procedure produced a product containing a free radical. He also made a homeopathic solution (12x potency; 10^{-12}) of a mixture of this product with benzoquinone, glyoxal and triquinoyl obtained from commercial sources. His homeopathic product was given to a person with a 12 year

history of a herpetic condition that would break out every 20 to 30 days. Three months later, Dr. Gounaris reported that there had been no outbreaks from this condition and that no adverse effects of any kind were observed from using this product.

It should be noted that there is a reversible oxidation-reduction reaction between ascorbic acid, its ascorbyl radical and dehydroascorbic acid where dehydroascorbic acid acts as a strong oxidizing agent due to its two adjacent "carbonyl groups" and ascorbic acid is a strong reducing agent due to its 2 adjacent "hydroxyl groups". Likewise, there is a similar reversible oxidation-reduction reaction between hydroquinone, the semiquinone radical and para benzoquinone where para benzoquinone is the oxidizing agent and hydroquinone is the reducing agent. I believe that it will be found that there is a multi-step biological oxidation-reduction series of chemical reactions between inositol with its 6 hydroxyl groups and triquinoyl with its 6 carbonyl groups where rhodizonic acid (with its 4 carbonyl groups and its 2 hydroxyl groups) acts as one of the intermediary structures between inositol and triquinoyl. The intermediary free radicals which are formed during the oxidation-reduction transformation between inositol and triquinoyl could be the most important part of the chemistry of the body's natural immune system. Thus, when the immune system breaks down, it becomes necessary to "jump start" this system with a strong activated carbonyl structure, such as triquinoyl, in a non-toxic catalytic homeopathic dilution. In fact, triquinoyl may be found to be the body's most perfect oxidation catalyst.

The importance of diet to avoid toxicity was brought out in the 1937 lecture, "Diet as a Basic Cause of Disease," by M.Beddow Bayly, M.R.C.S., L.R.C.P. He said:

"Mr. J. E. R. McDonagh, one of the most eminent of modern bacteriologists, regards intestinal toxæmia as the basic cause of most chronic diseases, and has declared:

'If it were possible to rid humanity of chronic intestinal intoxication, disease would become almost extinct.'

"It is here that the importance of the work of Dr. William F. Koch, of Detroit, may best be appreciated. By a series of brilliant investigations into the chemistry of the body, which were entirely unconnected with experiments on animals, he has shown that the absorption of certain products of the decomposition of animal proteids into the system results in their being eventually 'absorbed,' i.e., chemically attached, to the molecular particles of protoplasm which constitutes the cells of the body.

"The effect of this is that the oxidation processes of cell-life on which the healthy growth and normal functions of each individual cell depends is more or less inhibited.

"Just as one might imagine, by way of analogy, the effect of smoke on the glass of a lamp in which shines a light, so one can, I think, glimpse in some degree what the effect of a chemical substance intimately adherent to the minute cell-particles of every organ in the body might ultimately entail.

"Moreover, these chemical products of faulty diet have more than merely inhibitory properties. By virtue of their intrinsic power of altering the wave-length of radiations reaching the cell they may, and do eventually, elicit a vibratory response from the cell-life which takes the form of an exaggeration of one of the normal functions of the particular cell or tissue: for instance, of cell-division (i.e., growth) or of autolysis (i.e. death). The final result of this disordered metabolism is seen, according to Koch, in the development of malignant growths such as cancer, or of tuberculosis.

"It is not possible to do more than touch briefly upon this fascinating and illuminating theory here, and to add that its correctness finds convincing support in the effectiveness in practice of the chemical remedy which Dr. Koch has devised to destroy this basic toxin at its very point of attachment to the body-cells, its chemical point d'appui.

"It will be sufficient for our present purpose if these profounder concepts of disease causation are borne in mind when dealing, as now we must, with some specific instances of disease in relation to diet." (pp. 8 & 9)

"Sir William Arbuthnot Lane declared in 1933: 'Everyone can avoid cancer who is prepared to keep internally clean by eating natural foods and drinking plenty of water. I have never yet operated for cancer upon a healthy person.' While we need not necessarily accept this opinion as representing the whole truth about the problem, for there is evidence that the adoption of such ways of living does not always prevent the development of cancer, there can be little doubt in our minds but that they are vitally important factors, and, combined with the system of detoxification devised by Dr. William F. Koch, provide us with the most hopeful means of ridding humanity of this menacing scourge." (p. 26) Diet as a Basic Cause of Disease, A Lecture, by M. Beddow Bayly, M.R.C.S., L.R.C.P.; Published by The Health Education And Research Council, 15 St. Jame's Place, London, S.W.1, 1937.

I believe that over the years the independent research of both Dr. Szent-Gyorgyi and Dr. Koch have followed the same basic parallel path which has led them, individually, to the identification of the same "activated carbonyl" groups that are an essential ingredient of the body's natural immune system. Their individual basic research has complemented each other for the benefit of humanity. I further believe that Dr. Linus Pauling has recognized the importance of this dicarbonyl structure in dehydroascorbic acid and its relationship to ascorbic acid and the readily reversible reaction that takes place between dehydroascorbic acid (a strong oxidizing agent) and ascorbic acid (a strong reducing agent) and that Vitamin C is a general detoxifying agent. He further recognized the importance of the detoxification of the carcinogenic and other toxic substances by oxidizing these substances into nontoxic derivatives that can be eliminated from the body in the urine, all of which is in accordance with Dr. Koch's thesis. That Dr. Otto Warburg, Dr. Szent-Gyorgyi and Dr. Koch have recognized, independently, that cancer cells are normal cells that have reverted into an anaerobic state thus losing their normal aerobic biological direction and as cancer cells, they continue to reproduce out of control indiscriminately.

Albert Szent-Gyorgyi, M.D., Ph.D., N.L., wrote in his book, "Electronic Biology and Cancer, A New Theory of Cancer":

"The C=O groups seem to be Nature's universal tool to suppress cell proliferation. The animal body has to suppress the proliferation of its own cells, and do this reversibly, without causing damage. This can be done by use of the moderately active aliphatic dicarbonyls....The chemical structure of this substance (dicarbonyl) satisfies the requirement of an inhibitor of cell division....Possibly, the free radical described in Chapter 13 is the primary oxidation product of the oxidation of ascorbic acid. The bactericidal action of this stable radical has not yet been studied. It can be expected to be high, and it seems possible that it is actually this radical which protects the plant against bacterial invasion when its cells are

damaged." "This they can do by the highly active aromatic dicarbonyls, the diquinones of catechol derivatives....The animal, with its blood circulation, does not need such local defense, being able to invoke the immunological defense mechanism of its whole body. It could not use toxic substances either which would be spread by the circulating blood."(Chapter 14, Defense and Regulation; pp. 71-72)

"My experiments suggest two more important and direct roles for oxygen: transformation of the protein into free radicals and semiconductors, and promotion of electronic reactions, making charge transfer and formation of free radicals autocatalytic."(Chapter 13, The Biological Function Of Oxygen; p. 64)

Dr. Szent-Gyorgyi was right when he said that quinones inhibit cell division but are very toxic. I only wish that Dr. Szent-Gyorgyi had learned more about Dr. Koch's work. In 1979 Dr. Garber had contacted Dr. Szent-Georgyi in regards to my father's work. Dr. Garber had suggested that Dr. Szent-Georgyi meet with me in order that he might learn more about Dr. Koch's theories and work. Dr. Szent-Gyorgyi's wrote the following to Dr. Garber in his letter of November 1, 1979:

"I can tell you, I have a great admiration for Koch. He must have been a very outstanding man. My feeling is that he had a strong intuitive feeling about the role of C=O group and especially its conjugated form as C=OC=O as one of the great regulating forces in nature. It is very unfortunate that he never expressed this clearly and definitely in any (of) his writings known to me. I have been working myself on these lines now for years and the subject has made very great progress and it is doubtful whether the notes of Dr. Koch could help any further. (emphasis added)

"I would not like to become involved in the controversy around his name and, maybe, reproached later that I am led in my studies in by the posthumous notes which Paul could put at my disposal. I also doubt whether I could find the time for their study they undoubtedly deserve. I would not like either to revive the controversy around his work. That he has met by hostility is not doubtful for me. I know it from my own experience that people with intuition are regarded as an enemy by those who have none."

In a subsequent article "The Search For A Natural Cure For Cancer" Dr. Szent-Gyorgyi said:

"Carbonyls arrest cell division and my laboratory was led to the conclusion that it is still the carbonyls which arrest cell proliferation and it is the carbonyls which make the cell return to resting state, after it completed division. If the carbonyls are missing, proliferation has to go on and cancer results. We were not the first to be led to such a conclusion. A decade ago a very intuitive research, W. F. Koch, came to the same conclusion. Unfortunately, he did not leave us enough information to enable us to follow his trail". (emphasis added)

Though Dr. Koch's primary interest was in cancer research, this research opened the door to his research on other disease conditions including viral diseases such as poliomyelitis. He was able to apply his theories to the chemistry of natural immunity. I hope that this information on the life and research of Dr. Koch will be of interest to you.

If you are interested in additional information about Dr. Koch, his research, publications, books, etc, please contact me.

Sincerely yours,

Paul M. Koch

PMK/I

Enclosure: Copy of a reprint of "Chemical Consequences Of The Removal Of The Parathyroid Glands"

A list of some of publications and information on Dr. Koch's medical research and related cancer research information, etc.

- 1) On The Occurrence Of Methyl Guanidine In The Urine Of Parathyroidectomized Animals, W. F. Koch, The Journal Of Biological Chemistry, Vol. XII, No. 3, (1912);
- 2) Toxic Bases In The Urine Of Parathyroidectomized Dogs, W. F. Koch, The Journal of Biological Chemistry, Vol. XV, No. 1, (1913);
- 3) Chemical Consequences Of The Removal Of The Parathyroid Glands, Editorial from the Journal Of The American Medical Association, Vol. LXI, No. 13;
- 4) The Physiology Of The Parathyroid Glands, W. F. Koch, The Journal Of Laboratory And Clinical Medicine, Vol. 1, No. 5, St. Louis, February, 1916;
- 5) Tetany And The Parathyroid Glands, W. F. Koch, Ph.D., Medicine And Surgery, January, 1918;
- 6) A New And Successful Treatment And Diagnosis Of Cancer, Wm. F. Koch, Ph.D., M.D., Professor of Physiology, Detroit College of Medicine, Detroit Medical Journal, Vol. XX, No. 7, p. 244-248, JULY 1919;
- 7) The Detroit News. Sunday, September 7, 1919 article on Dr, Wm. F. Koch;
- 8) A New And Successful Diagnosis And Treatment Of Cancer, Wm. F. Koch, Ph.D., M.D., Medical Record, October 30, 1920;
- 9) The Function Of Cancer, Wm. F. Koch, Ph.D., M.D., Cancer, October, 1924;
- 10) Dr. A. R. Mitchell's letter of November 12, 1924 to Dr. Koch;
- 11) 1940 Brazilian Newspaper articles on Dr. Koch trip to South America;
- 12) Willard H. Dow's letter of June 21, 1946 to Mr. Thatcher;
- 13) Chapter XVIII, Chemotherapy from Farmer Victorious, Wm. J. Hale, Ph.D., 1949;
- 14) The Use of Peroxide of Diformaldehyde and Organic Unsaturated Compounds in the Treatment of Anergy and Hyperergy, Joseph Henri Maisin, M.D., The Medical Press And Circular, September 7, 1938, Vol. CXC VII, No. 5183;
- 15) Neoplasms, Infections And Allergy, Joseph Henri Maisin, M.D., "L.Europe Medicals", September 25, 1938, Mo. 5, page 52.

16) Dr. Albert Szent-Gyorgyi's articles:

- a) "The Search For A Natural Cure For Cancer". I believe this is a follow up article to his earlier papers;
- b) "Cell Division and Cancer," Science 149, p. 34-7, July 2, 1965;
- c) "Keto-Aldehydes and Cell Division, Glyoxal - Derivatives may be regulators of cell division and open a new approach to cancer," Science 155, p. 539-541, Feb. 3, 1967.
- d) The National Observer's July 5, 1975 article "Electromagnetic Theory of Cancer, A Nobel Winner's Explanation," by Patrick Young who reported on Dr. Szent-Gyorgyi's cancer research;
- e) Albert Szant-Gyorgyi's letter of November 1, 1979 to Dr. Garber;
- f) Dr. Szent-Gyorgyi's booklets:
 - (1) "Electronic Biology And Cancer", 1976; and
 - (2) "The Living State and Cancer," 1978 (Narcel, Dekker, Inc, New York and Basal) go into a greater detail on his research. These two Booklets can be obtained through "U.M.I." in Ann Arbor, Michigan (1-800-521-3042).

17) On the Origin of Cancer Cells, Otto Warburg, Ph.D. M.D., N.L., Science, Vol. 123, No. 3191, Feb. 24, 1956.

18) The Survival Factor In Neoplastic And Viral Diseases, Wm. F. Koch, Ph.D., M.D.; 1961;

19) The Chemistry of Natural Immunity, Wm. F. Koch, Ph.D., M.D., 1939;

20) Natural Immunity, Wm. F. Koch, Ph.D., M.D., 1936;

21) Cancer And Its Allied Diseases, Wm. F. Koch, Ph.D., M.D.; 1929.