ACQUIRED IMMUNITY TO TUBERCULOSIS

BY GERRIT JOHN WARNSHUIS, M. D.

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What custom wills we must in all things do it,
For multitudinous error would be heaped so high,
That truth could ne'er o'er peer it.

—Shakespeare.

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FOREWORD

Although recent years have shown a declining death rate of tuberculosis in our principal cities, it still remains a leading cause of death among the young adults of the country.

Approximately one hundred thousand deaths are the direct result of this disease annually in the United States. In the four years of the bloody civil war, fewer men were killed in action than the number of persons who died from this disease in the past four years.

This statistical examination of the actual loss of life, however, reveals only a small part of the ravishes of this scourge. Studies made with the tuberculin test and the experiments of every physician demonstrate that a very large number of persons suffer in some degree from infection with the disease even though they succeed in acquiring a sufficient immunity to the bacterium so that they do not succumb to it per se. Unquestionably many forms of chronic disabilities, nervous disorders, digestive disturbances and malnutrition have their origin in hidden foci of tuberculosis.

The most tragic feature of the sad effects of this disease is not so much in the appalling loss of life, distressing as this may be, but, in the fact that it strikes the victim down at a period of early maturity when life holds forth its richest promises; when youths are suddenly stricken and forced to abandon in many instances cherished dreams of a career, for which they have been patiently and industriously preparing themselves, shattering the hopes of proud parents; when young women on the threshold of happy marriage find this prospect denied them. In so many cases we find the even more pathetic circumstance of young children left motherless or fatherless and usually because of the lingering nature of the disease, destitute.

Any measure which can even in some small degree abate the menace of this pestilence to the family circles of our beloved country deserves serious consideration regardless of how humble its origin.

The record of past performance proves all too plainly that in this battle the family physician rather than public health authorities and institutions is the key figure. Measures aimed at segregation and attempts to isolate carriers have proven woefully inadequate and can by no stretch of the imagination be credited with any serious effectiveness in controlling the spread of the disease.

Economic improvement in the state of the poorer classes and education of the public on the principles of proper nutrition undoubtedly are not to be discounted, but the intelligent and sympathetic treatment and management of active cases by the attending physicians can accomplish magnificent results if carried out in a concerted fashion.

The method of treatment which is expounded in this brief treatise is not offered in any sense as a specific for tuberculosis. Whatever benefit we have been able to observe is the result of an improvement of the natural defense of the human organism rather than from any action on the tuberculosis bacillus itself or the lesions it produces.

A study of the characteristics of the disease both in the individual and from an epidemiological standpoint readily convinces one that this is sound practice and the correct approach to remedizing the disease. This point is discussed in the beginning of this work and need not be elaborated on now. From a practical view it is highly significant, that, should it be accepted that we have succeeded in correcting a fundamental and widespread weakness in the defensive mechanism or the natural immunity of the body to infection, this same chemical preparation may find a wide field of application in other forms of infection as well. For a discussion of these more extensive uses the reader is referred to a book on natural immunity by my associate, Wm. F. Koch, Ph.D., M.D.

The author wishes to take this opportunity to express his gratitude to his associate and all those who by their friendly interest and cooperation have inspired him in a task beset with so many difficulties, and one in which he recognizes his personal limitations too well.

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By Gerrit J. Warnshuis, M. D.

Evidence of Natural Immunity or Resistance

Before discussing this subject, it is necessary to qualify our conception of immunity both as to degree and duration. We must recognize the fact that with the exception of the exanthemata, such as, scarlet fever, small-pox, and measles, there are few diseases in which permanent and absolute immunity can be acquired, although on the other hand, such immunity may be inherited. Whether or not, as Besredka points out, the sharp contrast in the high degree of immunity acquired by a single illness in the case of the exanthemata as compared to other diseases is because the skin is an important source of anti-bodies still remains an open question. We do know, as a scientific fact, that the fixed tissue cells are as fertile a source of anti-bodies as the mobile leucocytes. Immunity acquired through injection or inoculation must usually be taken, however, as a matter of degree and not as being absolute.

We feel that this conception of immunity must be strongly emphasized to avoid giving the impression that we are claiming the ability to produce an absolute immunity to tuberculosis. It is sufficient if our experience demonstrates that the normal resistance possessed by individuals who escape the ravages of pulmonary tuberculosis can be restored. It is quite evident that the mere fact that we have individuals who never show signs of active tuberculosis do not, because of this fact, possess an absolute immunity.

Considering the universal occurrence of tubercular infection among the white races it is self-evident that a natural immunity, of a high degree, must be fairly general. The fact that approximately 70% of adults show evidence of having had tuberculosis while only 10% develop the disease in an active pulmonary form is evidence that a strong natural defense exists. Some authorities claim that from 99 to 100% of early childhood infections fail to develop into active pulmonary disease if re-infection can be avoided. This appears like a broad statement not susceptible to proof, but indicates at least that their experience has given them a high degree of confidence in the natural resistance of the human body to this infection. The improvement in the symptoms following the so-called "rest cure" is also accepted as evidence of a better state of immunity. To a limited extent this is doubtlessly correct but it is a dangerous teaching to mistake the increased tolerance that usually results from rest for a greater immunity. An improved tolerance may frequently

cause symptoms to subside even with an advancing infection. Tolerance is a result of a decrease in the allergic sensitization to the products of bacteriolysis and while this is usually proportionate to the activity of the immunity processes, such tolerance may be increased even while the disease infection is extending itself.

We will discuss this relationship between allergy and immunity a little further along. It is necessary that we first establish conclusively that a high degree of inherent, natural immunity to tuberculosis is widely distributed among the white races and we may as well add, the Semitic and Mongolian.

The situation is stated succintly by Fishberg, "To each one who becomes phthisical, there are many who have been infected with tubercle bacilli and remained healthy in the clinical sense. Indeed, spontaneous infection acquired during childhood appears to render the body immune against further and renewed exogenous infection with the same virus. It is also clear that chronic phthisis occurs only in individuals who have been infected with tuberculosis during childhood but have remained healthy until adolescence. In other words, *phthisis occurs only in persons who have been immunized by an earlier infection.* In fact, it is in itself a manifestation of immunity, otherwise the patient would succumb to acute general miliary tuberculosis as do those who have not been immunized by earlier mild infection. This immunity is apparently sufficient to protect the individual under ordinary circumstances, but under certain conditions it may fail, and the person may be reinfected from without, the tubercle baccilli being so ubiquitous we can scarcely escape them; or from within by proliferation of the bacilli that have been harbored in healed or quiescent foci, through metastasis."

This same author produces an impressive array of evidence to show that adult infection with tuberculosis is a very rare occurrence even under the most unfavorable conditions such as marriage to one with active pulmonary tuberculosis. The chances of both husband and wife developing tuberculosis are less than in respect to cancer.

The case could scarcely be stated more epigrammatically than by Fishberg's challenge. "All institutions for tuberculous patients are conducted on the principle that the danger of infection is negligible."

This inherent, natural immunity to tuberculosis probably furnishes a much greater degree of protection in early life than after maturity. There does not appear to be any other explanation for the circumstance that in spite of the fact,

that such a large proportion of the general population becomes infected during infancy or childhood very few of them develop advanced tuberculosis of the lungs. Occasionally, however, a person who has always been healthy, never shown any indications of having been infected, may contract the disease and develop a rapidly advancing and fatal "galloping consumption." Such occurrences add weight to the opinion that natural immunity unless stimulated by inoculation and acquired resistance has a tendency to decrease with advancing years. This is shown also by the fact that people develop cancer usually late in life. A third observation that indicates such falling off in resistance after puberty is the fact that even after immunity has been developed by early infection it frequently fails to prevent the disease from becoming reactivated in later years. Indeed, most adult phthisis is reoccurrence rather than re-infection or super-infection.

In regard to such recurrences we should take note of the fact too, that with each relapse it appears that the infection has acquired a higher degree of virulence and the patient finds an increasing difficulty in getting it under control. The progress of the disease in chronic pulmonary tuberculosis is usually by such succeeding periods of activity and quiescence, in each of which the symptoms acquire a greater and greater degree of severity over those of previous exacerbations until eventually the resistance breaks down entirely and the patient succumbs.

Numerous authors have pointed out that not only is there a natural though variable immunity to tuberculosis in the human family but with the exception of the guinea pig most animals have this same resistance. It is especially high among goats.

Role of Oxidizing Catalysts in Immunity

Efforts have been made in the past to seek the causes for this breaking down of immunity to tuberculosis by inquiring into the circumstances associated with the development of the disease. Goldberg, for example, points out that the relatively high incidence of tuberculosis among the Irish, Poles, and Negroes in this country as compared to other elements of the population may be explained by their dietary habits and suggests that the propensity of these races for salt pork may account for this peculiar susceptibility. The more likely explanation, however, lies in the fact that mortality statistics show that the death rate from tuberculosis has been declining more rapidly in urban than in rural commun-

ities. Most of the representatives of these races in this country have migrated from the country to industrial centers where the exposure to tuberculosis is greater and the hygienic conditions favor greater contagion.

The high death rate among primitive people when they are brought in contact with tuberculosis carriers demonstrates that the present population of our cities is made up of the descendants of the survivors of previous attacks from the disease when the natural immunity to infection could not be broken down. Were it not for this natural immunity the entire human race would have been wiped out by one form of disease or another ages ago.

This being the case, the question confronts us whether there exists some means by which this natural immunity can be restored after it has been broken down or has failed to develop. In considering such a problem, it is necessary, first, to remind ourselves that this natural immunity is different from the immunity acquired by inoculation or injection in that it is non-specific. It has to do with the mechanism by which such specific immunities are brought about. Ordinarily, we describe it as the resistance of the body to infection. When the resistance or natural immunity is high, the cells of the body readily elaborate bacteriolysins and anti-bodies to destroy and eliminate an invading micro-organism. They respond energetically by a change in the intra-molecular structure of the cell colloids to the presence of any kind of foreign protein. When the resistance is low this modification of the cell chemistry takes place more slowly or not at all and the more active electrical charge in the large protein molecules of the invading microbe results in the destruction, coagulation, and liquefaction of the cells of the host.

Observations on the circumstances effecting this state of natural immunity indicate that it is maintained through the ability of somatic cells to take up oxygen and to liberate it in a highly active form or combination that will split and digest foreign proteins into their products of carbon dioxide, ammonia, and water. Even a change in surroundings which influences the availability of oxygen in the atmosphere has its effect on the immunity mechanism. Ultra-violet radiation by energizing the oxygen in the blood stream is a powerful factor in raising resistance. The white cells which are credited with especially high resistance are known to contain an oxidase which can be detected by the strong color reaction it gives with guaiac or para-benzidine. The function of thyroid secretion appears to be able to make oxygen available to

the tissue cells and when a thyroid deficiency exists there is a simultaneous decrease in resistance to infection.

It remained for Dr. Wm. F. Koch in his studies in the cause and cure of malignant neoplasms to establish the chemistry of this immunity process in a definite form by the discovery of the important role of a certain oxidizing catalyst belonging to the carbonyl group and characterized by a double unsaturated carbon link. From a study of the behavior of proteins and their numerous derivatives, he deduced a priori, and hypothetically the character of this substance, demonstrated its presence in suitably prepared extracts of heart and brain tissue and eventually developed a method for its artificial synthesis. Continued and extensive clinical observations have proven the correctness of his views on the essential part this substance has in protecting the body against disease.

This work is an epochal discovery that for originality and importance in human welfare has no parallel in the history of medicine.

Koch's contribution is of great significance not only because of its practical value in combating the ravages of cancer but because for the first time, it sheds some light on the nature of the chemistry involved in maintaining resistance to disease. It is all the more remarkable when one reflects that this work was carried on at a time when the studies of our modern physicists such as Rutherford and Bohr, on the influence of electrical charges and vibration to molecular structure and the periodic system, were receiving scant attention in medical chemistry.

The apparent simplicity of this chemical formula of his synthetic antitoxin gives little intimation of the magnitude of the problems involved in its discovery nor the difficulties that enter into its preparation. These can only be appreciated by those who have attempted their solution and those who have had some experience in synthetizing this treatment material.

According to Koch the toxicity of many organic compounds including certain foreign proteins and their derivatives depends upon the presence of a radical of large molecular weight and always combined with one or more benzine rings. Such benzine compounds have the property of fluorescence, that is, of absorbing electrical energy of high vibration frequency and emitting it at a lower frequency. The effect of this is to retard and suppress chemical activity especially the processes of oxidation by which cell function is kept alive. There is only one means by which the inter-cellular substrate

of the body colloids can rid itself of such intruders, and that is through the intermediation of these powerful unsaturated carbonyl compounds. Koch has demonstrated their presence normally in the tissue fluids, especially of the heart and brain and has established their effectiveness as oxidizing catalysts.

Similarity of Tuberculosis and Cancer

Tuberculosis and cancer have many characteristics in common. This is not an original observation and, in fact, has led some to advance the theory that the decline in tuberculosis mortality is directly associated with the increase in the cancer death rate.

Both diseases are alike in their tendency to establish themselves in the human subject in a chronic form although they do occasionally take on an acute character and progress rapidly to a fatal termination. Recovery rarely takes place spontaneously in either case.

In each disease we observe a grave state of toxemia, nervous exhaustion, muscular atrophy, malnutrition, and often advanced anemia. Such toxemia and cachexia may be and usually is greatly out of proportion to the size and extent of the local lesions and the interference with the parts directly attacked. This very lack of proportion between the systemic effects and the size of the growth offers a powerful objection to the conventional description of cancer as a localized accumulation of cells that have through trauma and irritation suddenly taken on a parasitic character.

It is most depressing to observe how persistently this unsound conception of the nature of cancer is passed about in the face of such apparent discrepancy between the local condition and the general symptoms.

It is not uncommon to find decided proliferative changes in tuberculosis comparable to the neoplasms of cancer.

Sometimes the lesions of tuberculosis are confined to a small portion of the body, other times they may be very extensive so that the intestines, peritoneum, generative organs, lungs, skin, bones, tear ducts, and eyes may all be affected. The same thing is true of cancer.

While tubercular meningitis occurs in a small percentage of individuals infected with tuberculosis, the brain and heart appear to be immune. Cancer of the brain and heart is likewise extremely rare. In this particular, there is a striking contrast between these two diseases and syphilis.

In both diseases the intestinal tract is the most frequent

portal of entry. This statement may excite some incredulity in respect to tuberculosis because of the prevailing emphasis of health authorities on air borne contagion but we cannot ignore the impressive array of evidence supporting it. Opie, in autopsies made on presumably healthy British soldiers killed in war found tuberculosis of the bowels in twenty-two per cent.

In a roentgenological study of 2086 cases of tuberculosis of the lungs, Granet found definite lesions of the bowels in thirty-seven per cent, although the majority showed no stomach or bowel symptoms. (Granet, E.; Intestinal Tuberculosis American, J.; Digestive Diseases and Nutrition, Chicago, 2:209.)

The fact that a large proportion of cases of pulmonary tuberculosis show far more active and advanced lesions in the lungs than in the intestines offers no serious objection to the theory that the intestinal tract is the portal of entry or may be the site of the primary lesion. We see similar examples of such remote effects in other diseases. A dental abscess, a tonsilar or sinus infection, for example, when established in a chronic form may produce very little disturbance locally but the secondary foci in the heart, bony articulations, and kidneys may be of a very grave and disabling character.

It is not inconceivable that the mucous membrane of the intestines offers a less favorable pabulum for the propagation of the tuberculosis organism than the lymphatics of the bronchial tree and alveoli of the lungs. The observation, for example, that the Koch bacillus is a facultative anaerobe indicates how easily its ability to maintain itself in one part of the body or another may be determined by the degree of oxygen tension in the diseased part. This dependence of the infection upon the state of oxygen supply in its nutrient medium is a circumstance that assumes no little importance from the standpoint of preventing and curing the disease as we have already described.

If there exist so many weighty arguments for considering tuberculosis as a disease which gains entrance to the body through the alimentary canal and which, therefore, is favored by faulty intestinal activity, there are also certain significant facts about cancer which point to a similar conclusion in respect to its origin.

First of all, consider the great frequency of cancer of the stomach and bowels as compared to other organs. Secondly, we find nearly all cases of cancer show a history of constipation, biliousness, or other evidence of intestinal stasis. Thirdly,

there is the fact that the course of the disease is sometimes greatly modified by improved elimination.

In addition to such evidence we may quote the statement of a widely recognized authority on cancer. Ewing says, J. A. M. A., Dec. 7, 1935, "Man is the only animal which enjoys unlimited access to food and suffers from restricted opportunity to empty the bowel and he is the only animal that suffers notably from gastric and rectal cancer."

More recently some direct evidence has been advanced which may prove highly significant. In the J. A. M. A. issue of Jan. 16, 1937, Claude F. Dixon and Joel L. Deuterman report six cases operated upon for cancer of the rectum which terminated fatally because of a liver abscess produced by an anaerobic bacillus which they designate as Bacteroides Fundiliformis. The description of the organism corresponds very much to that of the anaerobe which Robertson of Edinburgh isolated many years ago by his special methods and which he was convinced was responsible for many forms of chronic disease including insanity, diabetes, anemia, etc.

There is one other characteristic which completes the analogy between cancer and tuberculosis and that is the hereditary predisposition to the disease. We have already discussed this in part. The observation may be added, however, that there is a noteworthy immunity to cancer in tuberculous families and vice versa although this relationship is not an absolute one. It must not be overlooked that the highly infectious nature of tuberculosis can easily lead to false conclusions regarding the part inheritance plays.

If further evidence were needed to show that both these diseases arise and progress because of a fundamental deficiency in the human economy which makes the individual peculiarly susceptible to the invasion of the micro-organisms of these diseases, it may be found in the application of the old adage; namely, "The proof of the pudding is the eating of it." Our experience has shown that tubercular patients respond in the same decisive manner to treatment with Koch's Glyoxylide as do cancer cases. As a matter of fact, the results, while not so spectacular as in cancer, are more uniform. We would naturally expect this. The morbidity and distribution of tuberculosis may be greater but the mortality rate is certainly much lower, indicating that the human body naturally acquires an immunity to tuberculosis much more readily than it does to cancer. We would, therefore, if our theory is correct, expect that a much larger proportion would respond favorably to the energizing effect of the Koch

Glyoxylide on the immunity mechanism than in the case of cancer.

In a previous publication the writer reported that of 217 cases of advanced pulmonary tuberculosis treated by this method, the mortality approximated 20%. A subsequent series of 86 cases that I have treated personally and have had with few exceptions under close observation over a considerable period, there was a total of 14 deaths or 16%, a slight gain but of no material significance in itself.

These figures assume a greater importance, however, when we analyze them more fully. Of the total series of 86 cases, 37 were far advanced and of these 33 were progressing rapidly toward a fatal termination at the time they received the injection of Koch's Glyoxylide. The logical conclusion would be that in only 14 of the 33 the treatment failed to turn the downward course, while in the remaining 19 the disease took a favorable change in spite of its extensive character and the gravity of the symptoms.

Another gratifying observation is the fact that of the milder cases, even though with very few exceptions they were all moderately advanced with definite x-ray evidence of cavitation and had had active symptoms at intervals over a period of from one to several years, all of them responded favorably to the treatment. Seventeen of these are working and show no indication of relapsing which is perhaps the best proof that can be offered of the favorable effect of the treatment. Some of the patients who are working had to pass a medical examination for insurance before they could obtain employment.

Case Reports

The following case histories demonstrate more fully what has been accomplished:

No. 1. Mr. K. L.
Age—27 years. Single.

No family history of tuberculosis.

Always well until in the summer of 1932 when he contracted pleurisy after sitting on cold cement block while perspiring. Recovered and felt well until in May, 1935, when he developed a pleurisy pain in the right side which lasted for several weeks. After an x-ray examination of the chest at that time he was admitted to the Herman Keifer Hospital for tuberculosis. In July, 1936 he was given a crush of the right phrenic nerve at that hospital.

He presented himself here for treatment September 4, 1936. There were no active symptoms except that he had failed to gain in weight. His normal weight was 153 pounds and since his illness began it had remained at 143 pounds. Physical examination of the chest showed adventitious breath sounds in right upper thorax and in the right axilla. There was no change in rhythm and there was no indication of cavity formation.

He received a treatment of Koch's Glyoxylide on September 9, 1936. September 25 he weighed 149 pounds and there was some improvement in the breath sounds on the right side. November 27 he weighed 151 pounds. His pulse was 88. February 15, 1937 his weight had increased to 156 pounds and it remained the same until he went to work in April. The breath sounds were normal and have remained such. July 19, 1937 after doing manual labor for four months, he weighed 161½ pounds and had no symptoms of tuberculosis.

No. 2. Mr. J. O.
Age—36 years.
Mexican laborer.

Coughed all winter but felt better in summer; had night sweats sometimes but did not feel feverish. No history of hemoptysis. Has been losing weight for several weeks and feels so weak he cannot work.

Physical examination—

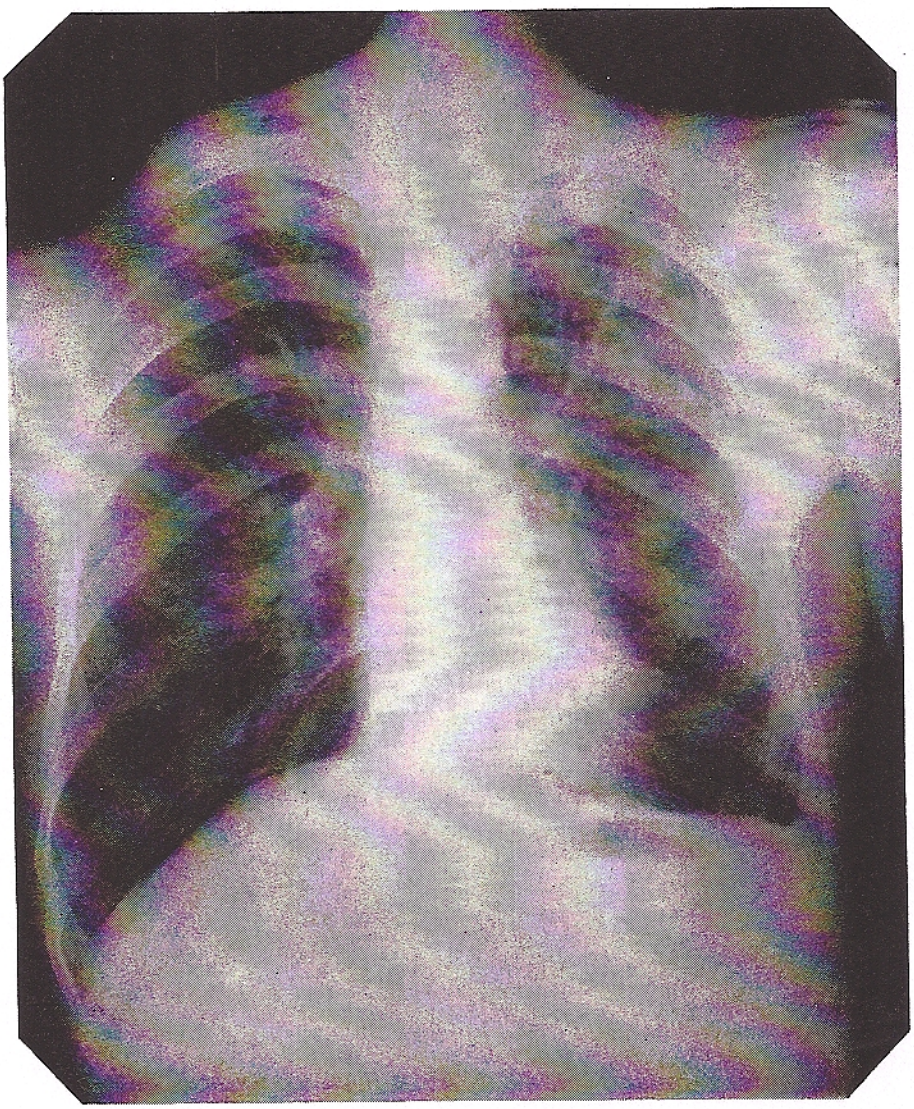
Kyphotic spine, pallid complexion, deep supraclavicular fossae, slight decrease in resonance in upper left thorax and left apex, no rales heard, no change in rhythm of breath sounds anywhere but appear greatly diminished in volume over entire chest, pulse 86. Normal weight 150 pounds—present weight 130 pounds. (See x-rays.)

Diagnosis—

Advanced chronic pulmonary tuberculosis fibrotic type involving both lungs. Contraction of upper left lobe and numerous cavities. Scattered areas of infiltration in both lungs.

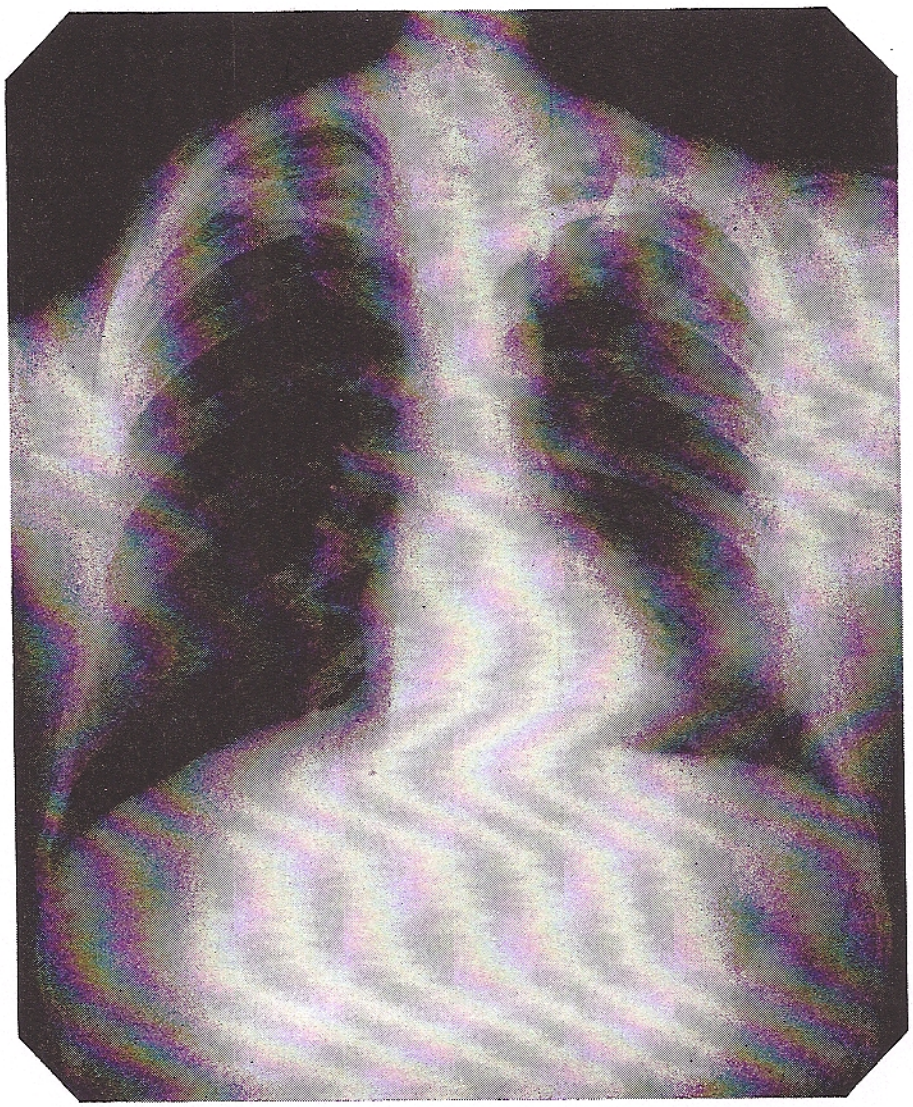
Progress—

Patient received intramuscular injection of Glyoxylide January 25, 1937 and was put to bed. Cough rapidly disappeared, appetite improved, and by March



Mr. J. O. Dated January 19, 1937

There appears to be some asymmetry in the conformation of the chest, the right side being more fully expanded throughout. There is considerable cloudiness in the left costo-phrenic angle but no definite fluid line. The upper left lung is densely infiltrated showing a marked honey-combed appearance in the area above the third interspace and there is a punched out rarefied area in the second interspace at the mid-clavicular line 2 x 3 cm. There is an area of density in the left hilus region just exterior to and above the cardiac shadow and radiating in all directions suggesting a peribronchial necrosis. Diagnosis: Moderately advanced pulmonary tuberculosis with numerous small cavities in the upper left lobe and an area of cavitation of 2 x 3 cm. in the upper left lobe and necrosis of the peribronchial lymph nodes and chronic pleuritis of the left pleural cavity.



Mr. J. O. Dated April 5, 1937

The costo-phrenic angles are clear. There is some cloudiness on the left side of the outer portion at the level of the fifth or sixth ribs. The densities observed in the previous plate in the upper left apex have largely disappeared. The circumscribed area in the second interspace observed on the previous plate does not appear on this plate. The density in the left hilus region previously observed does not appear on this plate except for some lines of infiltration extending outward from this area and a small spot of calcification at the upper border of the cardiac shadow 5 mm. in diameter. There is a decreased density in the lung markings on the right side and some calcified nodules which were less clearly outlined in the previous plate.

11 he had gained 16½ pounds in weight. Examination on this date showed improved aeration of right lung, no rales, but diminished resonance and breath sounds over upper left lobe. Pulse 86. Patient anxious to go to work.

On April 5 he weighed 152 pounds and was free from symptoms. Pulse 76.

An x-ray taken on this date showed a decided decrease in the areas of density.

April 12 he weighed 155 pounds. Pulse 72.

April 19 completed 12th week from date of treatment. Weight remains 155 pounds.

He is out of bed, able to take long walks without fatigue, and is free from symptoms. Advised to go to work.

May 15, weight 154 pounds. Has been doing light manual labor for nearly a month with no loss of weight and no return of symptoms.

No. 3. Mr. R. O.
Age—25 years.
Occupation—Job-setter.

Oct. 1, 1937, reported well and working.

Awakened at 3 a. m. July 24, 1936 with a coughing spell and raised about two ounces of blood. Had a medical examination and was told the x-ray showed tuberculosis of the lungs. He had a moderate rise of temperature in the evening for three days.

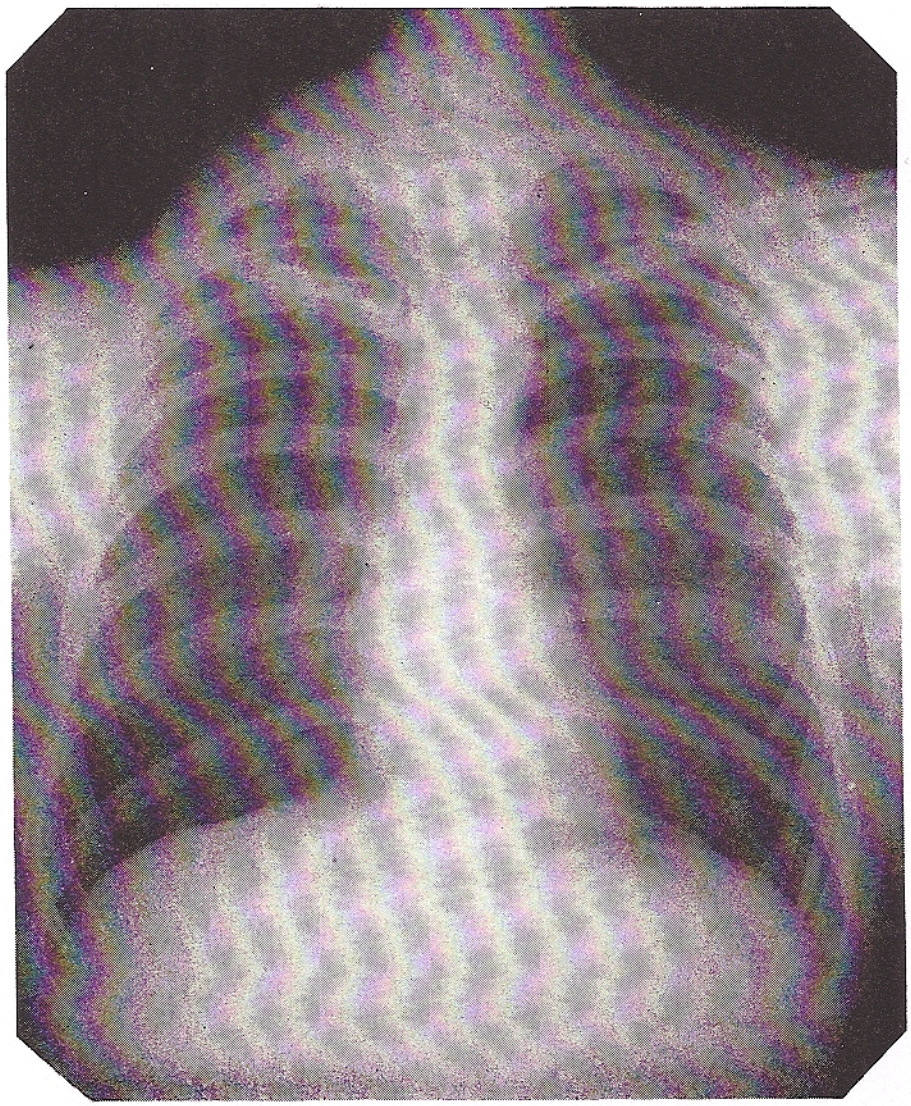
Examination of chest on July 31 showed no change in resonance. There was an increased expiratory sound in the upper right thorax and some subcrepitant rales. (See x-rays.) There was no afternoon fever on this day. His weight on that date was 137½ pounds—normal weight 140 pounds.

At a prior examination made at the Herman Kiefer Hospital he was given a diagnosis of active pulmonary tuberculosis.

Progress—

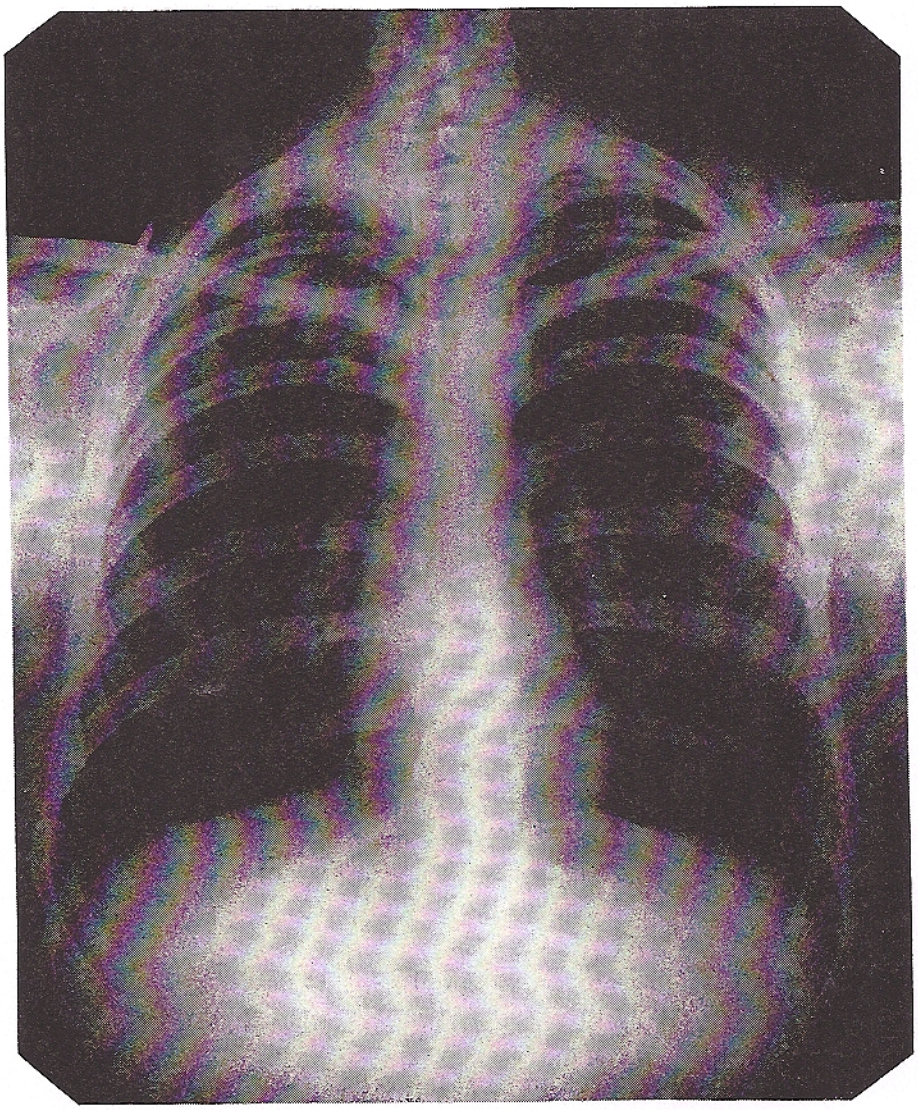
He received treatment on July 31, 1936. August 13 he had gained three pounds in weight and had no afternoon fever during past week. He still had a slight productive cough. Auscultation of chest was negative.

August 20—Cough gone. Walks a mile every day



Mr. R. O. Dated July 29, 1936

Fairly well developed, symmetrical, male chest. There is an area of density in the upper right lobe corresponding to the point opposite inner third of the clavicle. The costo-phrenic angles are clear. There is a slight exaggeration of the normal lung markings of the entire upper right lung as compared with the left side.



Mr. R. O. Dated November 11, 1936

A comparison of this plate with the previous one shows a decided decrease in the density of the lung markings of the upper right lobe. The area of infiltration observed in the previous plate in the region of the clavicle is still present but has a more circumscribed outline and is smaller.

but takes rest hours. Weight 140 pounds.

September 17—Weight 142 pounds. Pulse 70. No rales in chest with expiratory cough.

September 28—Weight 142½. Pulse 94.

October 8—Weight 143½ pounds. Pulse 86. Walks two miles every day.

December 3—Weight 144 pounds. Pulse 99.

December 22—Weight 144½ pounds, Pulse 60.

January 21—Weight 147 pounds. Pulse 100. Ordered to bed for three weeks.

February 18—Pulse 86.

March 18—Weight 152 pounds. Pulse 78. Walks several miles every day.

April 15—Weight 152 pounds. Pulse 88.

May 20—Weight 152 pounds. Pulse 64.

June 1—Weight 149¾ pounds (summer clothing). Pulse 88.

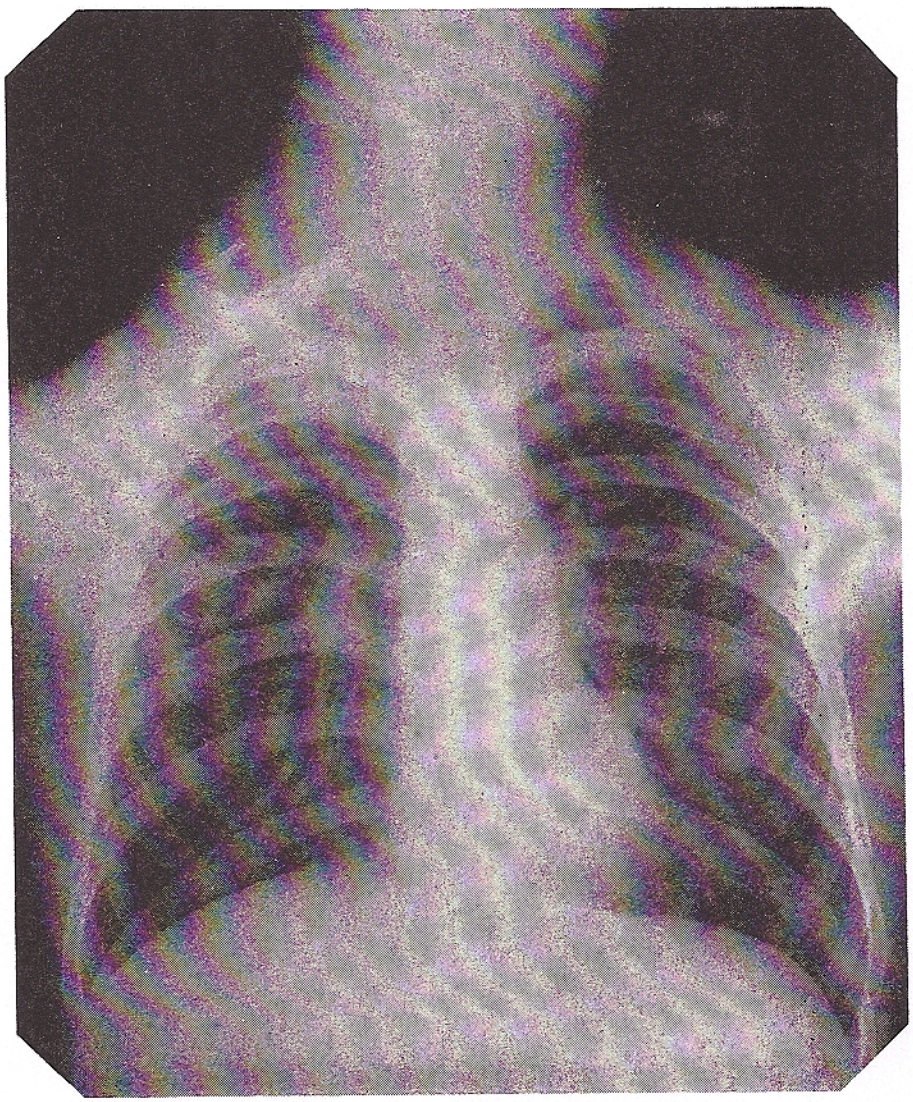
July 1—Weight 153½ pounds. Pulse 72. Playing tennis and golf for past month. Goes to dances. X-ray shows marked improvement. Advised to go to work.

October 1, 1937—Weight 161 pounds. Free from symptoms.

No. 4. Mr. C. M.
Age—20 years. Single.

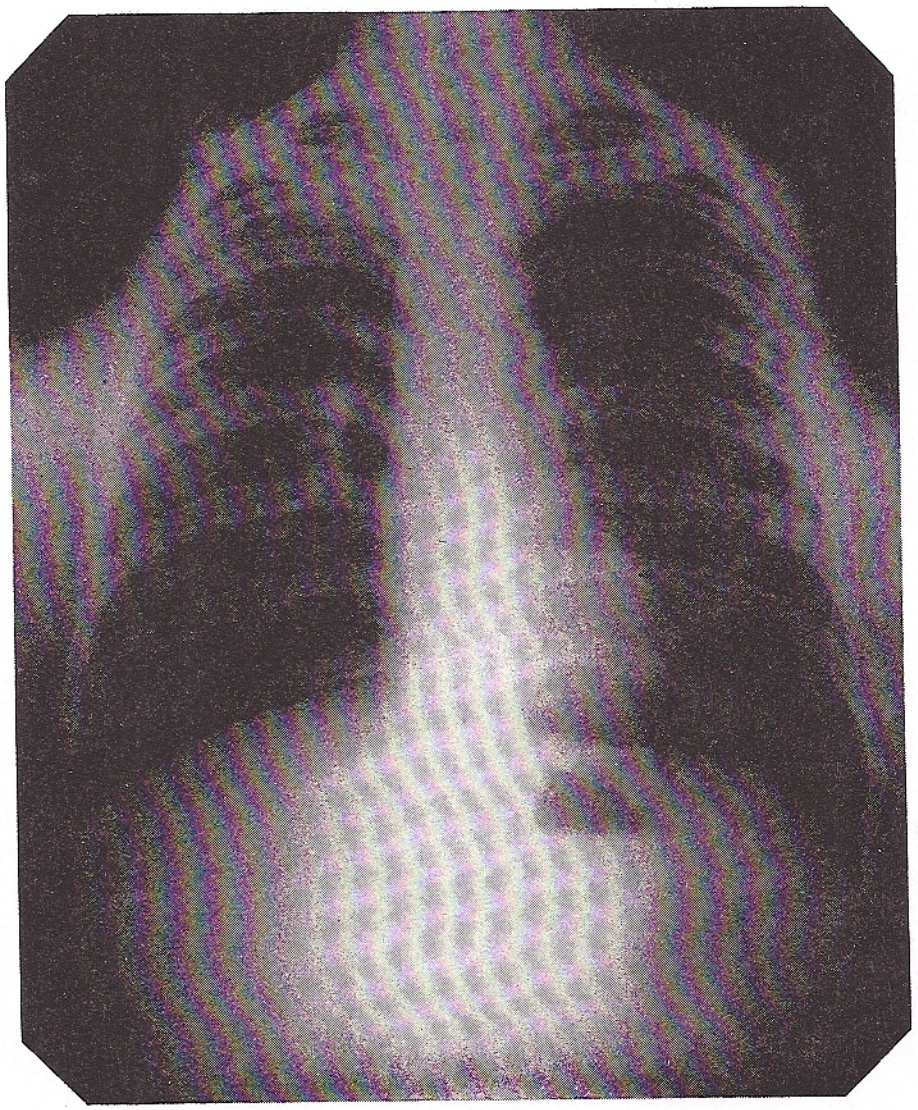
First symptoms observed were those attributed to bronchitis, coughing and raising in early part of 1934. Had been told repeatedly that his tonsils were diseased and in August, 1934 the tonsils were taken out. Soon after this operation he began having night sweats, raised blood in sputum, had dizzy spells and occasionally mild headaches. There was a rapid loss of weight at that time and he went from 127 pounds down to 118 pounds. Later with rest in bed his weight went up again to 150 pounds.

Physical examination of chest showed a slightly decreased resonance in an area two inches in diameter in the second and third left interspaces at the mid-clavicular line and in the left paravertebral space just above the angle of the scapula. There was no change in breath sounds except slightly diminished in this area with faint sibilant rales heard occasionally in this region. His weight was 141 pounds; normal



Mr. C. M. Dated January 11, 1937

The right apex is densely infiltrated and at a point opposite the second interspace about one inch to the right of the median line there is a rarefied area suggestive of cavity formation. The lung markings in the lower right lobe and the central portion of the right lung are greatly exaggerated. There are small areas of calcification in the lower right lobe and also in the hilus region of the left side. There is a circumscribed area about 3 x 5 cm. in diameter in the middle lobe which indicates an exudative lesion and the beginning of cavity formation.



Mr. C. M. Dated April 19, 1937

The comparison of this plate with the one dated four months previously shows a decided improvement in the areas of density in the right apex. The area of infiltration noted in the middle lobe on previous examination has entirely disappeared except for a small area of slightly increased density remaining in the lower central portion of this region suggesting consolidation of an abscess.

weight before illness was 127 pounds. An x-ray of chest showed an increased density in the right apex, an area of calcification and consolidation in the left hilus region corresponding to upper part of lower lobe.

Treatment with Koch Glyoxylide was given on January 12, 1937 and he was restricted to moderate activity with rest hours.

February 1—Weighed 142 pounds. Pulse was 76. No symptoms.

February 8—Weight was 145 pounds. Streaks a little in morning. Can take long walks without fatigue.

April 19—Weight was 154 pounds. Raised sputum streaked with blood during twelfth week. Walks five miles daily without fatigue.

April 26—No cough and sleeps well. Weight was 154 pounds.

September 4—Reports he has been working for past three months without symptoms.

No. 5. Mr. T. D.
Married.
Age—49 years.

Patient stated he experienced severe headaches twice a week for many years and had "sinus trouble" since 1918.

Two months ago he began coughing and after an x-ray examination he was told that there was a lot of old scar tissue. His cough persisted and on January 2, 1935, he had a severe hemorrhage. His doctor advised him to have his lung collapsed and to go away for a year.

His present weight (January 31, 1935) was 130 pounds. Normal weight was 135 pounds.

On physical examination of the chest there was an area of decreased resonance in the upper left thorax and apex. The expiratory breath sound was heard loudly in this area and there were loud rales present. These signs of a large cavity in the upper left lung were confirmed by x-ray.

Treatment was given January 31, 1935.

On February 13, 1935 he complained of chills and fever and a productive cough.

March 6, he reported he had had chills and fever for two days in the previous week. Weight had increased to 139 pounds, four pounds more than at any previous time in his life.

May 11, weight 144 pounds. Had moderate fever in ninth and twelfth weeks since treatment. States he has not had a headache since treatment.

October 23, weight 151 pounds. Had a hemorrhage in last week of July. In the 33rd week of his treatment he had a fever of 102 degrees for two days and lost five pounds. Has been doing manual labor for past four months.

June 30—Weight 156 pounds. He has been working steadily although he had a sharp fever reaction in the 48th and 60th weeks. Physical examination shows little change from original condition.

On March 25, 1937, although his general condition continued to improve and his weight had increased, while working, to 162 pounds, he was given another treatment because the x-ray showed the cavity to be still persistent. At the present time, September 15, 1937, he is working and has no symptoms of any tubercular activity, nearly three years since his first treatment.

The above cases typify the rapid uninterrupted recovery that follows the administration of Koch's Glyoxylide where there has been no previous sanatarium treatment and ill-advised collapse therapy. In Case No. 5 the recovery was somewhat more prolonged although steadily progressive for two reasons: First, the disease had been of much longer duration and more fibrotic changes had taken place in the diseased lung. Secondly, the environmental conditions were more adverse because of the fact that the patient felt compelled to earn a livelihood for his family.

The following cases demonstrated good results from the treatment but, because of the prolonged activity of the disease while receiving ordinary sanatarium care and diet and the collapse therapy they had had, there was a marked contrast in the recovery process to that of the above cases as the case records will show:

No. 6. Miss N. P.
Age—22 years.

Began complaining of loss of weight and tiring in August, 1934. An x-ray examination on August 29

showed an infiltration of the left lung and she was admitted to Herman Kiefer Sanatarium where she remained for nine months. Began taking artificial pneumothorax treatments on left side six months after admission and has been getting 500 cc. every week since then. Had a crushing operation on the right phrenic nerve. Sputum tests were repeatedly positive. She presented herself for treatment July 30, 1935. Her weight on that date was 119 pounds. Her maximum weight before her illness was 120 pounds. A year previously it had been 112 pounds.

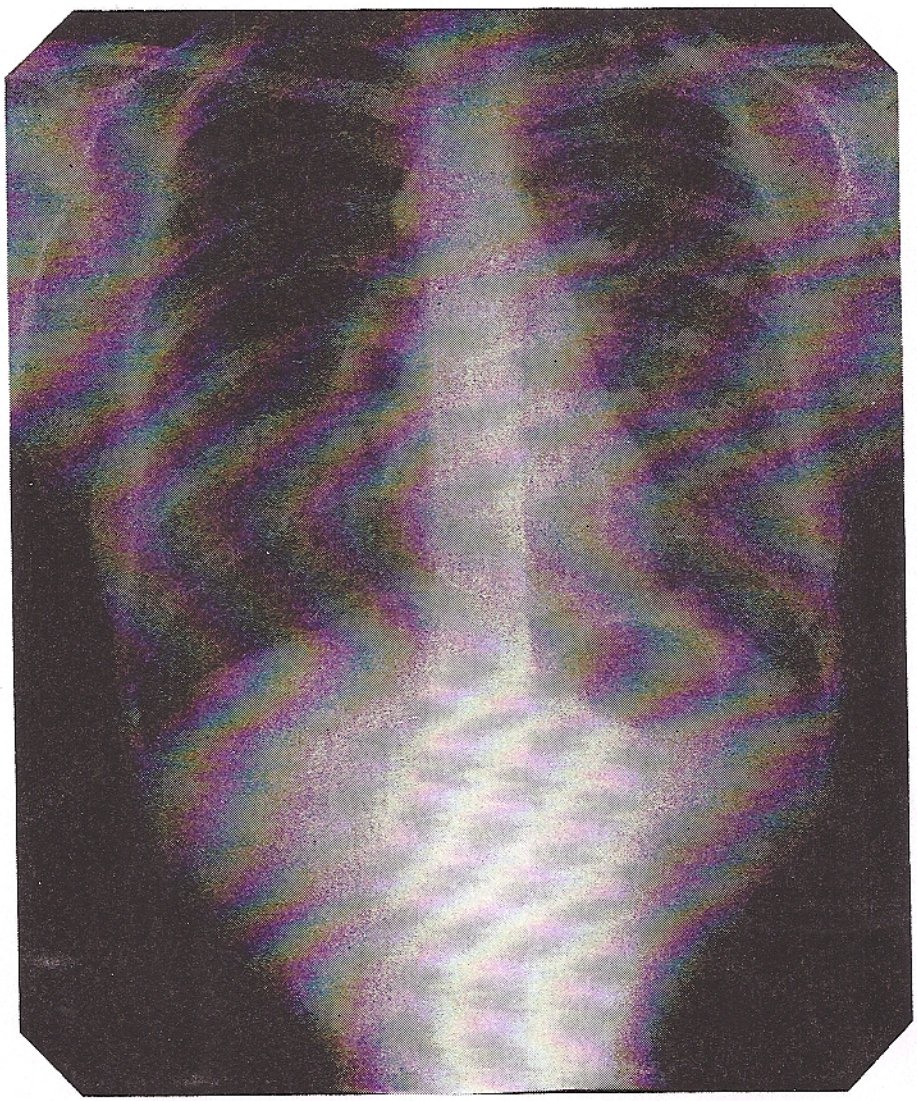
On account of the air in the left pleural cavity from her last pneumothorax treatment, no satisfactory examination could be made of the chest. There were several enlarged glands in the right side of the neck.

Treatment was given August 2, 1935.

Her cough continued and she had occasional spells of fever until the 15th week although she was confined to bed during this period. In the 15th week she had a sharp hemorrhage. Her weight at that time had decreased to 108 pounds. After the hemorrhage these symptoms subsided and by March 21 her weight had increased to 122 pounds but she still remained in bed. At this time she began to grow worse, her cough became more pronounced so that she coughed and raised a good deal at night even when given small doses of codeine. This continued and in the 36th week she had a severe chill and her temperature went to 106 degrees. She coughed frequently and raised considerable amounts of thick, blood-stained sputum. She had all the symptoms of a tubercular pneumonia. However, these symptoms began to subside in a few days and at the end of three weeks she was very much better. Improvement was rapid after that. By July sixth her weight had increased to 133 pounds. She had had no symptoms and no cough for the past two months.

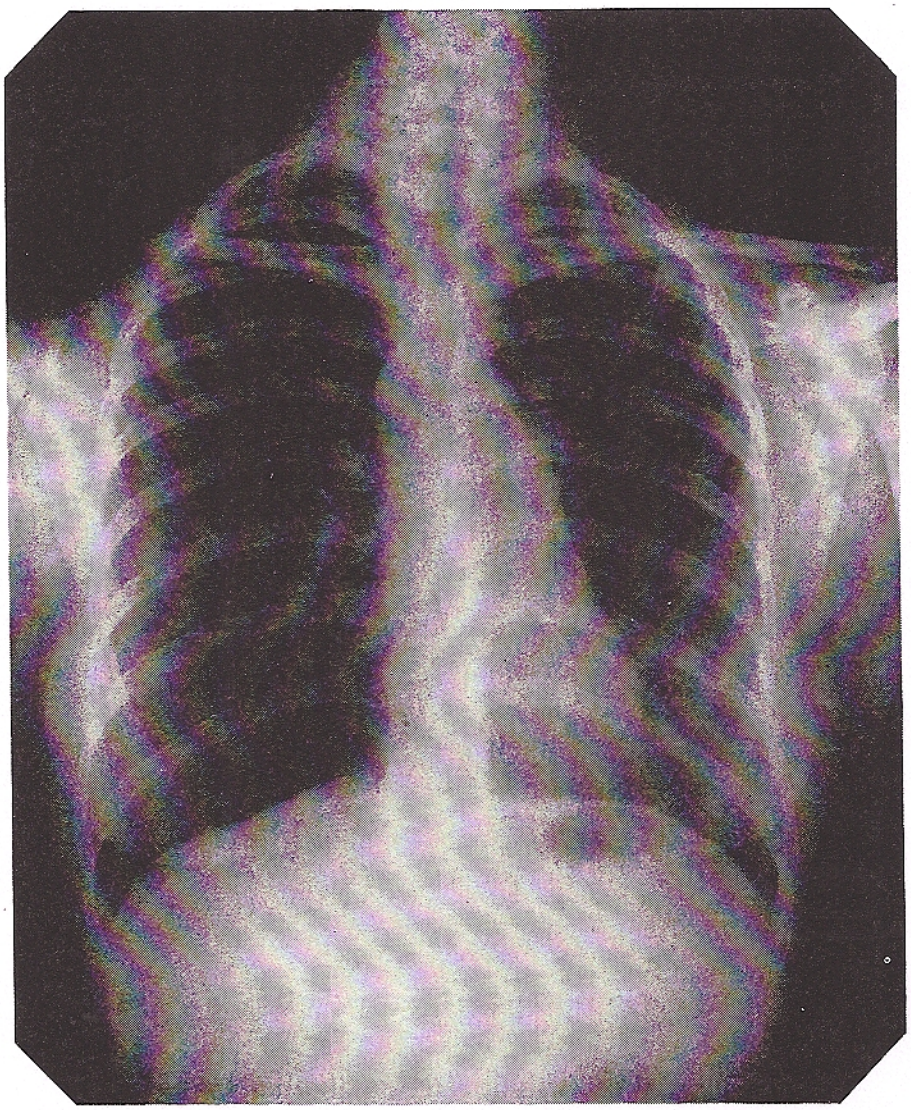
There has been no further disease activity since that date and since September 29, 1936 her weight has remained at 135 pounds, 15 pounds more than her maximum before she learned that she had tuberculosis.

In August, 1937 an x-ray examination showed a remarkable improvement in the areas of density



Miss N. P. Dated October 24, 1935

There is a circumscribed area of infiltration in the fourth and fifth interspaces just to the left of the mid-line and overlapping the left border of the cardiac shadow which has a sharp outline and is surrounded by small areas of infiltration extending in all directions principally to the lower left lobe and into the apex of the left lung.



Miss N. P. Dated July 23, 1937

The area of density observed on the previous plate has entirely disappeared and the infiltrated markings associated with it are very little in evidence on his plate. The lung markings on the lower right lobe are much less pronounced on this plate than on the previous examination. The heart shadow is smaller.

in the lungs and she successfully passed a rigid medical examination for a food handler's permit.

No. 7. Mr. A. S.

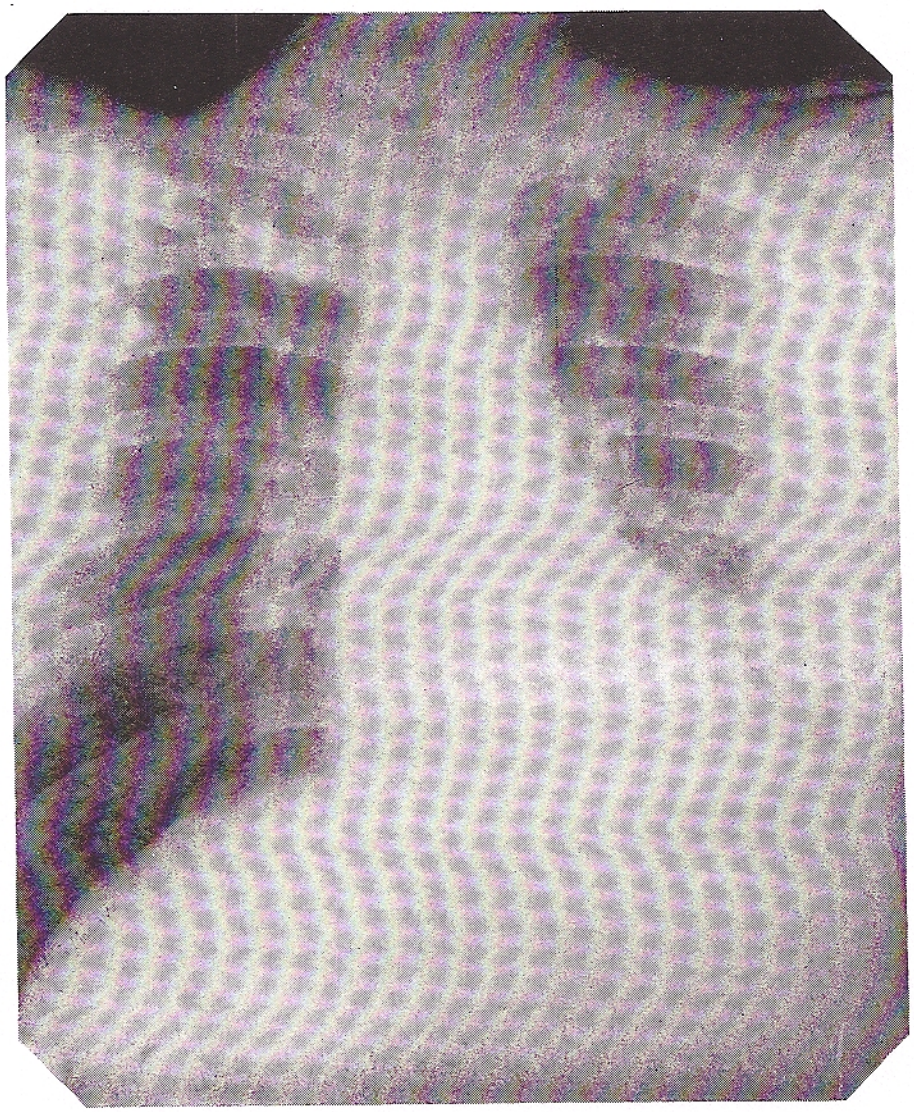
At the time he presented himself for treatment he gave a history of having been ill since February, 1935, when he had symptoms of a severe cold and developed a cough, had a slight hemorrhage, night sweat, and subsequent examination at Herman Kiefer Hospital showed a positive sputum test for tuberculosis. He was an inmate of the Herman Kiefer Sanitarium from August 21, 1935, until July 18, 1936, when he presented himself here for treatment. The physical examination of the chest on that day showed decreased resonance on the entire left side with a flat note at the eighth rib on the left side of the thorax. The breath sounds were diminished in this side and there was a coarse crackling sound at the border of the left scapula on deep inspiration and coughing with decreased expansion of the left side at thorax.

Physical examination made November 23, 1936 and on subsequent days showed normal resonance restored to left side of the chest and the breath sounds in this area normal and no rales and the only evidence of any disease in the lungs is the slight dullness at a point in the midclavicular lind just below the left clavicle.

X-ray examinations made on February 23 and May 6, 1937 show a marked improvement in the areas of density present in the x-ray made at the time he presented himself for treatment. The last x-ray made May 6 shows no evidence of any pulmonary disease except in the left apex there is an area of dense infiltration suggestive of a healed cavity.

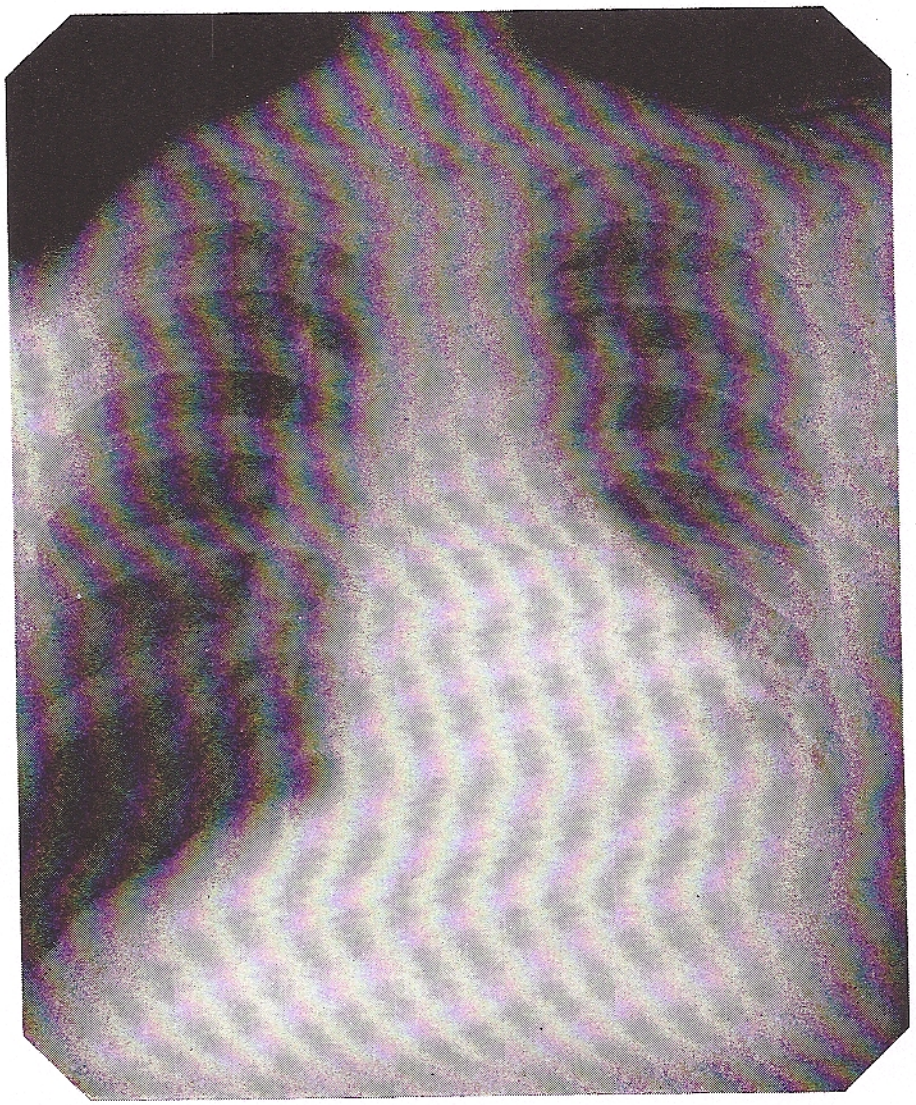
He has been employed at irregular intervals since last May without any return of symptoms and clinically I am of the opinion that the tubercular condition is definitely arrested and he should be able to carry on regular employment under suitable conditions.

In view of the history of this case and the x-ray findings, I am of the opinion that his symptoms were the result of pneumonokoniosis due to working in a smoky atmosphere complicated by a moderately advanced tuberculosis.



Mr. A. S. Dated July 20, 1936

A large well-developed male chest, symmetrical. The left costophrenic angle is obscure and considerable density continues with the cardiac shadow. There is a great deal of density in the lower hilus region in the right of the median line. The cardiac shadow is enlarged both to the right and the left. There are numerous areas of density of irregular outline throughout the entire left chest. These are of greater density in the inner portion corresponding to the third and fourth inter-spaces and the fifth rib at a point two inches to the left of the mid-line and the left apex shows considerable increase in density and areas of infiltration. The lung markings are exaggerated on both sides. There is an area of density in the right portion of the right third interspace about 2 cm. in diameter. The right apex is cloudy in its inner portion.



Mr. A. S. Dated May 6, 1937

A comparison of this plate with the previous one of July 20, 1936, shows a decrease in the size of the cardiac shadow and the apex of the shadow can now be definitely outlined at a point one and one-half inches from the outer border of the chest wall. There is still some obscurity in the left costo-phrenic angle but this can now be outlined and it is of much less density than the previous plate. The areas of density previously noted in the left chest external to the hilus shadow are less distinct and smaller. The infiltration and increased density of both sides is still somewhat in evidence but shows a decided improvement from the previous plate. It is most pronounced in the lower left lobe just external to the cardiac shadow and to a less degree in the upper right apex.

No. 8. Mr. G. S.
Age—45.

In the early part of 1935, he began to lose weight and found himself tiring easily. A physical examination at that time did not reveal any signs of tuberculosis. About August 1st he had an x-ray examination of the chest at Herman Kiefer Hospital and was admitted there for treatment with a postive sputum. During the second week in August he was given artifical pneumothorax on the right side and this was repeated every two weeks until February 29, 1936. Following this he had a right phrenectomy. Repeated sputum tests while in the hospital were positive for tuberculosis.

He left the hospital in June, 1936 and received his first treatment on the 17th of June. At that time the physical examination and x-ray showed an almost total collapse of the right lung and a large area of increased density and infiltration in the upper left lobe. The right side of the diaphragm was drawn up to about the level of the fifth interspace. There was no fever, cough nor night sweats. Patient was able to be out of bed for several hours daily. He had a rather pale complexion and his weight was 145 pounds. July 23rd his weight had increased to 158 pounds, pulse was 76, and he could walk several blocks without fatigue. On August 27th he reported a vesicular eruption had appeared on his right hand and his face on the 24th of July which all disappeared in three days. At the same time he complained of a pain and lameness in the right shoulder which was of such a degree that he could not draw his coat on. These symptoms have entirely disappeared. Physical examination reveals the chest free from rales. Pulse 72.

On May 26, 1937, he reported he had expectorated one-half ounce of blood three days previously and had a slight fever and sweat for one night; this was in the 48th week after his treatment. His leucocytic count was 19,650. October 11, 1937, patient weighs 165 pounds. He has been working irregularly and has put in long hours at his business on some days. During the past week he has felt nervous and shaky and now has a voracious appetite. Examination of the chest reveals sub-crepitant rales in the upper left thorax on expiratory cough, none on quiet breathing

The breath sounds are diminished in the right axilla and no expiratory breathing is heard in this area. The liver dullness is at the seventh rib in the right mid-axillary line.

An x-ray, taken previously in February, showed the right lung fully expanded and considerable improvement in the areas of density and the shape of the chest as compared to one taken at the time he had his treatment. While we cannot consider this case as cured nor even fully arrested, it is evident that there has been a great gain in the physical condition, and there is a decided tendency toward healing and ultimate recovery in spite of many unfavorable conditions and the downward course during the previous year while he was undergoing collapse therapy in the sanatarium.

The author received the following report on June 29, 1936, from a patient treated by Dr. Wm. F. Koch, October 13, 1931. It demonstrates not only an immediate and decisive change in the course of the disease following a serious and prolonged recurrence of an earlier infection but it also illustrates the permanency of the recovery. At the present date November 1, 1937, she continues to do her housework.

Mrs. N. C.
Age—40.

In 1926 went to sanitarium in September and left September, 1927. Had whooping-cough and developed pain in side and coughed blood. Aspirated three pints of fluid. Had lost weight and went down to 89 pounds and was 125 pounds when dismissed as arrested. Felt well for three years until pregnancy occurred and cough developed in fourth month with kidney infection. No tuberculosis found in kidney. Cough grew worse and after delivery lost 30 pounds. Sputum was postive. Weight three weeks after delivery was 95 pounds; afternoon temperature of 102. Went to sanitarium and tried pneumos and had left phrenic just before leaving. Improved with rest and weighed 150 pounds when leaving but still ran a slight afternoon temperature and pulse of 135. Too weak to get around. Came to Detroit, October, 1930, and began to improve within two weeks and after three weeks was doing housework. Temperature became normal and pulse was normal at end of month. Had chills and fever and too sick to work for three or four

days during twelfth week. Took second treatment a year later and had nervous spells of depression during reactions.

The following letter is especially interesting as it represents a physician's personal experience and a rather unusual circumstance of a doctor taking his own medicine. The significance of this letter may be appreciated by the fact, as the letter states, that the treatment was given in 1930 to a patient who showed every evidence of being in the last stages of tuberculosis and who today, in 1937 in spite of his advanced age, is busily and happily engaged in an active practice:

March 16, 1934.

Koch Cancer Foundation
7835 East Jefferson Avenue
Detroit, Michigan.
Gentlemen:

I am glad to comply with your request for a brief report of my own case of pulmonary tuberculosis.

On May 3rd, 1930, my physical examination determined dullness over the apices of both lungs, dullness in the middle of left lung, moist rales throughout both lungs and a probable cavity in right lung below third rib. Sputum contained 12 to 15 tubercle bacilli per field. Temperature 102, pulse 100.

X-ray showed density of both apices and middle of left lung. A cavity 2½ inches in diameter in right lung and fibrosis and general acid fast involvement of both lungs.

I remained in bed from May 3rd to July 1st, 1930. About May 15th Koch Cancer Antitoxin was administered. Three weeks later there was an increased amount of sputum containing many disintegrating tubercle bacilli undergoing phagocytosis. Since July 1st, 1930, there have been no tubercle bacilli found and my health has been good.

An x-ray taken in October, 1931 showed no evidence of any cavity and the lungs appeared clear and normal throughout except for a small amount of fibrosis that might be expected to be found in a person of my age.

I have continued to enjoy good health and have been engaged continually in the active practice of medicine, and I believe that my complete and prompt recovery was due to the one dose of Koch Cancer Antitoxin, prescribed diet, and correct living.

My use of Koch Cancer Antitoxin during several years before using it in my own case was confined to the treatment of inoperable cases of pronounced fatal cancer, and the treatment resulted in recovery of more than half of the cases treated.

My intimate observation of the use of Koch Cancer Antitoxin during nine years in the treatment of cancer, tuberculosis, and related disease conditions my knowledge of recoveries resulting from its use and my personal experience in using it successfully compel me to have confidence in its remedial value.

Sincerely yours,
Wm. R. Lyon, M. D.

The following is an unsolicited statement from a doctor in Texas.

Dr. B's Patient

Patient—Mrs. D. B.
Age—32.

Heredity: Nothing special.

Previous Illness: Childhood diseases, as measles, whooping-cough, etc.

Pregrowth Symptoms: None.

Present Illness: Easy to fatigue for three or four years. Seven months ago began running temperature; from 99 to 100. Had to quit work. Has not worked since.

Physical Findings: Infected tonsils. X-ray shows extensive involvement of both lungs. All involvements walled off by calcium deposits. No open points. No cough; expectoration.

Specimen: Tonsils removed December 11, 1936—tubercular.

Diagnosis: Tuberculosis.

Vitality, Ability to Get Around: Able to be up most of the time.

Hemoglobin: 60%.

Condition of Kidneys: Negative.

10-4-37.

We received the following letter Oct. 4, 1937 concerning this patient, less than 10 months after treatment administered Jan. 11, 1937.

Dear Dr. Koch
Detroit, Michigan.

I will make a report on the tuberculosis case of Mrs. D. B.

I have had X-ray pictures made of her lungs about every three months. There was steady improvement from one period to another. The last one was made September 17, 1937 and shows the lung to be entirely clear of all scars and signs of tuberculosis. She feels and looks to be A-1 health. She has been walking three miles a day for exercise and feels no ill effects from it.

The pictures have been made by the technician of the LaGrange Hospital and read by the chief of the staff. He pronounced the lung entirely clear and said there is no need to make any more. That she could go home and forget she ever had tuberculosis.

She and I both feel proud of the results.

Any comments or advice from you will be appreciated.

Fraternally,
M. D.

We are indebted to Dr. M. S. Lane of Buffalo, N. Y., for this excellent report of his experience with a chronic and advanced case.

Mrs. I. M.

I first came in touch with Mrs. I. M., July, 1931, when I removed her tonsils, which were badly infected. It was then that I got her history of pulmonary tuberculosis and that she had been in the tuberculosis sanitarium at Perrysburg, New York, since early in 1928. Tuberculosis of the lungs developed or showed up shortly after the birth of her baby. Mrs. M. remained in the sanitarium, until she consulted me, with apparently little or no improvement. The X-ray report of July, 1931, was the first I had and is appended but others were taken in the institution and I had no chance to review them.

The patient is six feet tall and weighed then less than 96 pounds on coming to me. She apparently improved physically after the tonsil treatment for about one year, but gained no weight. I had another X-ray taken by the clinic (State) on November 9, 1934, (No. 2 Report) and this showed an advancement of the disease and at this time her general physical condition was not much and she was now down to 90 pounds in weight.

January 8, 1935, she received the first treatment of Dr.

Koch's Glyoxylide and after the usual reactions, which were all mild, she steadily improved and began taking on weight, about ½ pound per month, so that by April, 19th she weighed 100½ pounds. This was maintained up to July 22nd when her weight was 103 lbs.

No. 3 chest clinic report was the first to be taken after the treatment, but I had examined her in August and she had gone through the very hot weather, perspiring very freely and had lost 3 pounds, but by October 10th had recovered to 104 pounds and was apparently in good condition, but in November, 1936 I had another X-ray examination. (Which is appended, Marked No. 3).

November 23, 1936, she was given her second injection and has steadily improved since then and now holds her weight around 107 pounds.

October 18, 1937, I gave her a physical examination and her lungs seem to be all O. K., but am waiting the report from the clinic of the last X-ray report.

Physically she is fit and looks it. Eyes and complexion clear and vivid and she wants to know when she can go back to work. M. S. L.

Report No. 1 from State Tuberculosis Clinic.

The following is a report of the examination of Mrs. I. M. who was referred by you to the consultation clinic for diseases of the lungs conducted by the New York State Department of Health at Hamburg on May 1, 1931.

Physical findings: Right Lung: Find rales above 4th rib and 9th Dorsal spine. Left Lung: Fine rales above 4th rib and 6th Dorsal spine.

X-ray interpretation: Changes above the 4th rib on both sides indicative of tuberculosis.

Diagnosis: Chronic pulmonary tuberculosis, moderately advanced.

Recommendations: Recommend that patient continue under the care of the family physician, for appropriate treatment. Sputum, when present, should be examined for tubercle bacilli, the usual precautionary measures should be observed and all contacts should be examined.

Report No. 2.

The following is a report of the examination of Mrs. I M. who was referred by you to the consultation clinic for diseases of the lungs conducted by the New York State

Department of Health at Hamburg on November 1, 1934.

Physical findings: Right Lung: After cough, medium to coarse rales above 4th rib and throughout posteriorly, diminishing downward. Left Lung: After cough, medium to coarse rales above 4th rib and 6th spine.

X-ray enterpretation: There are moderately discrete changes above the 6th rib on the right side and the 4th rib on the left side indicative of tuberculosis. These changes above the level of the 1st rib on both sides show evidence of honeycombing which may be due to small multiolocular cavity formation.

Diagnosis: Pulmonary tuberculosis — advanced.

Recommendations: Present x-ray as compared with that of October, 1932, shows a slight spread in the right middle lobe. Her general condition is not very satisfactory. She should continue under close medical supervision for appropriate advice and therapy which should be the equivalent of a sanatorium regime. Additional sanatorium care might be preferable. Precautionary measures should be strictly observed, sputum should be examined frequently and repeatedly for tubercle bacilli and lungs checked up frequently. All contacts should be examined.

Report No. 3.

The following is a report of a patient, Mrs. I. M., whom you referred to us, and who was examined at our Clinic held at Hamburg on October 23, 1936.

Physical Findings: Was in Perrysburg in 1930. At present she feels well, no cough; does not raise. No symptoms. Impaired breathing with moderate number of rales in the upper third of right lung and also in the left.

X-ray Interpretation: Involvement of the upper half of right lung with some cavitation in the apex on the right side. On the left side, involvement of the upper third with honeycombed condition in the left apex. The X-ray taken now shows definite improvement over that taken June, 1928.

Diagnosis: Pulmonary tuberculosis II, quiescent.

Recommendations: Continue under medical supervision.

Mention should be made of the group of twenty-five cases reported last year in Dr. Koch's book on Natural Immunity. With the exception of one, treated on May 13, 1935, all of these received their initial treatment with Koch's Glyoxylide more than three years ago. Twelve of these were gainfully

employed at the time this original report was published in 1936. Since then four more have found employment and continue free from symptoms. Another has married and our last information was that she was doing her housework and the original improvement has continued. One patient after a long period of hard work and living under very trying circumstances including a death in the family had a relapse or a reinfection from which she is now recovering.

Patient No. 2, Mr. S. H., deserves special attention. Present illness began with pleurisy pains in the autumn of 1929. During the following year he lost ten pounds in weight and in December, 1930, an x-ray examination after a slight hemorrhage from the lungs showed a cavity in the right apex. He began to take artificial pneumothorax treatments at that time and continued them for fourteen months when he was given a right phrenicectomy.

He entered the Herman Kiefer Hospital in January, 1933, and resumed pneumothorax treatments.

October, 1933, he was sent to Maybury Sanitarium where he was told he had a "lot of involvement with an open cavity not responding to pneumos" and recommended first stage thoracoplasty which he refused. He continued the pneumos which Dr. Smith said were doing him no good. During this period he was a sanitarium bed patient, had a hemorrhage in December, 1933, which lasted for three days and had occasional bloody streaked sputum at various times during his stay at these sanitariums.

Treatment given was Koch Glyoxylide on February 9, 1934. At that time he weighed 186 pounds, although his normal weight before symptoms developed was 165.

There was little change in his condition until April 5, 1935, when he received another treatment of Koch's Glyoxylide following a previous hemorrhage from the upper bowel and the development of a dental abscess. The abscessed tooth was extracted three weeks after the hemorrhage from the bowel had subsided. He continued to have recurrences of epigastric pain and digestive disturbances suggestive of duodenal ulcer and his weight declined until in September, 1936, he weighed 164 pounds. September 30, he had another treatment and this digestive disorder gradually improved. He gained strength and the occasional spells of chills and fever were less pronounced and of shorter duration until in August, 1936, he was able to do light work.

Following his treatment in July of this year there has been a complete disappearance of his previous symptoms. He is

actively at work and his weight remains steadily around 170 pounds.

The contrast between the patient's present condition and the gloomy outlook that his case presented at the time he received his first treatment is one of the most gratifying experiences we have encountered in this work. The total lack of progress and ineffectiveness of the collapse therapy during a period of three years certainly augured ill for an ultimate recovery. The seriousness of the lung lesion in itself presented a formidable situation to say nothing about the complications of the alveolar abscess and duodenal ulcer. The fact that the tuberculosis, the suppuration of the jaw, the grave infectious lesion in the upper bowel all yielded simultaneously and decisively with the improved chemistry brought about by the administration of the Glyoxylide solution demonstrates in a most striking fashion the fundamental importance of this catalytic agent in the natural defense of the body against disease.

Patient—Mr. M. F.

Duration of Disease	Possibly since 1915. Positive diagnosis 1928. Confined to sanitariums for seven years—1928-1935.
Principal Symptoms	Repeated and frequent asthmatic attacks over a period of years. Had the right phrenic nerve cut to paralyze the diaphragm in an attempt to collapse the cavities on that side, and was advised to have a thoracoplasty. Adhesions prevented pneumos. Weight 160 pounds.
X-ray	Cavity 5 x 6 cm. right middle lung.
Operation	Permanent right phrenic.
Date of treatment	January 13, 1935.
Present condition November 30, 1937	At date of treatment his lips were cyanotic and there was difficulty in breathing on the slightest exertion. He continued to have attacks of asthma, lasting several hours, about every third week during the reactions to his treatment until the twenty-seventh week when he had a febrile reaction, and since then there has been no return of the asthma except for occasional spells of difficult breathing with change of weather during reaction periods, but not such as to cause any serious discomfort or necessitate confinement to bed as they formerly did. He received his second treatment on November 1, 1935, following the forty-second week and has continued to show a steady improvement and gain in strength and vigor since then. This patient was recently given an examination at the Herman Kiefer Hospital and was informed his condition had improved so markedly that he could go to work.

SUMMARY

An examination of public health records and the results of various surveys demonstrates that the large majority of adults in civilized countries have acquired a high degree of immunity to tuberculosis. It appears that the ability to survive infection with tuberculosis and to acquire immunity to it is present in a larger percentage of individuals born in highly congested centers of population than in those from rural communities. This kind of natural immunity is increasing with succeeding generations and accounts for the falling death rate from tuberculosis. The most cursory inspection of the epidemiological characteristics of tuberculosis indicates that this increasing proportion of individuals with high natural immunity in modern times is really responsible for the declining death rate rather than restrictive measures and so-called tuberculosis prevention.

Recently, we have seen some hysterical newspaper agitation for the forcible segregation of all active cases of tuberculosis in sanitariums. The economic difficulties in the way of this are in themselves not inconsiderable. Assuming 100,000 deaths from tuberculosis annually in this country, we can safely estimate the number of active cases as no less than 500,000. There are available about 75,000 beds in tuberculosis sanatariums of the country at an average construction cost of over $3,000 per bed. The minimum maintenance cost is $30.00 per week for each patient or $1560 a year. It is plain, that with less than one out of five at the least estimate of active cases now segregated, this isolation of such a small group can hardly have any influence on the spread of the disease. Those who advocate saddling such an enormous taxation burden on the financial structure of a nation already strained to nearly the point of catastrophe, would do well to analyze the present situation more clearly.

Natural immunity is highest in early childhood and declines after maturity. Any measure or circumstance that influences the oxygen exchange in the body will cause a corresponding change in the degree of natural immunity the individual enjoys.

As a result of his study of the chemistry by which these oxidation processes take place, Dr. Wm. F. Koch found certain compounds of the carbonyl group, characterized by a double unsaturated carbon link, were highly essential to

the ability of the cells of the body to resist and destroy toxic substances and microbes. It was found that the injection of a very small quantity of these compounds frequently restored the natural immunity to such a high degree of effectiveness that it was possible to bring about complete recovery from cancer by this means.

A comparison of the course or pathogenesis of tuberculosis and cancer, as well as the various characteristics of the two diseases and the circumstances favoring their presence, reveals many similarities pointing to a common cause. The good results that follow the treatment of pulmonary tuberculosis with Koch's Glyoxylide bears out these observations.

Of a series of 87 unselected cases of advanced tuberculosis of the lungs, treated over a period of two years, 17 have recovered sufficiently to carry on gainful occupations without return of symptoms. Sixteen or twenty-two per cent of the worse cases died as compared to the usual immediate sanatarium mortality of forty per cent. As a matter of fact the comparison of the twenty-two per cent mortality of this group with the average mortality of all sanitarium cases is hardly a fair description of the results that have been accomplished. A recent review, which appeared in the November 6, 1937, issue of the Journal of the American Medical Association on this subject of the mortality rate of the advanced cases of tuberculosis, presents an entirely different picture than the average mortality rate of forty per cent would indicate. This review refers among others to a study of 1454 cases of pulmonary tuberculosis of demonstrable cavitation published by H. L. and Lena R. P. Barnes (Am. Rev. Tuberc. 18:412 (Oct.) 1928.) "Eighty per cent of these patients were dead within a year from the time they were first seen, 85 per cent within three years, 90 per cent within five years and 95 per cent within fifteen years." If this describes the usual course of such cases of tuberculosis then the conclusion is inescapable that the treatment of these cases in our experience has had a profound influence on the course of the disease and that the great majority of these patients would now be dead if the ordinary conventional treatment had been used. None of the more favorable cases became worse under treatment. Those cases that received this treatment shortly after the presence of active tuberculosis

infection was first discovered, became free from symptoms in a much shorter time and showed more decided improvement than those who had had previous sanatarium treatment and collapse therapy. A number of case histories are given to prove this contention.

A few cases treated a number of years previous to this series are described to show the positive and permanent character of the recovery after treatment with Glyoxylide.