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Author

REASONS FOR BELIEVING

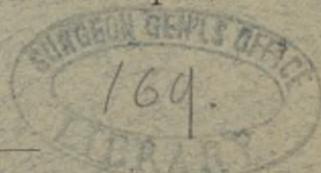
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CONTAGIOUSNESS

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By W. H. WEBB, M. D., Philadelphia.



—[Read before the Philadelphia County Medical Society, June 11, 1884.]—

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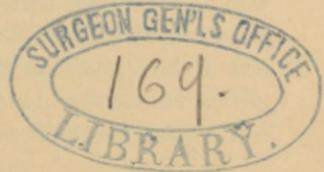
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REASONS FOR BELIEVING IN THE CONTAGIOUS- NESS OF PHTHISIS.

BY W. H. WEBB, M. D.

THE germ theory of disease is by no means a new theory. One of its earliest advocates was Athanasius Kircher, a learned German Jesuit, who lived in the early part of the seventeenth century; and about the same time lived Robert Boyle, an eminent Irish philosopher, who believed in the truth of this theory. The renowned Linnæus, the father of botany, was not only an ardent investigator of its claims, but published several memoirs in its support. In the latter part of the last century it had such supporters as Sir John Pringle and Dr. Wm. Farr, and in the early part of the present century it had such advocates as Sir Henry Holland, Schonlein, Cagniard de la Tour, Schultze and many others.

To the illustrious Pasteur, however, belongs the distinction of having done more than any of his predecessors to develop this intensely interesting and important subject, and of presenting its truths in such a way that they have become of immense practical use to mankind. His indefatigable labors, the ingenuity and exactness with which he pursued his investigations, the practical demonstrations he has given of the utility of the truths he has discovered, are well known to men of science. This special field of investigation is now occupied by many able and accurate observers and as a result of their labors the present generation may witness an epoch in the history of medicine, startling in its brilliancy of grand achievements in subjugating disease; when men shall hold in their hands effective weapons and be enabled to erect impassable barriers before those destructive scourges—cholera, yellow fever and tubercular phthisis. But two years ago

the medical profession was startled by the announcement made by Robert Koch,* of Berlin, that, "Tuberculosis is a specific infectious disease, caused by a specific micro-organism, the bacillus tuberculosis, which constitutes, in fact, the tubercle virus." Truly, since the time of the immortal Jenner we have not had such a remarkable statement, nor one so weighty in its import! There is no reason to wonder why medical and other scientific bodies, the world over, have this subject so frequently under consideration.

The work of Dr. Formad, of this city, as well as the work of all other investigators in this field of research, has seemed to confirm the statements of Prof. Koch. There is nothing more seductive than speculation regarding the outcome of their future labors, of the truths which shall belong to those who will follow us, and of the beneficent power these truths shall arm them with.

But it is only hard and intelligent work that can make this future a reality, and I am persuaded that the frequent discussions by our Society, of points connected with the study of germs as a cause of disease, will do much good by stimulating the efforts of those members who are engaged in such investigations, and by enabling others who are interested in this work to make suggestions or offer criticisms that may be of some advantage to them.

In my paper this evening, I purpose to limit myself to answering in the affirmative, a question of great practical importance propounded by Dr. Formad in his recent paper, namely:—"Is Consumption Contagious?" Dr. Formad is disposed to answer it in the negative and offers to you the names of a number of eminent physicians who apparently lend strength to his doubts concerning its contagiousness. For a number of years I have carefully studied this disease, and as a result of my observations I am firmly convinced that it is contagious. Indeed, the contagious character of the disease is generally believed in, and is taught by the most able and experienced clinicians of our day.

When a disease is unusually prevalent, it is very natural to suppose that it may be due to contagion or infection. Think, for a moment, of the ravages from tubercular phthisis. It exists in

* Die Etiologie der Tuberculose. Berliner Klin. Wochenschrift, 1882, No. 15.

all climates; it affects all classes of people; it respects neither age nor sex. It claims about twenty per cent. of the death-rate of the civilized world. The mortuary lists of our own city show a percentage in its favor amounting to about fifteen and a half, and the native population of those latitudes most frequented by consumptives succumb to this dire disorder as frequently as people do elsewhere! except, perhaps, Colorado. Is this to be accounted for by heredity or pre-existing lung trouble? If the disease was due to inheritance alone it would have become obliterated generations ago by a species of natural extinction, but the disease is increasing in a greater ratio than the increase of population, which shows that the disease *must be acquired afresh*.

Dr. Formad, in his valuable paper, makes the statement that, "According to the observations of the most prominent clinicians who have paid special attention to this matter, there is not a single authenticated case of tuberculosis as a result of contagion on record." This assertion is not tenable, since cases are recorded by C. B. Coventry,¹ S. G. Morton,² Daniel Drake,³ Tauchard,⁴ H. G. Bowditch,⁵ Vialettes,⁶ Beregeret,⁷ Hardy,⁸ Seux,⁹ Condie,¹⁰ L. Tait,¹¹ Stevens,¹² Bernard,¹³ Chamontin,¹⁴ Herman Weber,¹⁵ Flint, Sr.,¹⁶ Holden,¹⁷ Reich,¹⁸ Da Costa,¹⁹ Booth,²⁰ Bryhn,²¹ and many others. Is this not sufficient evidence that such cases are recorded?

1. U. S. Med. and Surg. Journal, New York, 1835, p. 392.
2. Illustrations of Pulmonary Consumption, Phila., 1837, p. 80.
3. Principal Diseases of the Int. Val. of N. A., Phila., 1854, p. 915.
4. These de Paris, 1860, p. 37.
5. Boston Med. and Surg. Journal, 1884, p. 329.
6. These de Montpellier, 1866, N^o. 44.
7. Annales d' Hygiene et de Medicine l'egale, 1867.
8. Bulletins de Academie de Med., 1868, p. 348.
9. La Marseille Medical, 1869, No 4, p. 310.
10. Am. Journ. of the Med. Sci., July, 1871.
11. Ibid., Oct., 1871.
12. Boston Med. and Surg. Journ., 1872, p. 168.
13. These de Montpellier, 1872, No. 46.
14. Ibid., 1874, No. 22.
15. Clinical Societies Trans. London, 1874, vol. viii, p. 144.
16. On Phthisis, Phila., 1875, p. 419.
17. Am. Journ. of the Med. Sci., July, 1878, p. 145.
18. Reynolds' System of Med. Am. Ed., 1880, vol. ii, p. 117.
19. Am. Journ. of the Med. Sci., April, 1878.
20. Trans. of Southern Ill. Med. Assoc., 1879.
21. London Med. Record, 1880.

The fact that some of these names are better known than others, does not militate against the honesty and care exercised by the less distinguished observers and their deductions, and are justly entitled to a fair consideration. Obscurity does not, by any means, imply ignorance, lack of ability and keen perception.

Dr. Formad also asserts that, "Among scores of experienced men who deny thus the contagiousness of tuberculosis, it is sufficient to mention the names of Virchow, Recklinghausen and Stricker, in Germany; Gull, William Watson, Paget, Humphrye and Richardson, in England; Bennet, in France, and Hiram Corson and Trail Green in our midst—all men of close observation, with ripe experience extending over from thirty to fifty years." I also take exception to this statement, for Drs. Corson, Bennet, and probably many others mentioned in Dr. Formad's list, if heard from to-day, would not subscribe to this declaration, which finds fewer supporters than one might imagine to be the case. Some time ago I received a letter from Dr. Corson, in which he said: "Long since I advised my patrons not to have young daughters, who were compelled to wait on a consumptive mother, sleeping in the same room with the patient." This certainly shows that while Dr. Corson may not be a thorough convert to the contagion theory, yet he thinks it prudent to resort to preventive measures, by securing as much separation as possible of the well from the phthisical individual. And Dr. Bennet, who is also quoted by Dr. Formad, records the following typical case of contagion in his work :*

"A strong, healthy, well-made husband, age 27, with no hereditary or constitutional taint or weakness, came over from Australia—a four months' journey—in the same cabin as his wife, who was in the last stage of suppurative phthisis. She died soon after her arrival in England, and he came to Mentone that winter a confirmed consumptive, dying himself subsequently. He was perfectly well when he stepped on board of the vessel at Australia; but in a small confined cabin breathed for months an atmosphere loaded with pus particles thrown out of the suppurating cavities of his wife's lungs, possibly to his destruction."

After referring to the inoculating experiments of Buhl, at Munich, he makes the following statement.—"But in the face of

* On the Treatment of Pulmonary Consumption, Phila., 1879, p. 51.

the results that these researches have brought to light, *it seems to me impossible to deny that it may be communicated to the healthy by breathing constantly air saturated with the purulent secretions of advanced phthisis.* This is an all-powerful argument [I am still quoting Bennet] for the free ventilation of rooms occupied by the consumptive, for the sake of those who attend them and live with them, as well as for their own. In a confined atmosphere they probably poison themselves by their own fœtid breath, and extend disease to the healthy regions of the lungs."* Can this be used to confirm the belief of Dr. Bennet in the non-contagiousness of phthisis, or is it evidence in support of the position I take? This is but one of many similar cases quoted by various authors, who are scarcely willing to commit themselves while the evidence is so striking, that they, like Dr. Bennet, feel constrained to express the possibility of a contagious element in their causation.

"Whatever has happened, is capable of happening again; the only question relates to the condition under which it happens,"† and what are the conditions under the present circumstances? This is exemplified in the following case, very similar to the one narrated by Dr. Bennet :

"A lady, about 30 years of age, the wife of an officer in the army, left Calcutta with her husband to go by sea to Southampton. At the time of leaving Calcutta *she was in robust health*, whilst he was in an advanced stage of consumption. They had a single close cabin, and she performed all the duties of a nurse for her husband. The weather was stormy, and the hatches were more than once battened down. The husband died off the Cape, and was buried at sea. About three days later the lady arrived at Southampton. I was called to see her professionally. I found her with both lungs stuffed with tubercles; and she died in about six weeks afterwards. The painful duty was cast upon me of acquainting her with her condition, which I did, when she said 'Impossible; I was never better in my life than when I stepped on board at Calcutta.' I knew the lady well, and all her family, and there was no hereditary predisposition. In this case, all the necessary conditions for the propagation of the disease were fulfilled; *a high-temperature* in a close ill-ventilated cabin, where the ex-

* Ibid, p. 53. Italics mine.

† J. S. Mill, System of Logic, 9th Ed. London, 1872, vol. 2, p. 144.

halations from the diseased lungs were inhaled by the sound lung, with the well-nigh inevitable result I have described." *

Were these the only cases we would think our point sustained. There are, however, but few physicians in our large cities who cannot recall cases in which they would rather commit themselves to a belief in the contagiousness of consumption than to ascribe its cause to anything else.

The following cases, due to contagion, have been communicated to the writer and are worthy of record :—

Dr. J. Solis Cohen has kindly furnished me with following case :—

"More than ten years ago Dr. H. of this city, sent me a young female from the country in advanced phthisis, much emaciated, with aphonia from pressure of consolidated apex on right recurrent nerve. I gave her little encouragement and sent her home with some general instructions. Some two years later she called on me asking me if I remembered the last words I said to her ; I did not, but she repeated them, 'Your best chance is to take cod-liver oil, live on it if you can, eat it with your bread, with anything.' She went home much depressed, became bed-ridden for a number of weeks. She subsequently married, her husband acquired phthisis and died of it, and she was still living three or four years ago with consolidated apices and cicatrized cavities."

Juan B. Mears, of Monterey, Mexico, communicates to my friend, Dr. A. C. W. Beecher, of this city, the following case :—

"A woman, suffering from the last stages of consumption, who some year or two before had adopted a girl. The latter's mother, Mrs. H., questioned me about the safety of letting her daughter remain with the afflicted person. I examined the girl and found her strong and healthy, tall and well developed for her age (about 16 or 17 years old), without any hereditary predisposition, I told her that I feared no danger to the daughter if she would only take some ordinary hygienic precaution. Well, the old lady died, and a few months afterwards Mrs. H. brought the girl to me, already with an as acute phthisis as I ever saw, and she died too. Questioning them about the case, they attributed the malady to the companionship of the old woman ; they slept in the same bed, ate from the same dishes, breathed the same air, infected probably by the phthisical debris. I must add that the people here believe in the actual contagiousness of phthisis."

The following case occurred in my own practice, and is also worthy of record :—

* Brit. Med. Journal, 1883, vol. 1, p. 21.

October 7, 1880, I was requested to attend professionally Mr. H. F., aged 52 years, who had been ill for one year with phthisis. He died September 23, 1881. During all of Mr. F.'s illness he was most carefully nursed by his wife, who occupied the same room constantly; she contracted phthisis, and died August 3, 1882, aged 50 years. Mrs. F.'s mother died twenty years previously of phthisis, her father died at the age of 56 of cancer.

I may be permitted, in view of the few eminent names offered by Dr. Formad in support of his theory, to mention the names of a number of men of equal practical experience in medicine, who have recorded their belief in the contagiousness of the disease:—Aristotle,¹ Galen,² Riveris,³ R. Morton,⁴ Baume,⁵ Cullen,⁶ Herberden,⁷ Darwin,⁸ Coventry,⁹ S. G. Morton,¹⁰ Bright and Addison,¹¹ Dunglison,¹² Andral,¹³ Drake,¹⁴ Sir T. Watson,¹⁵ Copeland,¹⁶ Dickson,¹⁷ W. Budd,¹⁸ L. Tait,¹⁹ Walshe,²⁰ Madden,²¹ de Mussy,²² H. Weber,²³ Holden,²⁴ Da Costa,²⁵ Rühle of Bonn,²⁶ Lichtheim,²⁷ Klebs,²⁸ Bollinger,²⁹ Flint,³⁰ and many others could be mentioned.

1. Practical and Historical Treatise on Consumptive Diseases, by T. Young, M. D. London, 1815, p. 15.

2. Paulus Ægineta, Syd. Soc. 1844, vol. i, p. 286.

3. Practice of Physic. London, 1668, p. 170.

4. Phthisiologia, or a treatise on Consumption. London, 1694, p. 67.

5. Phthisis Pulmonaire. Montpellier, 1789, vol. i, p. 189.

6. Practice of Medicine. Edinburgh, 1790, vol. ii, p. 390.

7. Commentaries on the History and Cure of Disease. London, 1802, p. 375.

8. Zoonomia. Phila., 1818, vol. i, p. 311.

9. U. S. Med. and Surg. Journal. New York, 1835, vol. i, p. 389.

10. Illustrations of Pulmonary Consumption. Phila., 1837, p. 80.

11. Elements of the Practice of Medicine. London, 1839, vol. i, p. 204.

12. Practice of Medicine. Phila., 1844, vol. i, p. 365.

13. Notes to Lænnec's Treatise on Auscultation, edited by Herbert. London, 1846.

14. Principal Diseases of the Int. Val. of North America. Phila., 1854, p. 915.

15. Principles and Practice of Physic. London, 1857, p. 217.

16. Dictionary of Practical Medicine. New York, 1859, p. 1223.

17. Elements of Medicine. Phila., 1859, p. 625.

18. The Lancet, 1867, vol. ii.

19. Amer. Journal of the Medical Sci., 1871, vol. ii.

20. Diseases of the Lungs. London, 1871, p. 452.

21. Dublin Journal of Med. Sci., vol. xi, p. 33.

22. Brit. and For. Med. and Chir. Rev., April, 1870, p. 529.

23. Clinical Soc. Trans. London, 1874, vol. viii, p. 144.

24. Amer. Journal of the Med. Sci., July, 1878.

25. Ibid., April, 1878.

26. Medical Record. New York, May 19, 1883.

27. Ibid.

28. Ibid.

29. Ibid., March 22, 1884.

30. Medical News. Phila., Jan 19, 1884.

Dr. Formad lays great stress upon the fact that the medical officers and attachés of the Brompton Hospital have not contracted phthisis. This would be the last place in the world to look for the disease as the result of contagion, for every one knows who has visited that hospital, that hygiene and regimen are most scrupulously carried out to the highest point of excellence known, the nurses and other attachés being on duty only a portion of the twenty-four hours, and when on duty are not constantly in the wards. Compare this with the manner in which patients are cared for in private practice. The nurse, a member of the family or friend of the stricken individual, generally occupies the same room, day and night—more especially in the advanced stage of the disease, and the hygiene and regimen do not, except in a few instances, receive proper attention; in some cases it is wholly neglected; every crevice about the windows, and sometimes even the key-holes, as I have more than once seen, are plugged up for fear a little fresh air might get into the room and the patient “take a cold.”

As a rule, the nursing of the phthical in private practice is unskilled, and the circumstances under which the nurses perform their office, render them more liable to fall victims to the disease. Cases of phthisis due to contagion *have*, nevertheless, occurred at Brompton Hospital, for Walshe* makes the following statements in regard to his assistants:—

“Curiously enough, of the first three clinical assistants I had at Brompton, two died of phthisis, and the third left the establishment with slight hæmoptysis, cough and chest uneasiness. The latter is now (1871), in perfect physical condition, one of the former had clearly been affected before he came to the hospital, the other was a model of sturdy health when he took the office.”

He says further:—

“* * * I must confess my belief in the reality of such transmissibility has of late years been strengthened. I have met with so many examples of the kind, that ‘coincidence’ becomes itself an explanation difficult of acceptance. I have besides, in three instances, seen a robust husband become distinctly and

* Diseases of the Lungs, London, 1871, p. 450.

actively phthisical, as shown by general and local symptoms and physical signs, and on the death of his phthisical wife, whom he had closely tended, fell into the retrogressive stage of the disease, and ultimately practically recover."

"Hereditary influence in producing the disease is not as great as many believe, and all efforts have failed to prove, by statistics, the existence in a majority of the phthisical of an unfavorable tubercular family record. Walshe* says:—"The final conclusion flowing from the analysis of the family history of 446 persons is, *that phthisis in the adult hospital population of this country is to a slight amount only a disease demonstrably derived from parents.*" "Of 374 cases occurring in old women at the Salpêtrière Hospital, reported by Piorry, 78 died without presenting any traces of tubercle, although their parents died from that disease."† Dr. Cotton, who analyzed 1000 cases at Brompton Hospital, found only 365 cases in which hereditary taint could be proved; Scott Allison's observations, at the same institution, show, in 603 cases, a hereditary influence in but 19. Walshe concludes, after most careful investigation, that not over 26 per cent. can be traced to hereditary taint. How then are we to explain the cause in the remaining, we will say, 60 per cent.? Are they to be traced to pneumonias, pleurisies or kindred diseases? Or are we to conclude that there is a *specific poison* to which they may be exposed which produces this disease? I think there is, in fact there must be such a specific poison.

I will here give a hypothetical case, in order to show *the fallacy of hereditary transmission of disease*:—A. B. is stricken with tuberculosis, the family are amazed at the announcement of the fact by the attending physician, and they state that the parents and grandparents are still living and enjoying good health; the family trace back to the third generation and find that a great-grandmother died of phthisis, and this gives some satisfaction as to the disease being in the family. And if we go back three generations to find the cause for tuberculosis, why not go back four or five if nothing is found in the third, or failing to find it in these go back as far in the family history as tradition may

* Diseases of the Lungs, 4th ed., London, 1871, p. 462.

† Quoted by Dr. Durant, Trans. of the N. Y. State Med. Soc., 1871, p. 172.

extend, and finding one ancestor who *probably* died of phthisis, to conclude that therefore the case we see is transmitted from that ancestor. This, to my mind, is absurd, and yet I know the tendency of family and physician (particularly the latter) to look for this, in the transmission, rather than in an acquirement in the individual, *per se*. It is not sufficient to declare hereditary transmission when even some of the children of phthisical parents, while partaking of their delicate constitutions (that is delicate in figure and lacking ruggedness) will live to good round ages and perish from other diseases.

I do not assert that exposure to the poison will produce the disease in all individuals any more than other zymotic poisons will, for there are many who are for the time at least insusceptible to their action, and this is owing to the fact that they present no proper nidus for the poison-germ, yet from this we are not to argue that the germ itself is less potent to an individual susceptible to it. The belief in the contagiousness of the disease is as old as its literature itself. As long ago as 1668, Riveris,* who for more than twenty-five years was professor of physic in the University of Montpellier, in speaking of the causes of phthisis, wrote as follows: "Moreover, there are external causes, as contagion, which is the chiefest; for this disease is so infectious, that we may observe women to be infected by their husbands, and men by their wives, and all their children to die of the same, not only from the infection of their parent's seed, but from the company of him that was first infected. And this contagion is more easily communicated to those that are of kin, wherefore it is not safe for a brother or sister to enter into a chamber, for the *miasmata* or infective vapors, which come from their lungs and infect the whole air of the chamber, and being drawn in by others (especially if they are any way disposed to the same disease) beget the same disease in their lungs."

Not only among the members of our profession, but among all classes of people, the belief is prevalent, especially in Italy, Southern France, Spain, Portugal and Mexico. At the Canary Islands they look upon consumptives as little better than lepers,

* Practice of Physic. London, 1668, p. 170.

and they are kept in a species of quarantine, being subjected to many vexatious restrictions in regard to their intercourse with the indigenous population. This would serve to show that there must be some well-grounded reason for such belief, and it ought not be regarded as superstition.

It is impossible to comprehend how a disease, specific in its character, and definite in its course can be transmitted from parent to child; how the germ comprising the complicated organism of man could develop from the microcosm into a highly complex creature, carrying with it the elements of destruction as a part and parcel of its structure. Such teaching is opposed to all known biological facts, and it seems that writers have fallen into the fashionable professional rut in searching for the etiology of many diseases, and in none more deeply than ascribing hereditary transmission, when in reality they should say an hereditary predisposition to certain diseases.

There are a number of authorities who hold the opinion that phthisis is transmitted from parent to offspring, and among the number is Sir Wm. Jenner * who states—"That tuberculosis is transmitted from parent to child, is one of the established facts in medicine." This is absurd. If the disease is transmitted why does it remain latent for so many years? There is no such thing as the direct transmission of a tubercular virus from parent to offspring, this has been shown by such pathologists as Guizot, who, "In four hundred post-mortem examinations of the bodies of new-born infants, failed to find a single deposit of tubercle, and Gluge asserts that there is no born tubercle." † Tuberculosis to-day is the same, and manifests itself in the same manner that it did centuries ago. It reveals the same pathological appearances in one case as in another, and maintains its specific character under all circumstances. How then is it possible to harmonize known facts with the doctrine of hereditary transmission, when diseased parents and the east wind are equally effective in producing the same specific result? That constitutional peculiarities are not pathological, needs no argument; and therefore our faith in

* *The Practice of Medicine To-Day.* London, 1869, p. 48.

† Quoted by Durant, *Trans. of the New York State, Med. Soc.* 1878, p. 174.

their transmission need not be put upon the stretch in acquiescing in this belief. Nor is it to be denied that constitutional peculiarity may be acquired and still leave the body in a physiological condition. As an instance: Most persons have a transmitted constitutional condition of body that may be infected by the virus of small-pox; this habit of body may be so altered, by vaccination or otherwise, that it cannot be infected, and still leave the body in a physiological condition. The susceptibility was transmitted and it is destroyed. On the other hand, the susceptibility may be acquired instead of being transmitted, so that he who was born constitutionally protected may become jeopardized, if exposed to the infecting influence of the small-pox germ. Even in the propagation of this highly infectious disease two distinct factors are engaged, between which there is a perfect coadaptability, if I may so speak, for, when they are brought together they combine to bring about a certain result, uniform in appearance and constant in character.

We have a marked illustration of the fact that certain modified conditions of the parents are not transmitted to the offspring, in the case where parents have been vaccinated and yet there is no protection from small-pox in the child. This has been aptly compared to the soil and the seed. The earth could not bring forth fruit without the seed, the seed could not germinate and reproduce itself without the soil. The soil in order to be productive should be fertile, and the seed should embody within itself the elements of life. The condition of the body, like the condition of the soil, determine its efficacy as a factor and its relevancy to a specific result, when joined to that other factor, the seed or germ, in the production of disease. The body is the soil for disease producing germs. If the body does not offer a suitable nidus, the seed planted therein could not germinate, grow, bud, bloom or fructify. This peculiar condition of various parts of the animal body, which offers a suitable soil to disease-producing germs is familiarly known in medicine as *predisposition*. It is that which is transmitted from parent to child—the predisposition to certain diseases, and not the disease itself. A tuberculous parent may transmit this soil, this habit of body, this *predisposition*, to his or her offspring, but cannot under any

circumstances at the same time transmit the seed in a dormant state already planted in that soil. Dissections, as already stated, have not revealed tubercles in the new-born. They may be born with many physical imperfections but never with any trace of tuberculosis. The individual must be subjected to disturbing extrinsic causes before there are any evidences of tuberculosis, and when such manifestations do occur, they are of a peculiar and constant kind. One case of tuberculosis is as much like another as one case of small-pox is like another of that disease. It would indeed be a strange coincidence, and one that could not be accounted for by any telluric or atmospheric influences so variable in their nature and uncertain in their operation. When we observe a constant recurrence of symptoms and pathological changes in a series of cases, we naturally conclude that a specific cause is operating upon a peculiar condition of body to produce such a uniform result. It is evident that the offspring of phthisical parents sometimes escape the disease for M. Pidoux states that:—"Not over twenty-five per cent of those born of consumptive parents themselves become phthisical."*

The predisposition is not only inherited, but is also acquired by the offspring of healthy parents; thus parents of non-phthisical children may themselves acquire the disease under conditions favorable to its development. It is not contended by those who believe in and know the fact of the contagiousness of phthisis, that the disease is thus contracted as frequently as other infectious or contagious diseases are acquired; but, I am free to say, however, that there is far more danger to be dreaded from nursing the phthisical in private practice, than there is from nursing cases of typhoid fever. In the latter disease, the "*materies morbi*" reside in the excreta, and by cleanliness the infectious element is promptly removed and the danger lessened; this is not the case in phthisis, for in that disease the "*material cause*" resides in the effete matter constantly being thrown off from the lungs of the stricken individual, especially in the advanced stage of the disease. This has been proved by Ransom, † who found the bacillus tuberculosis in

* Quoted by Dr. Durant, Trans. of the N. Y. State Med. Soc., 1871, p. 172.

† A His. of Tuberculosis by E. E. Sattler. Cin., 1883, p. 164.

the air of a room containing several advanced cases of phthisis. Dr. R. Charnley Smith,* detected them in a respirator worn by a phthisical patient, and Dr. C. T. Williams,† by an ingenious method, has found the bacillus in fair abundance in the extracting flues at Brompton Hospital. The tubercular bacillus is characteristic, and can readily be discriminated from all other bacilli. It has been found in all the tubercular lesions of the organs and tissues of the body of the phthisical, including, of course, the osseous system and its medullary substance. It has also been found in all the secretions and excretions of organs similarly affected. It is a well known fact that phthisis prevails to a great extent in most of the European armies, and this prevalence can only be accounted for by the contagious character of the disease. As an evidence of this, it might be stated that Surgeon General von Lauer,‡ of the Prussian Army, has recently issued a circular to the medical officers, directing them not only to isolate the phthisical from the non-phthisical, but *that special means be taken for the disinfection of the sputa in tuberculous cases.*

“Sir Wm. Wild,§ in the Irish Census Reports for 1851, states that in the years 1847, '48, '49, there died of phthisis, in Ireland, 66,000 persons, or 22,000 per year.” This occurred before the tide of emigration to this country set in. So frightful a mortality can only be attributed to the crowding together of people obliged to breathe an atmosphere loaded with the germs of this disease.

It is well known that the red, as well as the white blood-corpuses sometimes leave the vessels and migrate through the adjacent tissues. They have even been seen to enter the vessels. These corpuses, as is also well known, are from the $\frac{1}{32000}$ to the $\frac{1}{40000}$ of an inch in diameter. How much easier would it be for the *tubercle bacillus*, which is generally described as varying in length from the $\frac{1}{12000}$ to the $\frac{1}{40000}$ of an inch, and having a breadth of $\frac{1}{2}$ of its length, to escape from or enter the blood-vessels? It is through the medium of the lymph and the blood that these bacilli are carried throughout the system. The tubercle is

* The Lancet, Jan. 20, 1883.

† Ibid., July 28, 1883.

‡ Sanitary Engineer, 1883, vol. viii, No. 20.

§ Dublin, 1856, vol. i, p. 447, also quoted by H. McCormac, M. D., “On Consumption,” London, 1865, p. 225.

developed according to, and is governed by its own laws, as are the eruptions of small-pox, or the formation of false membrane in diphtheria, and who will deny that there is a *specific contagium* in the blood, in cases of these diseases, before such local manifestations occur? I hold that tubercle, as we know it, is never a primary product; it derives its origin from the action of a pre-existing *materies morbi*. The lymph or the blood carries the morbid material throughout the body, and certain organs attempt to eliminate the poison, but failing to do so become themselves the ground in which the poison accumulates. Why certain organs are more prone than others to become the receptacle of these deposits, I will not here attempt to explain. Perhaps the peculiar structure of the lungs, and the fact that all of the blood of the body must and does pass through them in great quantity and with great velocity, may be one reason why they are apt to be the seat of tubercular deposit, the softening and breaking down of which is the result of an inherent irritation of the *materies morbi*; this being a foreign matter the lungs rebel against its presence and make an effort to cast it off. More or less perfect parallels are seen in the exantheas, where the skin becomes the eliminating organ. In diphtheria, where elimination is by the mucous membrane, and in small-pox, scarlet fever, measles and erysipelas, diseases each having its own peculiar and characteristic eruption, each respective disease being due to the presence and action of a peculiar characteristic *materies morbi* prior to the appearance of local symptoms. In the attempt at elimination or resistance to the invasion of these poisons we have the lesions so characteristic of them and generally recognized as belonging to the disease. Do they constitute the disease, comprising both its cause and effect? By no means; they are but the expression or effect of the cause, precisely as tubercle in the lung or elsewhere is but the expression or effect of a pre-existing *materies morbi*.

The germs producing these diseases are not diseased germs; they are germs in perfect health as to themselves and are capable of producing disease only where a nidus suitable for their development is found. It seems to me unnecessary to enter into any labored course of reasoning or offer any lengthened recital of

examples, further than has been done in this paper. There is still a ring of mystery in the minds of some physicians about this whole matter. But when, in the near future, the smoke and dust have been made to subside by the great workers who are now engaged in this promising field of labor, and when all the avenues and by-ways are macadamized, so to speak, by their results, then will this much mooted and intricate subject be far on the way to a final settlement, and millions of lives saved annually from premature graves.

So thoroughly am I impressed with the importance of this question, and of the incalculable advantage a thorough understanding of its bearings must be to the members of my profession, that I feel I have not consumed time unprofitably in my effort, however faulty it may be, to set before you the facts which have convinced me of the contagiousness of a so fearfully common and invariably fatal disease as tubercular phthisis.

