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# MALARIA
# WHAT IT MEANS

EDWARDS

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## WHAT IT MEANS AND HOW AVOIDED.

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BY

JOSEPH F. EDWARDS, M.D.,

AUTHOR OF "HOW A PERSON THREATENED OR AFFLICTED WITH BRIGHT'S DISEASE OUGHT TO LIVE," "CONSTIPATION PLAINLY TREATED AND RELIEVED WITHOUT THE USE OF DRUGS," "DYSPEPSIA, HOW TO AVOID IT," ETC.



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# PREFACE.

Of all preventable diseases, of all human suffering that can be avoided by a litttle general knowledge, the myriads of symptoms ascribed to malaria stand pre-eminently high. Of all affections about which public misapprehension is very great, malaria is entitled to the highest rank. Of all unsatisfactory terms, this title of malaria is by far the most unsatisfactory. Whenever a person feels *out of sorts*, biliousness or malaria receives the blame. This term is made the shield by many incompetent physicians, to hide their want of penetration in diagnosis, and is accepted by the patient as the true cause of all his suffering. This general belief in the great prevalance of malaria and the public notion that quinine is a specific for the disease in all its forms, has caused the unintelligent use of enormous quantities of quinine by an unadvised and uninstructed public, much to the

general detriment of the human race. In malaria, probably more than in any other disordered state of the system, *an ounce of prevention is worth a pound of cure*. Therefore it seems to me, that mankind can be improved in general health and benefited physically, by a better understanding of the true nature of malaria and the best means of avoiding it.

JOSEPH F. EDWARDS.

*Saint George Hotel,*
*Broad and Walnut Sts., Philadelphia,*
*September, 1881.*

# WHAT IS MALARIA?

I have undertaken a herculean task, when I attempt to answer this question. So diverse are the views entertained on this subject, and so comparatively meagre the accurate knowledge which we possess, that it will be a very difficult matter to give an explanation of the nature of malaria that will be universally satisfactory; so that, while I feel sure that the views expressed in this chapter will receive some rough handling and severe criticism, yet I am equally certain that what I will tell you will be the means of enabling you to avoid very much of the suffering which is directly or indirectly traceable to malaria. There was a time when the name malaria was applied to a certain specific poison, which possessed the power of producing Intermittent Fever, Chills and Fever, Ague. Thus Professor Flint, of New York, in the third edition of his Practice of Medicine, published in 1868, says, "The causation" (of Intermittent Fever) "involves a special morbific agent, commonly known as malaria." In 1717, Lancisci, an Italian writer, called this special poison

*marsh miasm*, and described its origin as due to vegetable decomposition. In Dunglison's Medical Dictionary, published in 1868, malaria is defined as follows: "The word *miasm* (malaria) has by some been employed synonymously with contagion. It is now used more definitely for any emanation, either from the bodies of the sick, or from animal and vegetable substances, or from the earth, especially in marshy districts, which may exert a morbid influence on those exposed to its action. To these terrestrial emanations the Italians give the name *aria cattiva*, but more commonly, *malaria* (bad air). Of the miasm which arises either from the animal body or from the most unhealthy situations, we know, chemically, nothing. All that we do know is, that under such circumstances emanations take place, capable of causing disease in many of those who are exposed to their action."

A very indefinite definition, but as accurate as any that have hitherto been offered in our present limited knowledge of the exact nature of these poisonous emanations. In his "*Practical Hygiene*," Dr. Parkes, the late eminent English sanitarian, says, "The most important organic impurity of the atmosphere is malaria." Dr. F. T. Roberts, in his *Practice of Medicine*, says, "Certain other diseases are attributed to it (malaria), such as dysentery, diarrhœa, gastric disturbance, etc., *and also*

*a general state of ill health and low cachexia, with ultimate degeneration of the race.*" He also tells us that "The essential conditions for the production of the malarial poison are, vegetable decomposition, a certain temperature, with a certain degree of moisture." You can now understand how much uncertainty exists concerning the true nature of malaria. Until we accumulate exact information on any subject, theorizing is not only permissible, but, by giving us a platform upon which to conduct our experimental researches, becomes a very important factor in the accumulation of this knowledge, provided always, that we do not rest content with the mere theory, but accept it as a fact only when it has been indubitably proven to be such by the crucial test of the severest scrutiny, the most intimate research and the weight of overwhelming experience. Therefore, premising that what I am about to say is only theory, and warning you against regarding my theories as facts, until they have been amply proven to be such, I will conduct you through a process of reasoning, by which I hope to make it seem at least probable that the origin and true nature of malarial poison, as we now call it, has been shrouded in unnecessary mystery, thus preventing us from comprehending its true nature, and at the same time, that the term malaria is improperly applied. Even if I do not succeed in theoretically estab-

lishing my position, at any rate, there can be no question but that the information I will give you, if properly utilized, will be productive of very much physical good. These few words of explanation I have deemed necessary, because, as this book is more especially intended for the non-professional public it becomes imperative that I should exercise the greatest care not to mislead them, nor to give them erroneous ideas, nor to cause them to accept as settled fact that which is in doubt. Therefore, I again say, the reasoning I will now furnish is my own, the ideas I will give are my own; whatever is to blame in them or to commend, I alone, and not my profession, am responsible for. The profession recognizes the uncertainty of our knowledge concerning the malarial poison, and speaks of it in doubtful and uncertain terms; I also recognize this uncertainty, but I am at the same time endeavoring to erect a theoretical framework, to be filled in with the accumulations of research and experience, until either a clear case is made out for my theory, order springs from the present chaotic notions of malaria, and from uncertainty we possess a certain and accurate knowledge of the nature and origin of malarial poison, or, on the other hand, my theory dies for want of experimental support, and sinks out of sight unsupported by the research and experience of observers. Medical readers will now understand

my position and non-professional persons will be prevented from falling into the error of accepting a theory as an admitted fact, by the explanation I have made. Now to our reasoning. In the first place, let us examine whether the term malaria is properly applied. In my opinion it has not been, and is not. Its application is too liberal and hence has been misleading. In a more restricted sense, it is an eminently appropriate and expressive term, and its nature can be much more readily comprehended. The word *malaria* has been derived from the two words *mal aria, bad air,* and considering its derivation, its present broad application is entirely too broad, and is calculated to leave its exact nature forever in doubt, since it necessitates the impossible achievement of tracing too many effects to the same cause. The word *miasm* has a different origin, being derived from the Greek, *μιασμα,* a stain from *μιαινω, I contaminate.* Now, although Dunglison in his medical dictionary refers the definition of the word malaria to *miasm* or *miasma,* and so confounds the two and makes them identical in their meaning, yet it will be seen, from their derivation, by the meaning of the parent words from which they have been formed, that they are distinct. While malaria really means bad air, and is a comprehensive term for atmospheric impurities of various kinds; miasma conveys the idea of an *effect* and not a *cause;* it is *a stain,* a *contami-*

*nation* of some portion of the human body, which contamination must be the result of some causative action. Hence the terms malaria and miasma, which are generally used synonymously, are not only not the same in meaning, but the only relation that they can possibly hold to each other is that of cause and effect, the malaria or *bad air* being the cause and the miasma or *contamination* the effect of this cause. Here, then, we see one important error in the application of the word *malaria*. Again, nearly all medical writers tell us, as Professor Flint has done, that the causation of intermittent fever, chills and fever, ague, etc., involves a special morbific agent, commonly known as *malaria*. Had they said a special morbific agent commonly believed to *constitute one of the elements of malaria*, they would have been at least more accurate. Since malaria really means *bad air*, this causative influence of malaria on Chills and Fever is evidently exaggerated and misinterpreted, since bad air will not in every instance give rise to intermittent fever, simply because the air is bad; in order to produce the characteristic symptoms of this disease, the malarial poison or bad air must contain some particular deleterious agent, capable of producing these characteristic symptoms, and without the presence of which they are not developed, no matter how bad and impure the air may be. There-

fore it would seem that the application of the term malaria had become entirely too comprehensive, since the poisoned condition of the atmosphere which is generally indicated when we say *bad air*, cannot of itself alone produce the phenomena of Intermittent Fever, which depend for their existence on the presence of a special poisonous element in this bad air. To illustrate this point, that the presence of the special poison of Intermittent Fever is necessary in the atmosphere, in order that this disease may be developed, I will quote from the July bulletin of the Secretary of the Connecticut State Board of Health, which says, "Malarial diseases appear to have taken a step eastward and northward, as a death from malarial fever is reported from Norwich. I have not yet learned of any east of the Thames river. In many places they are reported as increasing, as in Bloomfield, New Canaan, Unionville, and other towns in various parts of the State, while others report decrease, as in Clinton and Guilford. Collinsville claims entire exemption from malaria in every form, unless imported, as thus far no cases have originated there. *If flowing large areas and alternately covering and exposing the bed of the pond produced malaria, we should have it here. If vegetable decay alone produces it, we should have a fearful epidemic at this Poquonnoc Bridge, instead of Scarlet Fever, as the*

*river was absolutely choked with vegetable substances, decaying, and alternately covered and exposed. Yet no case of malaria has ever originated in this town.*" In this communication the Secretary of the State Board of Health does not mean what I do, and am endeavoring to make you, understand by the term *malaria*. He clearly refers to some one of the forms of Intermittent Fever, as nearly all writers now do. You will observe that he shows many causes for air impurity, for *malaria* or *bad air*, yet he says that no cases of *malaria, of his malaria*, have originated there. Yet my malaria, *bad air*, surely would be found there; but the special poison capable of producing Intermittent Fever was wanting. So that it is entirely too liberal to ascribe the production of Chills and Fever to *Malaria* in its true sense. Smallpox is caused either by the inhalation from the surrounding atmosphere of a particular poison capable of producing this disease, or by the reception of this poison from the closer contact of a person already afflicted with the disease. In either case the air acts as the medium of communication. Typhoid Fever is caused, in many cases, by sewer gas; this impurity contaminates the air we breathe, and so entering the body gives rise to this particular disease. Cholera is likewise propagated. The same is true of all the infectious diseases. Now the air which is capable of

giving rise to Smallpox, Typhoid Fever, Cholera, and the like, surely must be *mal aria;* it must of necessity be bad and impure air, since it contains noxious elements capable of producing a diseased condition of the human body, which elements do not exist in pure air. Therefore, since malaria really means nothing more than bad or impure air, is it not misleading and confusing to speak of malaria as the cause of intermittent fever, as the active agent in the production of chills and fever? Does it not seem more correct to hold the view that malaria means simply impure air, rendered unwholesome by the presence of a great variety of impure elements, which elements are capable of producing various disordered and unhealthy conditions of the system? In one instance the impurity may be of such a nature as to give rise to the phenomena of chills and fever, in another to cholera, in a third to smallpox, in a fourth to diphtheria, and so on; but that in each case it is absolutely necessary that the *special* impurity should be present to give rise to the special disease, which cannot be produced merely by the inhalation of foul air in which this *particular* special impurity does not exist. It would, therefore, be more proper to speak of the poison of Smallpox, of Typhoid Fever, of Dysentery, of Chills and Fever, as elements of malaria or of impure air, if we desire to bring malaria into a causative relation

with these diseases at all. This is not, however, my intention. It will be better and will cause less misunderstanding and confusion, if we speak of *the poison of Smallpox, of Dysentery, Chills and Fever*, and so on, and leave *malaria* entirely out of consideration. Let us endeavor to form an accurate view of this very popular word, and to have a definite idea of its meaning. The use which has been and is made of this word is truly ridiculous. The very fact that it has been utilized to designate so many diverse conditions, plainly indicates the indefinite and uncertain views of its true nature and properties which have been and are entertained alike by the Medical Profession and the general public. Superficial physicians, when baffled by the intricacies of an obscure chronic case of disease, fearing to confess their inability to penetrate the difficulties of the case, and make a correct diagnosis, lest their honest confession may cost them their patient, fall back upon this mysterious *malaria*, and their patients having a very vague and visionary notion of the nature of this wonderful affection, accept the diagnosis, and another case of malaria is added to the already immensely long list of cases of this hydra-headed disease. The medical profession are commencing to realize the absurd and ridiculous position which this undefined word occupies, and our medical journals now contain many

articles on the subject, some ridiculing the prevalent ideas concerning it, while others are seriously endeavoring to find a proper place and meaning for it. Some of the most wonderful and apparently most mysterious tricks performed by the great magicians, are, when explained, exceeding simple and easy of performance. It is their very simplicity that saves them from detection. Apparently wonderful, it seems to the uninitiated that they must be very difficult of comprehension, and a laborious process of thought and reasoning fails to elucidate them, while, when understood, one is ashamed of his former obtuseness, and wonders how he could have been so stupid as not to penetrate such an obvious and childish trick. So it is with many more serious questions. Man seems determined to mystify himself. Instead of endeavoring (where possible) to explain the phenomena of nature as easily as possible, he seems to think it necessary to surround his investigations with all the difficulties and obstructions that he can possibly invent. Imagining that everything which he does not already know concerning nature's workings and scientific truths must be very obscure, and can be elucidated only by the most profound and circuitous reasoning, he fails to try first to explain them by simple, practical common sense, but straightway rushes into scientific theorizing of the most sublime character, and

interprets every ordinary occurrence of nature, not through the eye of *common sense*, but views it with the high power microscope of science. As a result, many things are shrouded with mystery and but imperfectly comprehended simply because a tremendous effort is made to understand them, instead of explaining them in a simple, practical, common sense, matter-of-fact way. This point is particularly true of the question under consideration. There is nothing wonderful or mysterious about *malaria*. No deep reasoning or intimate scientific research is necessary to comprehend its nature. If properly viewed, its nature is as clear as the clearest spring water. What, then, is the nature, what are the properties of this much-abused word? Simply what the word means. I have already told you that *malaria* is derived from two words, *mal, bad,* and *aria, air;* put them together and you have a perfect definition of this hitherto mystic word, *malaria*, which does mean, and can mean, nothing more nor less than bad air. Let us do away with all the uncertainty surrounding this word, and comprehend it properly. Do not let us any longer say that Chills and Fever are produced by *malaria* (*bad air*), that Typhoid Fever is due to *malaria* (*bad air*), or that Smallpox owes its production to *malaria* (*bad air*). Some critics will say, "who ever claimed that malaria did cause Typhoid Fever or Smallpox?"

All of you who claim that malaria causes Chills and Fever (and nearly every physician is wont to ascribe this disease to the cause under consideration) must, if you be honest, admit that malaria has just as much influence in producing Typhoid Fever and Smallpox, as it has in causing Chills and Fevers, because *bad or impure* air is the causative agent in each case. *But* in each case the *malaria* or *bad air* must contain some particular impure or bad element which is capable of producing the particular disease under consideration. Therefore, the idea which at present prevails of *malaria* is very erroneous and misleading. For instance, if we speak of *Typhoid Malaria*, of *Smallpox* MALARIA, of *Diphtheritic* MALARIA, and so on, we are correct, because we here convey the idea of an impure air or atmosphere, the principal impurity in which is capable of producing Typhoid Fever, Smallpox or Diphtheria, and so we denominate the special poisonous ingredient as well as the whole of which it forms a part, and in which it constitutes the most active ingredient. To illustrate: the family of SMITH is an exceedingly extensive one. Scarcely any, in fact, I imagine none, of my readers are denied the acquaintanceship of very many of the name. The word *Smith* is no less nor more familiar than the word *malaria*. If a friend desires to tell you something about a certain man,

and after describing his characteristics, informs you that his name is Smith, he leaves you with a very vague and illy defined notion of whom he has been talking about. You have a very indefinite idea of the individuality of the person referred to, and should you afterwards meet the man whose characteristics had been described to you, and be told that his name was Smith, you would still, in many cases fail to recognize the man about whom you had been told. But should your informant, after describing the characteristics and personal appearance of the man, finish by telling you that his name was *Abraham* Smith, you would then have a very definite idea of the whole nature of a certain individual, who would be represented to your mind by the words *Abraham Smith*, and upon hearing these words you would at once feel intimate with and perfectly capable of describing the elementary characteristic points and personal peculiarities, the grand combination of all of which would be represented to your mind by the two words constituting the name of the individual possessing these characteristics. So it is with Malaria. There is no doubt that many diseases are developed through the agency of impure air, but when we come to *special* diseases, characterized by *special* symptoms, we must look for a *special* cause, and finding it, give it a *special* name. The disease popularly known as "*Chills-and-*

*Fever*," when properly developed, possesses for its chief peculiarity periods of intermission in the manifestation of its symptoms, hence the name of Intermittent Fever, a most appropriate one; if we desire to give a name to the causative agent of Intermittent Fever, and if we designate this cause as *malaria*, we open the door to untold misunderstandings and confusions. One person is exposed to the evil influences of *malaria*, or *bad air*, and is seized with Intermittent Fever, while his neighbor, also exposed to bad air or *malaria*, suffers from Typhoid Fever, and a third from Smallpox. It is just as correct to assign the production of Typhoid Fever to malaria as it is to claim it as the cause of Intermittent Fever, since in each instance bad air has caused the disease. But in order that our nomenclature may be intelligible and non-confusing, it becomes necessary, when using the comprehensive term malaria, to qualify it with a prefix, as we have seen was necessary in the case of the comprehensive name of Smith, and to speak of Intermittent malaria, Typhoid malaria, and so on. Thus, then, the proper definition of *Typhoid Malaria*, is or should be as follows, "*Bad or impure air; the impure element*, or if there *be many, the chief and most potent impure element of which is capable of giving rise to Typhoid Fever.*" We have been discussing what malaria *is not*, let us now see what it is. In

order that the functions of the human body may be properly carried on, it is absolutely necessary that pure air should be supplied to the body. Typically pure air is composed as follows: seventy-nine per cent. nitrogen gas, twenty-one per cent. oxygen gas, some watery vapor, and ammonia. This is the composition of ideal atmospheric air. Such air is the best adapted for the maintenance of healthy life; but such air, with exactly such a composition, is rarely found. In some localities and on some occasions particles of dust, of ashes, of coal and the like, will be found in the atmosphere. The air of a city like Pittsburgh will contain many other impurities resulting from the burning of coal. The air in certain buildings used for manufacturing purposes will contain certain foreign elements derived from the manufacture carried on therein. Thus, in steel factories the air will be found to contain small, almost microscopic particles of steel. In chemical laboratories the atmosphere will contain certain foreign gases or vapors liberated during the manufacture of certain drugs. In bone-boiling establishments the air will be rendered very impure by the decomposition of the fragments of animal tissue adhering to the bones, as well as the animal portions of the bones themselves. In a large city it is almost an impossibility to discover an atmosphere which approaches at all near to the ideal

one given above. So numerous and so various are the sources of impurity, that even the healthiest portion of the city must have its air vitiated more or less. Where, then, can *typically* pure air be found *for our use? Nowhere.* A most astonishing, but a true statement. Such air as we have described as typically pure does exist, but we cannot now and never can find it *for our use.* It exists in virgin plains, forests, and mountains uninhabited by animal life. It may be found in mid-ocean. But let man approach to hunt for this beautiful atmosphere, and like the frightened fawn it eludes his grasp and rushes with the velocity of the deer from his presence. This is literally true. Man contaminates that which he uses. Let conceited and foolishly egotistical people remember this in the midst of their self adulation. That they are absolutely so rotten that they instantly render foul the purest air if it merely enters their worthless bodies. This is true, and I will prove it to you. Suppose you are in the presence of such an ideal atmosphere as I have described to you; you inspire and receive into your lungs a certain amount of this air; in the next instant you expire and give forth a bulk equal to that which you received. But how changed. Instead of the pure and vivifying oxygen gas which formed the vital principle of the air which you inspired but a few seconds before, the air

given out is laden with carbon, a most impure and poisonous element, and this impurity has been derived from your rotting body. You can now understand what I mean when I make the statement that perfectly pure air can be nowhere found *for our use*, since the very instant we commence to use it, we render it foul by the admixture with it of the impurities from our bodies. By a wise provision of nature, however, this carbon impurity, as well as all other impurities, is soon removed from the air, which is rendered once more fit for use. While, as I say, we can nowhere find *typically* pure air *for our use*, yet air sufficiently pure to maintain healthy life *can* be found everywhere; and it is a deviation from, a deterioration of, this ordinarily pure air which I propose to call Malaria. Now, then, in conclusion, I will define *Malaria* for you, and will furnish the definition in two words, BAD AIR.

Finally, let me say that throughout this little book, when talking about Malaria, I am not talking about Intermittent Fever. I have already given my reasons for saying that it is an erroneous and misleading view to hold that *Malaria* is the cause of Chills and Fever. There is no specific relation between them. This book has nothing to do with Chills and Fever. I believe, as all of my professional brethren do, that the active causative agent of intermittent fever is still

a mystery, but, differing with some, and with the sanction of others, I say that it is erroneous to apply the comprehensive term *malaria* to this special, mysterious, unrecognized agent. Again, I have nothing to do here with Intermittent Fever nor its cause; I do not discuss either. I am enunciating and explaining what I believe to be the proper condition expressed by the word malaria, and helping you to avoid the many evils which will result from this condition.

## CHAPTER II.

### WHERE IS MALARIA FOUND?

Malaria CAN be found *everywhere* and SHOULD be found *nowhere*. Malaria is entirely and completely under human control. Give me the healthiest locality in the world, and I will develop there malaria in twenty-four hours. Give me the most malarious district of the globe, and in time I will remove from it every trace of malaria. In this bold statement I include malaria according to my definition of it. Let us imagine a house in the country, situated on an eminence, from which the ground slopes in every direction. Suppose the water supply to be perfect and plenty, while the drainage is beyond reproach. Imagine the surrounding atmosphere to be of that typical degree of purity described in the last chapter; allow that all the rooms are sufficiently large and the ceilings high enough to admit of perfect ventilation and to insure to each occupant of the house a liberal supply of air. Would you not think such a house impregnable to disease; would you not imagine such a locality the greatest foe to malaria; would you not consider bad air an impossibility! If you did, you would be right.

Such a location *ought* to be entirely free from *malaria;* but see how soon and how easy bad air can be produced in this temple of health. Suppose this house faces north and south; suppose the kitchen is at the southern end; outside of the kitchen door you have constructed a wooden trough with a lid, in which you place your slop pail. After dinner the cook empties the remnants from your table into this pail, and with the proverbial carelessness of servants, neglects to shut down the lid. The hot July sun beats down on this mass of organic matter, decomposition takes place, and foul gases are liberated; if the wind is blowing from the south, these poisonous gases are carried in the back kitchen door, are blown through the house, they mingle with the atmosphere there, and the air of your supposed healthy house becomes *malarious*, it is *bad.* Again, your privy may be situated some distance, sufficiently far, from your house. It may be on sloping ground and may be well drained. The solid evacuations deposited therein remain there and decompose, liberating poisonous gases which ascend and mingle with the atmosphere. If you know anything about hygiene, you instruct your hired man to throw dry earth into your privy well two or three times a week, according to the frequency with which it is used, which will have the effect of disinfecting the privy and destroying these pois-

onous gases. In the majority of cases he neglects to do this, and these impurities are allowed to mingle with and contaminate the atmosphere and to produce *malaria*. You have water closets in your house, the drainage from which is perfect, the water supply to them is also good; you never suspect that they can possibly be a cause of evil, and therefore never use any disinfectants. Some particles of solid matter may cling to a joint or bend in the pipe, and decomposing, produce *malaria* in the room in which your water closet is, from which it is wafted all over the house. Your drain pipe terminates in a well, a long distance from your house; you are busy, and neglect to examine this well; it gradually fills, until finally its contents reach up to the opening of the drain pipe. Foul gases ascend this pipe and pass along unobstructed until they reach the trap under the water closet; here they are halted for a time by the water in the trap, but, by degrees, and particularly if the closet is not often used, the water becomes saturated with them and soon commences to liberate them from its upper part, and the air of the room and the house becomes malarious. How common is it for cooks to throw the water in which they have been washing dishes out on the ground. This water contains particles of organic matter; the water soaks into the ground and leaves the organic matter on the

surface, where it decomposes and poisons the atmosphere. Many persons use the bed chamber before retiring at night, and allow it to stand in their bed rooms uncovered all night. Its contents decompose and render malarious the air of your sleeping room. Manure heaps are frequently allowed to accumulate very near the house ; they consist of organic matter, which, decomposing, makes the atmosphere *bad.* It is a very common and very erroneous notion that all residents of the country must, because they live in the country, be very healthy. I am practicing among country people, and I know whereof I speak. From the many illustrations I have given, you can readily understand how easily atmosphere naturally pure may become contaminated and unfit to support healthy life. Such, unfortunately, is the case among the majority of country people. They know nothing about hygiene, and consequently fall into the very errors I have pointed out to you, all of which really depend on the imperfect and incomplete removal from their vicinity of decomposing organic matter. In cities these matters are regulated and attended to by competent persons, hence, strange as it may appear, the residents of the better portions of our large cities suffer less from the effects of malaria or bad air than country people do. While in the country we find a lesser proportion of serious and *special* diseases than in the

city, yet we find a much larger proportion of persons suffering from depraved health, and depressed functional activity, as a result of the use of impure air. Now, malaria, or bad air, is always produced by the decomposition of organic material, hence, to put the matter in a nut-shell, *malaria* will always be found wherever we find dead organic matter, and since dead and decomposing organic matter must, as a necessity of life, be found everywhere, so, therefore, malaria must be found everywhere. True, as an abstract principle, but a statement admitting of qualification and explanation. The gases resulting from organic decomposition, must, of course, exist everywhere; this is true. Their presence must contaminate the air; true enough. But, as I have already told you, the air will admit of a certain amount of impurity, without becoming unfit to sustain healthy life. It is only when these impurities become concentrated and intensified to an injurious extent, that they have the power to make air *malarious* or bad. This is well illustrated in the contamination of air from respiration. I have already told you that at every expiration, you give out from your lungs into the surrounding air a certain amount of carbon, which is poisonous; in the course of twenty-four hours the amount of this poison given off from an average healthy man, if all collected, would amount to about eight ounces

of solid carbon. Given off gradually, as it is, it mixes with the surrounding air and be-becomes so diluted, and finally so altered in composition, by the vegetable life about us, that it becomes perfectly harmless. On the other hand, shut yourself up in a room ten feet square and ten feet high, hermetically seal all openings, and varnish with some impervious wash the walls, in order that there may be neither ingress nor egress of air. This room will contain one thousand cubic feet of air. At the end of one hour all of the oxygen in this room will have been used, and in its place will be found carbon. At the end of a second hour you will in all probability be dead, from charcoal or carbon poisoning. Had this same little room been ventilated, you might have lived in it with impunity, without ever leaving it, for fifty years. Hence you see the danger of impurity in the air is not so much from the mere presence of the impurity as it is from the concentration and accumulation of it, which can only result in the impure gases displacing and substituting the pure elements of natural air. I could hold my head over a privy well and suffer no ill effects from the poisonous gases arising therefrom, if a fan were revolving near me, constantly forcing a copious stream of pure air across my face, thus diluting the privy impurities to such an extent as to render them harmless. This point is remarkably well

illustrated in the city of Chicago. The Chicago river runs through the centre of the city. Of all foul streams that ever were found this is surely the foulest. So intensely foul are the odors arising from it, that any one who has not lost all sense of smell must necessarily hold his nose when crossing it. And yet, strange as it may seem, vital statistics prove Chicago to be one of the healthiest cities in the United States. Every once in a while a strong wind coming in from the lake will blow these foul gases away from the city and carry them off to the boundless prairies of the west, where they become diluted down to a healthy degree. Were it not for these life-saving winds, Chicago would soon be depopulated by a malarious plague. It is not necessary that the organic matter whose decomposition gives rise to malaria should belong to the animal world. The vegetable kingdom will furnish it equally well. Thus it is that the atmosphere is rendered malarious or bad in the vicinity of marshy districts. During the rainy or wet season this land is covered with water; the vegetation thereon becomes water-soaked. The hot sun beats down upon it and we have the two prime factors of decomposition, *heat* and *moisture*. On high and well drained land this cause for malaria will not be found, since the water will run off and soak away as fast as it falls, leaving but little remaining when the sun appears, so

little that it is soon absorbed by the sun and carried away, thus removing one of the essential elements for the organic decomposition and the production of malaria. It has often been said, and with truth, that new settlements are particularly prone to be unhealthy, are in a particular manner afflicted with malaria. Bearing in mind what I have said about the nature of malaria, and discarding all consideration of that particular malarial element which is capable of producing Intermittent Fever, of the nature of which I have confessed our present ignorance, this phenomena is very easy of explanation. All land, all soil that has never been before worked is particularly rich in organic matter. The leaves from the trees have for centuries been dying, decomposing and yielding their organic constituents to this earth. The birds and wild animals which from the beginning of time have roamed over this virgin land have deposited their organic excrement upon it. The winds have wafted organic material from far-off cities to it; while countless myriads of animals have died and decomposed on this land, yielding up their component parts to it. The rains and snows of centuries have washed all this organic material into the earth, until this land fairly teems with organic wealth; like the untrodden prairies of our western country it is black with organic richness. Some little of this material is utilized in giving nourishment to the grass and

trees which grow on this soil; still, but a very small proportion of this organic matter is thus consumed, and what little is used is returned a hundredfold in the manner I have indicated above, until the subsoil of this region is fairly reeking with organic elements not exposed to the sun, while that very near the surface is consumed by the grass and trees, as I have already pointed out. This soil contains moisture. Man and civilization come along; the plough turns up this land; this enormous accumulation of organic matter is exposed to the sun. What have we? *Organic material, heat* and *moisture.* What results? *Organic decomposition* and *malaria.* In addition to this fact, poisonous gases will be developed also from the decomposition of the organic waste which always necessarily attends the presence of man, and which, owing to the imperfect methods of drainage or removal which always obtain in new settlements, will not be taken from, but allowed to remain in close proximity to the residents, there to decompose and render the air malarious. In course of time, as the ground becomes more cutlivated and successive crops are taken from it, the locality loses its malarious character, the air becomes purer, because the excess of organic matter is consumed in giving nourishment to vegetable life; until finally this depletion becomes so great that it is necessary to furnish to this same

soil decomposing organic matter in the shape of manure, else the land will be too poor in these elements to furnish nutrition to vegetable life. Again, I find it stated that malaria is very prevalent in the northwestern parts of the city of Philadelphia and in West Philadelphia. That it occurs on high ground, where a large amount of soil is continually disturbed in grading streets, draining, etc. Here, again, we have the conditions to which I have already referred, the exposure to the heat of the sun of large masses of moist organic matter (which has hitherto been buried away from the sun's influence), and its consquent decomposition, with the liberation of poisonous gases and the production of bad air. In cities a great and prominent cause of malarious or bad air is found in the method now in use of illuminating the streets and buildings with our ordinary gas. Illuminating gas is a compound of the two gases, carbon and hydrogen. When the match is applied to this compound a chemical change takes place. The carbon unites with the oxygen of the surrounding atmosphere and carbonic acid results. Not only is a very poisonous gas thus formed, but the vivifying element of the air, the oxygen, the principle which is so requisite to healthy life, is consumed in large quantities. You have very little idea how great this source of contamination is in large cities. To impress it on your memories, I will quote from

an article in the *Revue Scientifique*, by M. G. Robinet, who says: "The combustion of illuminating gas, in Paris (218,813,875 cubic metres) alone, produced last year a quantity of carbonic acid thirty-five hundred times more considerable than all the dead buried in the cemeteries during five years could give at the maximum rate of exhalation. The grand Opera House alone gives out every year thirteen times more carbonic acid from its gas lights than could be disengaged from all the cemeteries put together, even if all their carbon were converted into gas." Will you wonder any more at the sense of languor and oppression, sometimes amounting to a positive headache, which you so often experience after a long evening passed in a crowded theatre? Will you wonder at the pale, anæmic, cachectic appearance of so many of the residents of a large city? The electric light now coming into such general use seems to promise a relief from this source of impure air, and this alone should be a great argument in its favor. Another source of impure air in cities may arise from the ice supply. If this ice be cut from impure water, it will necessarily contain some of the impurities of the water from which it has been cut, and melting, will liberate these particles, allowing them to be wafted through the house. To illustrate this means of contamination, I will quote from the Louisville *Medical News*, in which, in

the course of an article on "The Sources of Ice Supply," the editor says, "Again, any one who has traveled from Joliet to Chicago, on the St. L. A. and C. R. R., cannot have failed to notice the long line of ice storehouses which stretch for miles along the banks of the Des Plaines river. This beautiful stream is one of the sources of the Illinois. It runs through miles of rich prairie land, and formerly drained nothing worse than the many farmers' barnyards, and a dozen thrifty villages along its banks; but now, alas! it is disgraced for a considerable part of its course by the companionship of the Illinois and Michigan canal, the outlet for the sewage of Chicago—a sluice of filth which might well put in a claim for rivalry with the Thames, after London is passed. Not a fish dares venture into its water; not a stranger approaches its bank without holding his nose; and upon either side of it is a strip of country where filth diseases abound; diphtheria, for instance, being a perpetual heritage to the unfortunate inhabitants. A curious situation for the sanitarian to contemplate. On one side is the loveliest of the 'laughing rivers that run in haste to form the Illinois;' upon the other, and at a higher level, the open sewer of a mighty city rolls its stinking sheet of suspended filth sluggishly on to the same destination, and between the two a narrow strip of land covered with houses wherein is stored the ice

for Chicago. It may be urged that there is no surface communication between the waters of the river and the canal; but who can doubt that there are many subterranean courses of contact; and at times of freshet, when the Des Plaines overflows its banks and the canal is high up in its walls, there is doubtless a commingling of the waters at some points above ground. Besides, if direct communication could be proved to be impossible, who will say that nightly the clean water of the river does not absorb myriads of disease-producing germs from the vapors and exhalations that arise from this uncovered sewer? All the laws regulating the diffusion of microscopic organisms testify to the truth of the proposition; and if there is any warrant for the statement that diseases of a zymotic character can be propagated through drinking water, the dweller on the banks of the Des Plaines, from the point where the canal first approaches the river to its mouth, had, during a fatal epidemic in Chicago, better say his prayers before placing a cup of its innocent-looking water to his lips. We believe that the ice supply of Chicago is chiefly derived from this source; and if so, does it not account, to some extent, for the present unusually bad health of that metropolis?'' Fortunately for the residents of Philadelphia this danger does not exist in ice cut from the Schuylkill river, since Professor Leffmann tells us some interesting facts

concerning the purity of this water, which will possess so much interest for all residents of the city that I give his remarks in full: "It is my purpose to take only a few minutes to give some results, or rather conclusions, which have been derived from recent analyses of our water supply. Very little is heard about the hygienic relations of Schuylkill water, probably because public opinion has long since settled to the conclusion that it is a good water. Nevertheless, as visitors sometimes complain of it, and as newspapers in their flings at the Water Department not infrequently condemn the quality as well as the quantity of the supply, I have ventured to take up the Society's time long enough to say that examinations made at various times during the winter and spring have shown that the water is of fair quality and cannot be regarded as an active cause of disease in our city. It is an insipid water, lacking the pleasant taste and sparkling character of spring water, especially of the so-called hard waters, and this lack is often taken as evidence of impurity. During the periods of freshet it becomes quite turbid, from the suspension of particles, mostly silicious, but such suspended matter rarely exceeds a grain or two to the gallon, and the individual particles are too minute to cause any irritation. In the turbid water several species of harmless animalculæ can usually be detected. In making any brief statement of a composition of

a water we are embarrassed by the fact that the modern methods of water analysis are very strictly technical; they give us, not the impurities themselves, but the amount of certain indications of impurity. Without stopping to explain the mere chemical phase of the question, I will simply give a comparison of a recent analysis of Schuylkill water with that of two samples of London water analyzed by the same method and considered excellent waters:—

| | Schuylkill. | Kent Company, London. | Chelsea, London. |
|---|---|---|---|
| Chlorine | 0.53 | 1.2 | 0.51 |
| Ammonia, from organic matter | 0.0028 | 0.0022 | 0.0035 |
| Total solids | 7.00 | 34.00 | 17.64 |

All the figures are grains to the imperial gallon. The Society of Public Analysts, of England, has recently proposed a system by which each factor in the composition shall be valued by an arbitrary number, and all the numbers being added will give us a figure representing the standard of the water. In good waters this sum will not exceed 35. Schuylkill water varies from 17 to 23, so that it comes decidedly below the limit. In regard to Delaware water I may remark that, so far as I have examined it, it is not as good as the Schuylkill water. The amount of organic matter is higher and the microscopic examination shows forms of life which are frequent in decomposing materials."

This question of water is a very important one in connection with the production of malaria, as evidenced by the testimony of many writers, the most recent observation I have found on the subject being as follows: "In reference to the increasing distribution of malaria, it is worth noting that water is often the vehicle by which the malarial poison reaches the system, and that it is often charged with malaria at points distant from the places where it comes to the surface and is used. Thus, it happens that soils are often reputed malarious, when, in reality, the unhealthiness is due to the fact just stated." Another prolific cause of malaria or bad air is the occupancy of a sleeping or sitting room by too many persons. Experience teaches that while life can be supported with a lesser quantity, yet in order that the various functions of the human body may be carried on properly and without let or hindrance, each adult should be supplied with three thousand cubic feet of air every hour. This amount of air will be contained in a room ten feet wide, thirty feet long and ten feet high. Natural ventilation, that is to say, the interchange of air through the cracks of doors and windows and through the walls of a room or house, will change this volume of air, will renew it, three times in the course of an hour. If special means for ventilation exist, if sufficient ingress for pure and egress for impure

air be provided, this volume of air will be renewed six times in every hour. So that under the first condition not more than three, and under the second condition no more than six persons should occupy a room of the dimensions given above. How seldom this rule is observed, you all know. These calculations do not take into consideration, you will notice, the consumption of oxygen by the carbon of illuminating gas, to which I have referred. And when you realize that one burner will consume more oxygen in a given time than one man, you will appreciate how important a factor this may become in deteriorating and rendering malarious or bad the air of a room. The brightly lighted sitting room, with its cheerful log fire, all the windows and doors tightly closed against Jack Frost, and the crevices hermetically sealed and stuffed, so that not a particle of the pure and bracing air of the cold and wintry night may enter, with the family of ten or twelve passing the long evenings of winter in a room but little if any larger than the one I have described, may be very cosy and comfortable, but it is terribly unhealthy. Again, many persons have a habit of making their own soap, for washing purposes, using the waste fat in this way. This is a most reprehensible and unhealthy custom; the fat has been kept for some time, until it is in a state of decomposition, and then put into the pot to boil, it sends foul gases all

through the house. Better dispose of your fat in some other way, it will be more economical and much more sensible; will be more healthy and will greatly reduce your doctor's bills. Slops left standing in an uncovered bucket in the back street for hours, until removed in the swill cart, will generate bad air. The sun beats down on this moist mass and the gases of decomposition are liberated. Foul and exceedingly poisonous gases often gain admittance to a house where the plumbing is not perfect, through the outlets for waste water and the overflow. If you have reason to suspect this, indeed, whether you have or not, it will be a wise precaution to have a metallic slide arranged to the overflow outlet, and keep it always in position unless using this opening, and to always have the stopper of all your basins and bath tubs in position, with an inch or two of water in the basin. While it is true that much disease is caused from foul air entering the house from the drain pipes, yet such ought not to be the case, there is no necessity for it. The hue and cry against wash stands and water closets is an unjust one. If properly arranged and drained they are perfectly harmless. This prejudice against them has arisen, not from the fact that the system is wrong or injurious in itself, but because it is not properly carried out. How can you expect an ordinary plumber, who, as an apprentice, has mechanically learned his trade

from his master, to know anything about scientific plumbing? He may do his work in a masterly and perfect manner, so far as the mechanical part of it is concerned. But what does he know about the principles of hygiene. I make the assertion that, if properly arranged, water-closets and sinks are by far the healthiest means of getting rid of refuse matter, and will support this assertion by the statement, that I would be perfectly willing to live in a house with a water-closet, sink and bath tub in every room, provided I had personally superintended the plumbing of the house. I will have more to say on this subject in the last chapter. The slop jar in a bed chamber is a common cause of impure air. You wash your bodies and empty the water into this jar. The water contains scales of your skin, as well as many of the dead particles of your body given out through the pores of your skin. This matter is organic, and undergoes decomposition. Unless the slop jar is thoroughly washed out every day it soon becomes foul, and is then an unhealthy article of furniture. Keep it covered all the time. Another prolific source of bad air in winter time arises from the modern method of heating houses by furnaces in the cellars. In the majority of instances the air chamber of the furnace derives its supply of air from the cellar, which must of necessity be very impure, since it is impregnated with the ashes and coal dust and the

various impurities usually found in a cellar. If the air chamber is supplied with pure air from outside of the house, if a receptacle with water is placed near the register, and if a proper outlet in each room, for the air when it becomes foul, exists, I can see no valid objection to furnaces. They certainly heat a house more thoroughly than any other system in vogue in ordinary dwelling houses, and if their drawbacks be reduced to the minimum their use is to be commended. Soiled clothing allowed to accumulate in a room will vitiate the air of the apartment. The soiling is due to dead organic matter derived from the body, and it will decompose and give rise to malarious or bad air. In this connection a most reprehensible practice in common use must be emphatically condemned. I refer to the habit of hanging wet diapers over a chair, before the register, to dry. Children are particularly susceptible to the noxious influences of bad air, and this practice will so vitiate the air of their rooms as to work serious injury to their little bodies. Wash each diaper as it is soiled and hang it out of doors, in the sun, to dry. There is a very important factor in the production of bad air which is so common and ought to be so thoroughly appreciated, that it seems almost foolish to refer to it here, still, as it does exist and as very little effort seems to be made to remedy it, it may do some good to dwell on it for a

little while; I mean dirty streets. Street dirt is principally derived from two sources; slops and refuse from houses, and excrement, both solid and liquid, from horses, dogs and the like. All this matter is organic and undergoes organic decomposition, with the consequent production of malarious or bad air. This is really the principal source of air contamination in large cities, as, witness the city of New York last spring and the city of Philadelphia at present. Does it not seem strange that intelligent men will go to all the trouble and expense that they do, to remove from their neighborhood all human excrement, and yet seem so indifferent to the presence of such enormous quantities of animal excrement in the streets, which is, in reality, nearly, if not quite as poisonous as the former. Consistency, thou art, indeed, a jewel, a jewel possessed by but very few inhabitants of our large cities. In my last chapter I will propose a remedy for this state of affairs, which may, indeed, seem utopian in conception and impossible of achievement, as it really is under our present selfish and corrupt system of government, but a plan that would be perfectly practicable were our city governed by intelligent men, who had the welfare of its inhabitants to guide them in their administration. Whatever city does first adopt this plan will find a wonderful diminution in its mortality rate, and will deserve and receive the

gratitude of the whole country for setting them an example, by following which the health of the nation will be greatly benefited, and the life of man prolonged. Having cursorily discussed the principal causes of bad air in the city, let us return again to the country, and see in what localities and under what conditions we will there find malaria. I have told you that malaria *can* exist everywhere. I have told you how malaria can and will be produced in houses, from what might be called hygienic defects of living. Let us now see what localities in the country are particularly prone, I might say naturally, to be malarious. Let me again say that I am not discussing the poisonous element of bad air which is capable of producing Intermittent Fever, and about the nature of which we know really nothing; this poison is developed and exists in certain localities which I could mention, and does not exist in others; but the malaria of which I am writing, the bad air I am telling you about, may be found anywhere, as a result of man's negligence or want of knowledge. A healthy country locality might be described as follows: High ground, without too much shade, and with a rather loose and porous soil, preferably a gravelly or gravelly and clayey soil. Such a briefly described locality will be naturally free from malaria, and if bad air does there exist, it will surely be the fault of the resident or of some

neighbor. When I say high ground, I mean comparatively, and not positively high. Country locations may be very high when compared with the neighboring city or river from which the comparisons are made, and yet be very low when compared with the country immediately surrounding them. Such a spot will not be, naturally, free from malaria or bad air. A pen picture of a country location which would be naturally malarious, would read as follows: Ground low when compared with the surrounding country, basin-like in character, with a hard, clayey, or otherwise impervious soil. Into such a location the refuse from the surrounding country would naturally drain. The rain descending from above would, of course, flow down from all directions into this basin, and in its downward course would carry along all the dead organic matter for some distance around, which would accumulate in a rotting mass on this low ground. The hard, impervious soil would refuse to allow this water to drain away through it, thus compelling it to lie on the surface until, in the rainy season, it would almost form a small lake. This, in the first place, would be unhealthy, since it would, of necessity, render the location very damp. But a still greater danger here exists. This mass of water, with its load of organic matter, lies on the surface of the ground. After a while the sun appears, and you can anticipate what

I am going to tell occurs. Here, again, we have the dead organic matter, the heat and moisture. Decomposition necessarily ensues, and the air becomes bad. I am sufficient of a farmer to tell you that such soil will produce very indifferent crops. The dead and decomposed organic matter, which in porous soil would soak into the ground and furnish nourishment for vegetable life, will here lie on the surface, and furnish poison for human animal life. How can you expect a locality that is too poor to grow potatoes to be rich and good enough to grow children. Just here, I will enunciate a rule, which is almost universally correct. It will serve as an almost infallible guide in selecting a country home. When you have found a high location, look into the character and nature of the crops produced. If you find them first class, you can, in the great majority of cases, make up your mind that such a location will make a healthy residence. Of course, you must find out whether these crops are derived from the natural soil, since almost any ground can be made to produce very good crops if thoroughly worked and manured. Apart from the nature of the locality, the same carelessness in properly disposing of organic matter will produce malaria in the country that I have indicated in speaking of the city. But in the country there are some particularly dangerous

practices in vogue which demand a moment's consideration. Thus, in many cases where a house stands on high ground, surface drainage is resorted to. The drain pipe from the water closet and bath tub will discharge its contents on the surface of the ground some twenty or thirty feet away from the house. This is most reprehensible. The supposition is that because of the sloping ground this refuse will all drain away. While very nice in theory, this is not the case in fact. At first most of this matter will drain away; but in time, and especially if the closet and bath be much used, the ground in the vicinity of the open mouth of the drain will become so saturated with this water that it will be unable to absorb any more. It will then be compelled to run along the surface. The grass and weeds will entangle and hold some of the organic matter, which will decompose, and when the wind is blowing towards the house, this poisoned air will be carried into it. To avoid this really great danger; great care and intelligence should be exercised in arranging the drainage. If a swift flowing stream, in which there is always plenty of water, even during the greatest drought, pass at all near the house, your drain pipe should empty into it. But unless there is always plenty of water and a sufficiently strong current to carry the waste away, do not think of draining into it. Because when the dry spell comes,

and the bottom of the small stream or creek is exposed to the sun, there will be found the accumulations of your winter's drainage, ready to decompose and poison the air. If you have no convenient stream, select the *very lowest* point on your land and dig there a deep well. Brick the sides of it, from top to bottom, and cement it thoroughly, so as to render it strictly water proof. Let your drain pipe empty into this well. The bottom of the well, being earth, will allow the liquid portion of the waste to drain off out of harm's way. The solid portion will accumulate, and the well should be emptied when it becomes full. An air-tight covering should be always in position on top of the well. If you take these precautions, and if your plumbing be good and your water-closet trap efficient, you need fear no danger whatever from this source. It would be well, if possible, for the family to absent themselves from home when the well is being emptied, and for you to employ a man for this work who makes a regular business of it, because such a man will not be affected by the poisonous gases, since usage breeds a tolerance. While, if you were to employ a man unaccustomed to such work, you might become the innocent and unwilling cause of his sickness, and may be of his death. Finally, to sum up, you must understand, from what I have said, that malaria will always be present wherever dead and decomposing organic

matter is, and that if such matter is allowed to accumulate in the vicinity of human habitations, and if proper measures to destroy it are not instituted, malarious or bad air will surely be the consequence, and the inhabitants of such a locality will surely suffer from its baneful influences. You also understand, to some extent, how really difficult it is, in many cases, to avoid the production of this bad air, how easily it is generated and how insidious may be its approach. To make you realize still more how insidious may be the march of this arch-enemy of health and longevity, I will conclude this chapter with a quotation from the *British Medical Journal*, in which Messrs. Maguire & Son, of Dublin, who have had great experience in the examination of dwelling houses say: "In endeavoring to awaken public attention to the importance of sanitary reform, we here enumerate thirty of the dangers to health which we most frequently detect in our sanitary examination of houses. *Any one* of these defects, by admitting foul air, constitutes a real danger to health; but, in the large majority of houses many of these defects may be found existing together, and in some houses they may nearly all be found, rendering those houses pestilential: (1) Common built drains under houses; large built drains under or near mansions. (2) Pipe drains with leaking joints, or broken, laid under houses, saturating the basement

with sewage. (3) Pipe drains laid under houses, without sufficient fall, or with fall the wrong way. (4) Drains of every kind, without proper intercepting traps, admitting foul air from sewers or cesspools. (5) Drains of every description, without a constant free current of fresh air through them. (6) Rat burrows from built drains or sewers undermining flags and floors, and admitting foul air to house. (7) Rat burrows worked alongside perfect pipe drains from street sewers, and into houses. (8) Defective connections between soil or waste pipes and sewers, admitting foul air to houses. (9) Soil pipes passing through interior of house, under almost any circumstances. (10) Soil pipes inside or outside houses, without any or sufficient ventilation. (11) Defective water-closet apparatus. (12) Water-closet cisterns with overflows joined to soil pipe or drain. (13) Safe trays under closets, connected to soil pipes or drain. (14) Two or more water closets or sinks on same soil pipe, untrapping each other when used. (15) Sink overflow pipes joined to soil pipes untrapped, or with trap liable to untrap. (16) Water supplies to sinks taken from water closet or other contaminated cisterns, and used by careless servants to fill bed room caraffs for drinking. (17) House cisterns and tanks with overflows direct into soil pipes or drains. (18) Traps of every description with-

out ample ventilation to guard them. (19) Scullery sinks connected direct to drains, admitting foul air to houses, not only through traps, but through joints of brickwork all round, as shown by our smoke test. (20) Bell traps, with loose covers, on scullery sinks connected to drains. (21) Gullies or traps in sculleries, laundries, larders, etc., connected to drains, usually dry and untrapped. (22) Rain pipes used as ventilators to drains, delivering foul air near bedroom windows, or under eaves or roofs. (23) Ash pits near larders and pantries; ash pits liable to soak foul moisture through house walls. (24) Defects of drainage and rat burrows, from neighbors' houses. (25) Water tanks in areas, near ash pits or sculleries, and with overflows direct to drains. (26) Wash-stand basins in dressing rooms, connected directly in any way to drains or soil pipes. (27) Water-closet cisterns in return rooms, frequently under bedroom or parlor floors, perhaps with overflow direct to drain. (Sixteen years ago the writer thoughtlessly used a room of this kind, and was attacked with Typhoid.) (28) Cesspools near houses, and cesspools or defective drains near wells. (29) Neighbors' drains crossing under houses or joining drains. (30) Drinking water defects, and all impurities likely to contaminate milk, meat, or food of any kind." After reading this long list, you may wonder how it is

possible for any house to be healthy, when disease has so many avenues of entrance. Truly, our life is one long, continual warfare against disease. But you will notice that all these indications, as well as all the others which I have pointed out to you, depend upon the presence of decomposing organic matter. If such matter is not present, no matter how defective the drainage may be, poisonous gases cannot enter the house, because they cannot exist. Therefore, once more, in conclusion, *malaria means bad air*, and the most frequent cause of this bad air is organic decomposition.

## CHAPTER III.

### SYMPTOMS OR SIGNS OF MALARIA.

Typhoid Fever has its special symptoms; so has Smallpox, Diphtheria and Intermittent Fever. And by these special signs or landmarks, as it were, is each particular disease recognized and differentiated. When called to a patient, who at regular intervals has a well marked chill followed by fever, succeeded in turn by profuse sweating and a subsequent restoration to health, the physician at once recognizes a case of Intermittent Fever. So it is with every other special disease. There are certain definite signs and symptoms, the presence of which make known the nature of the disease. It is not so with *malaria*. The conclusion that a person is suffering from malaria must be arrived at rather by a system of exclusion of the symptoms of other diseased conditions, than by the presence of any special characteristic symptoms of this trouble. This is because malaria or bad air will produce, and does produce, such a great variety of symptoms, that it frequently simulates many other diseases. I have told you that pure air is an absolutely essential agent to the healthy performance of duty on the

part of your organs. If, instead of pure, bad air or malaria enters your lungs at every inspiration, and from your lungs enters your blood, the poisonous elements act injuriously on your system at large and interfere with the functions of healthy life. Acting thus on all parts of the body, you can understand how diverse may be the symptoms presented. Every one of us has some particularly weak spot; in you it may be the lungs, in another the stomach, in a third the kidneys. Whatever injurious agent may act on the body of each particular being will make itself most manifest on this weak spot. So that in one malaria may present symptoms referable to the stomach, in another to the lungs, and in a third to the kidneys. In still another class of cases it seems to exert a depressing and debasing influence on the system at large; lacking the healthy stimulus of pure air, all the organs of the body seem to imperfectly perform their duty, and a low state of vitality, a depressed condition of the general health, without any definite or peculiar symptoms of any special disease, exists. This is the most common form in which bad air manifests its evil influence. And when you bear in mind the fact that a wholesome supply of fresh air is an absolute essential of healthy life, you can easily comprehend how impure air, even that which does not contain the germ of any special disease, may produce this condition of de-

pressed health, of lowered vitality. So that when a person complains of ill health it becomes necessary, in the first place, to carefully examine him for any special disease that may give rise to the symptoms of which he complains. If after a careful and thorough examination all specific diseases are excluded, the hygienic conditions and surroundings of the individual must be inquired into, and most likely malaria or bad air, from some cause or other, will be found. How many people are there in the world who are constantly complaining. They have no organic disease. They are not confined to the house, but are able to go about. They are not addicted to excesses of any kind. They do not suffer from dyspepsia, neither are they afflicted with constipation. They do not absolutely suffer from headache, but are always verging on that condition. They do not exactly experience nausea, but feel as though almost anything would make them vomit. They feel hungry, and yet when they go to the table an unconquerable loathing for food, takes possession of them. They feel sleepy, and yet when they go to bed they lie awake for hours. They do nothing to exhaust themselves, yet are always tired. They take interest in nothing. Their minds are clouded and their memories poor. Such is a description of a person afflicted with malaria. If such a person lives in the city, let him walk, ride or drive in the

pure air of a healthy country neighborhood, and immediately he feels better, the old symptoms returning, however, when he again reaches his malarious residence. So that when one is not in robust health, yet has neither special nor organic disease, but feels as though (to put it vulgarly) he were only half living, if he can discover no other cause for this unfortunate state of affairs, let him look carefully about him and see whether he be not living in a poisoned atmosphere. Let him remember and realize how many and how unsuspected may be the causes of this impure air, and let him diligently search for, and when found remove, the particular cause in his case. Let him remember the various causes for the bad air I have pointed out; let him not forget how profoundly this malarious atmosphere may affect his system, and let him be ever mindful that I have said that the principal source of this impurity is organic decomposition. I have purposely curtailed this chapter on the symptoms of malaria, for two reasons. *First.* Were I to enumerate all the symptoms producible by bad air, I would be obliged to name every sign of every deviation from health, since, as I have told you, bad air, by interfering with the healthy functions of life, is capable of producing, at times, the symptoms or some of the symptoms of every disease. This would be confusing, unintelligible, and productive of no general good. *Second.* The two

important points for the general public to learn about malaria are, how it is produced and how it can be avoided. Therefore, with this short hint at the symptoms, we will close this chapter and go on to the last and very important one, "*How to avoid malaria.*"

## CHAPTER IV.

### HOW TO AVOID MALARIA.

This little book is intended for intelligent and thinking people. It would be impossible of achievement, and therefore useless to undertake in so small a volume, the exhaustive discussion of any subject, so I am endeavoring merely to give you the outline, as it were, of the question, the details to be filled in by the thought and reasoning abilities of the intelligent reader. These small popular books on matters pertaining to health would be dry, uninteresting, unintelligible and uninstructive reading, were all the small details and minutiæ thoroughly discussed. They would then partake more of the nature of medical text-books, and would be interesting and instructive only to the student of medicine. The busy man of the world would not have time to read them. When, however, this information is condensed, and the salient points selected from it given to the public in a small volume, which can be read in a short time, it will be productive of much good. The uneducated and unintelligent classes will not, of course, read these books; they know nothing and care nothing about the means of preserving bodily

health. The intelligent classes, who will read these books, do know and do care about health. They value it, and are anxious to preserve it to its utmost limit. Such people are blessed with the power of reasoning, and all that is necessary is to direct this power into the proper channel. Therefore I will point out to you the main indications for the avoidance of malaria, and will give certain hints which, aided by your reason, will enable you to avoid in every instance this bad or malarious air. Let us first look into the city. Do not occupy a house until you have had the whole drainage system carefully examined by a thoroughly competent expert. If found defective, do not move into the house, even though you may get it for nothing; if you do you will have more than the amount of the rent to pay in doctors' bills. From what I have told you in the second chapter, you can understand that defective drainage is *the* most prolific cause of *malaria* or *bad air*. Therefore it is of paramount importance that this matter should be carefully attended to. If you intend to build a house, it behooves you to employ only a first-class plumber to do your work. Even if you are close and mean, and desire to economize in other ways, do not begrudge expense in this direction. If you look around, get many estimates from different parties, and finally decide on the cheapest, you may have your foundations, your

brick work, your plastering and your wood work, done for very little money. In a short time the defective workmanship will make itself known, and you will be put to additional expense to have it remedied. The only ill effects, however, arising from this mistaken economy will be some personal discomfort and an additional expense, which, with the original cost, will foot up a sum greater than would have been requisite to have done the work properly in the first place. But how different it will be with the plumbing. If you look about you, and get one plumber bidding against another, you can, beyond doubt, have the plumbing of your house done very cheaply, that is, for a very small sum of money, comparatively speaking. But if it is imperfectly done, the damage resulting cannot be measured by mere personal discomfort or increased expense. Probably the first intimation you may receive of imperfect drainage will be when a serious case of sickness, mayhap a fatal case, appears in your family. The pipes and system of drainage may be sufficiently complete, mechanically speaking, to carry off all the refuse from your house; there may be no leaks and nothing prominently calling your attention to defective drainage. After a while, maybe, some one member of your family, or even possibly the majority or all of them, may become unwell. Without exhibiting any definite symptoms of any

particular disease, they are out of sorts. Formerly, before removing to your present house, they have all been hearty and robust. You cannot account for the change. They may sleep well and yet awake unrefreshed. They may sleep, and have their sleep disturbed by hideous dreams. They may arise in the morning with a dull, heavy feeling in the head, a sense of nausea, a coated tongue, a bad taste in the mouth, and a general sense of lassitude and unrest altogether inconsistent with a healthy body after a night of healthy sleep. They are not sick enough to require the doctor, yet they are not well. They have good appetites, may be, but its full gratification distresses them. In a word the functions of life are imperfectly and improperly performed. The vital power is depressed. For a long time you speculate as to this cause of ill-health, and reason and wonder in vain. Finally your attention is directed to your drainage, and upon careful examination you find it so defective that great volumes of foul sewer gas are allowed to enter the house, and, mingling with the air in your living rooms, to render the atmosphere you use *malarious* or bad. Now will come in the extra expense, and I can assure you that by the time you have brought your plumbing to that degree of excellence necessary to render your house healthy, you will have spent very much more money than you would have done had your

plumbing been properly attended to in the first place. In England, this question has been considered of sufficient importance to have had legal enactments for its solution, and to-day the whole of Great Britain is divided into sanitary districts, with a medical officer of health in each. This officer is empowered by law, and is obliged, to examine every new building in course of erection. If it is being constructed according to the most approved hygienic rules, all is well; if not, he has the authority to point out in what it is deficient, and direct these defects to be remedied, possessing at the same time the necessary legal power to enforce the fulfillment of his directions. This and other sanitary reforms in England have been so beneficial in their influence on the life of man, that within a few years the annual death rate in that country has been reduced from about eighty-four in every thousand, to only twenty-four in every thousand. In time, it is to be hoped that we will have such beneficial laws in this country, compelling persons, against their own foolishness, to live as they should. At present our people are so busily occupied developing the enormous resources of our great country, that they have but little time to bestow upon the preservation of health. But when we are more developed and commence to have leisure in which to become cultivated, our attention will be given more in this direction.

In the meantime, it becomes the duty of physicians to use all the persuasion of which they are capable, to induce people to live in accordance with the doctrines of hygiene. To still further illustrate the importance of this point, I will quote from the *Medical Times* and *Gazette*, of England, where, under the heading of "Noteworthy," I find that "The Local Board of Eastbourne have got a clause in their Bill, whereby they are enabled not only to regulate the junction of house drains with the sewer, but to go inside the house and see that it is constructed on sanitary principles, without which permission will not be given for occupation." As I have already indicated, the two great causes of impure air in cities are, 1st. Defective drainage, in its most liberal sense. Any imperfections that may interfere with the thorough removal of dead organic matter, or that may allow the gases resulting from the decomposition of this matter to be returned to the house. 2d. Dirty streets. To remedy this latter condition comes in my utopian plan, already referred to. The most thorough sweeping alone will not and cannot completely clean the streets, more particularly when, as in Philadelphia, they are horribly paved with rough and unsightly cobbles. Notice, some day, when the street sweepers are at work in your neighborhood, what a perfect farce their work is. They sprinkle the streets a *little*, a

*very little*, and then a number of men commence to sweep. In a short time they raise a tremendous dust, full of dead organic matter, which finds its way into the lungs, eyes and ears of passers by, and is carried by the wind hither and thither, through open windows into houses, and much of it is deposited at some point in the street a short distance away. After a while, these antiquities (street sweepers are always aged and decrepit) succeed in accumulating piles of dirt along the street. As fast as built, they are partially demolished by the horses' feet and wheels of wagons passing over them. In time, a filthy cart appears, and what remains of these dirt mounds is lifted on a shovel and thrown toward the cart. Probably a goodly proportion is deposited in the cart, while the balance falls back into the street, or is carried off by the wind. When the cleaning of a street is finished, it is, of course comparatively cleaner than it was before, but it is far from being positively clean. There is sufficient dirt, enough dead organic matter, to poison the air and render the city unhealthy. How can we do away with this dirt. I will tell you. In the first place, some of the enormous sums of money annually wasted by the administration of our large cities should be utilized to largely increase the water supply, the reservoir system of our cities, so as to make it equal to the demand I am presently

going to make upon it. In Philadelphia, a few of the millions foolishly expended upon our new public buildings would suffice to give us this increased water supply. As far as possible, cobble paving should be done away with, and our streets laid with a smooth, even pavement of some kind, Belgian block, Asphalt, or the like. The stream of water from the fire plugs should have sufficient pressure to throw it with great force more than half across the streets. Every morning at three o'clock, or thereabouts, it should be the duty of every policeman to turn on every fire plug in his beat and to let them run with full force until five o'clock, or for two hours. Let us glance for a moment at the advantages of this plan. Every morning, every single particle of the decomposing organic material which had accumulated the day before would be washed from the surface of the streets, into the sewers. This large and powerful flow of water, rushing through the sewers, would carry everything before it. This daily washing out would so purify and cleanse these previously dirty sewers, that sewer gas would be unheard of; thus not only would the streets be daily *thoroughly* cleaned, but the air of dwellings would be deprived of its most dangerous impurity, sewer gas. This gas is generated in sewers from the decomposition of organic matter accumulated therein. If this matter were removed daily, and the sewers

thoroughly washed out, the production of sewer gas would be an impossibility. The only additional expense attendant upon this plan would be for the extra water supply, and this would be infinitely more than counterbalanced by honest city government. Making the policemen turn on and off the water would do away with the necessity for contractors and their antiquated horde of sweepers. If, however, it was considered necessary, for political purposes, that this army of men should be supported by the city, let me suggest a more useful way than the one in which they are at present employed. Ten years ago, in Florence, Italy, I was struck by the remarkable cleanliness of the streets in the better portions of the city. They were laid in asphalt, and were immaculate. I was at a loss at first to account for this great purity, since horses and wagons were continually passing to and fro. The mystery was solved when I met a man walking in the middle of the street, with a large hamper-like basket strapped to his back and a shovel in his hand. Every particle of horse manure, every piece of paper, in fact, everything excepting the asphalt pavement itself, was dexterously lifted on the shovel and deposited in the basket. Thus, with but little trouble and no attendant dust, were the streets of the better portion of Florence kept marvelously clean. With the flooding in the early morning and the

constant daily gathering of this refuse, dirty streets would be impossible, while epidemics would be unheard of. How beautiful, on a bright morning, to look out of your window and gaze on streets absolutely free from impurity, streets that positively smell sweet. Let me beg any newspaper editors who may read this book to think over my plan, and having recognized the great good to be derived from it, to set apart a space in their papers for the furtherance of this grand sanitary reform. Let them urge the matter upon the attention of the city authorities, and do not rest until the proposition is an accomplished fact.

Dr. Richardson, of London, a Sanitarian of eminence, has printed an address called "*Hygeia, a City of Health.*" There are so many valuable suggestions contained in it, concerning our subject, that I will make a few quotations therefrom. He says, "The most radical changes in the houses of our city are in the chimneys, the roofs, the kitchens, and their adjoining offices. The chimneys, arranged after the manner proposed by Mr. Spencer Wells, are all connected with central shafts, into which the smoke is drawn, and, after being passed through a gas furnace, to destroy the free carbon, is discharged, colorless, into the open air." "Considering that a third part of the life of man is, or should be, spent in sleep, great care is taken with the bed-rooms, so that they shall be

thoroughly lighted, roomy and ventilated. Twelve hundred cubic feet of space is allowed for each sleeper, and from the sleeping apartments all unnecessary articles of furniture and of dress are rigorously excluded. *Old clothes, old shoes,* and other offensive articles of the same order, are never permitted to have residence there." "The houses, being built on arched subways, great convenience exists for conveying sewage from, and for conducting water and gas into, the different domiciles. All pipes are conveyed along the subways and enter each house from beneath. Thus the mains of the water pipes and the mains of the gas are within instant control on the first floor of the building, and a leakage from either can be immediately prevented." I could go on thus for pages, making interesting and valuable quotations from this excellent little book, but instead of doing so, I will recommend to any one who desires to build a truly model house, from a sanitary standpoint, the careful study of this little essay, entitled "Hygeia, a City of Health," by Benjamin Ward Richardson, M.D., F.R.S. In addition to the few measures I have indicated, let me impress strongly upon you what I have already said, that outside of mechanical impurities, malarious or bad air will be produced, in the majority of instances, by the decomposition of dead organic matter, and since the death of organic matter is one of the

necessary conditions and outcomes of the life of the world, it must always take place and its decomposition must ensue, during which process it is separated into its original elements, which elements are unfit to sustain healthy animal life. So that I will make the broad and sweeping statement that, in order to avoid malaria, all dead organic matter must be removed from the vicinity of man while it is undergoing decomposition. This can be accomplished by attending to the following indications. Perfect drainage. Removal of excrement of all kind. Perfect cleanliness of house, person and clothing. Free ventilation. Abundance of sun-light. Immediate removal of all soiled articles. Frequent removal of table slops, and the limited use of gas, or if freely used, an abundant supply of oxygen. I have told you that carbonic acid gas, which is produced in so many ways, is a very important element of atmospheric impurity. The phenomena of the workings of nature, I must also tell you, are very beautiful and very complete, and in no instance is this remarkable adaptability of means to ends more perfectly illustrated than in the disposition of this very carbonic acid gas which is so liberally produced in nature. You now know that this gas is a combination of carbon and oxygen. The carbon, I have told you, is very poisonous to human life, but according to the wise provisions of na-

ture it is this very article for which vegetable life hungers. Therefore trees immediately seize upon and appropriate this carbon to themselves and turn loose the oxygen, once more pure and suited to support human life. So that trees growing in front of your house are very healthy and should be encouraged. They act as scavengers, they purify the air. In his model city, already referred to, Dr. Richardson says that he would have trees growing on either side of every street. Now to the country. Here, of course, you will have the same dangers of impurity to contend against as in the city, if you have the same conveniences. Although the greater space around your house and the lesser interference with the currents of air will dilute and render less hurtful these noxious elements. So that, while, as I say, you must be on the alert against these impurities, just as in the city, yet the greatest danger to be considered in the country is from a naturally malarious or unhealthy location. I have already indicated what localities ought to be unhealthy. To point this I will relate an actual case, which is not by any means an isolated one. I had at one time a patient who lived in a very pretty place in the country. But the land was low and the soil was of heavy clay. His place was lower than his neighbor's, all of whose drainage flowed from every direction into his ground. When it rained the water

would lie in pools, and in dry weather the clay would bake like bricks. His friends would come to see him and admire his place, and comment on the healthy appearance of his family, and think he was so wise to live in the *pure* country air. This was before the scenes. Now take a peep behind them. The children were apparently healthy. They were never confined to bed by sickness. Neither his wife nor himself ever had any serious illness during their residence in this place. Yet the children were cross, peevish and fretful; their appetites were fitful and erratic; half the time they were exhausted and wanted to be nursed. Their sleep did not seem to refresh them. One day they would seem well and hearty, and the succeeding one languid, petulant and feverish, without any apparent cause. His wife was a constant sufferer from dyspepsia, which persisted during her entire residence in this place, in spite of the greatest care in eating and varied medical treatment. While the gentleman himself, though never sick, but young, strong, and ordinarily robust, never felt comfortable. He was always tired, and the slightest exertion would produce great exhaustion. Although they both retired hardly ever later than half past nine or ten o'clock, and led the most regular kind of lives, yet they were always uncomfortable and depressed. To such an extent did this unhealthy condition go, that the wife, in

her despondency, was wont to exclaim "*What is the use in living, if I must feel so badly all the time*, AND SO UNEQUAL TO EVERYTHING." Yet apparently there was no discoverable cause for this condition. Here was a perfect illustration of the evil and insidious influences of bad air; typical cases of malaria. Now note what followed. This gentleman had a relation living near by. But his location was of the nature I have described to you as naturally *non-malarious*. Occasionally he and his wife would visit this place. A wonderful and magical change would occur. A hearty supper would not be followed by dyspepsia. A pleasant evening would be succeeded by a long night of sound sleep, and in the morning they would arise refreshed, while a walk before breakfast would be substituted for the customary languid lolling around in their malarious home. This change occurred so frequently and so universally, indeed, there was not one single exceptional instance, and the change was so immediate and so marked, that the gentleman commenced to think that his location could not be a healthy one. He commenced to investigate, to consider, and to study, and finally concluded that his place was naturally unhealthy, that it was malarious. When he reached this conclusion, he immediately moved. Like magic, the dyspepsia, the malaria, the langour, the inaptitude for work, the general oppres-

sion, vanished, and they were once more naturally healthy and robust young persons. This is not a fancy picture; it is drawn from real life, and furnishes an excellent illustration of malaria. I have said that this book is intended for intelligent persons. Ignorant people will never derive any benefit from such books, because they cannot comprehend the points made. Were I to enumerate all the causes of malaria, and all the means recommended for its avoidance, I would write for many months and would make a book so large and so full of dry details that very few of you would undertake to read it. Yet with such a large volume I could not hope to do as much good as with this smaller one. When one endeavors to instruct intelligent and thinking persons, it is proper that he should direct their thoughtful minds in the proper channel. Too many small details not only insult this presumed intelligence, but render a book so tiresome that it is apt to be laid aside. Therefore it has been my purpose, in preparing this small volume, merely to throw out certain hints, to erect sign posts as it were, which would enable the intelligent man or woman to avoid malaria. I do not claim to have exhausted the subject, by any means; I have not enumerated all the causes of, neither have I mentioned all the methods of avoiding, malaria. But I have said enough to make you reflect, and this is the true

object of all writing. If I have made clear to you the true nature of malaria, if I have established my theory in your mind, and if I have directed your intelligence and your reasoning faculties in the right channel ; if I cause you to reflect, I am deeply gratified, for then have I fulfilled my purpose in undertaking this task. If my few words will cause you so to act as to diminish in any degree the immensity of unnecessary suffering produced by malarious or bad air, my ambition will be satisfied, for to do so I have written this little book. Therefore, asking you to remember that I am writing for thinking people, I will conclude what has been to me a very pleasant duty, summing up in a few words the substance of this little book, which, constituting the essence, so to speak of all that I have told you in it, I will beg you to take seriously to heart, to remember, to ponder over, to reflect about and to act upon. Do so and I assure you we will hear much less about malaria. *Malaria means bad or impure air. These impurities are of various kinds. They consist of any substances which are injurious to the health of the human body. They may be of a mechanical character ; but are generally derived from organic decomposition. Everything that has life, be it animal or vegetable,* MUST DIE. *Everything that dies* MUST DECOMPOSE, *and everything organic that decomposes* MUST PRODUCE BAD AIR, *if the resultant*

*products of this decomposition become mixed with the air. Bad air depresses the whole system; malaria vitiates the body and interferes with the healthy performance of function of every organ. Its symptoms are innumerable, since it may present some symptoms of every known disease, because, as each specific disease will present symptoms referable to some particular organ or part, according to whatever organ or part may be the seat of the disease, and as malaria will affect every organ or part on account of its deleterious action on the whole system, it may and will offer symptoms of some disease, when in reality such disease does not exist. Since malaria is principally due to organic decomposition and is always produced by it, it* MUST *be found, to a greater or lesser extent, wherever organic matter is* EXPOSED *to decomposition, its severity or mildness depending upon the amount of such matter exposed. Since the principal cause of malaria is organic decomposition, and since it is one of the inevitable laws of nature that organic matter* MUST DECOMPOSE, *therefore it is self evident that the surest way to* AVOID *malaria is to remove this matter from your presence while it is undergoing decomposition.* You now have the question of malaria concisely placed before you. Reflect and think about it. Use your intelligence and your judgment. Act upon the results of this intelligent reflection, and banish *malaria* from the haunts of civilization. In final

conclusion, one word of wholesome advice. If you value your health, do not use quinine without medical advice. It is a strong medicine, potent for good if properly used, and equally so for evil if improperly employed. It will cure Intermittent Fever, when intelligently administered, and is useful in many other conditions of ill health, but on true malaria, such as I have been describing to you, it will have no good effect whatever and may do much harm. If you ask a druggist about the soundness of this view, he will tell you it is false, because a large proportion of his profit is derived from the popular use of quinine; but any intelligent, conscientious and unprejudiced physician will substantiate my statement.

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