PRESIDENT'S ADDRESS.

The Evolution of Medicine in Indiana.

Robert Hessler, A. M., M. D.

On looking over the addresses of our past Presidents, I observe that they have usually dwelt upon subjects in which they were especially interested, and I feel it but natural that I should do likewise.

In addressing you I am not unmindful of the fact that the people as a whole are behind you, are in a measure represented by you as leaders in scientific thought, and that a discourse should be shaped accordingly. All that I should like to say would require much time; what I can say in the brief time allotted must be suggestive rather than a full and exact statement of scientific facts and deductions.

The subject is a vast one, but I shall consider it briefly from three standpoints: First, the evolution of the medical student and the coming of the medical man into our State; second, the evolution of diseases and the coming in of new diseases, or, rather, the introduction of old diseases into a new locality; and lastly, the changes in methods of the treatment of diseases.

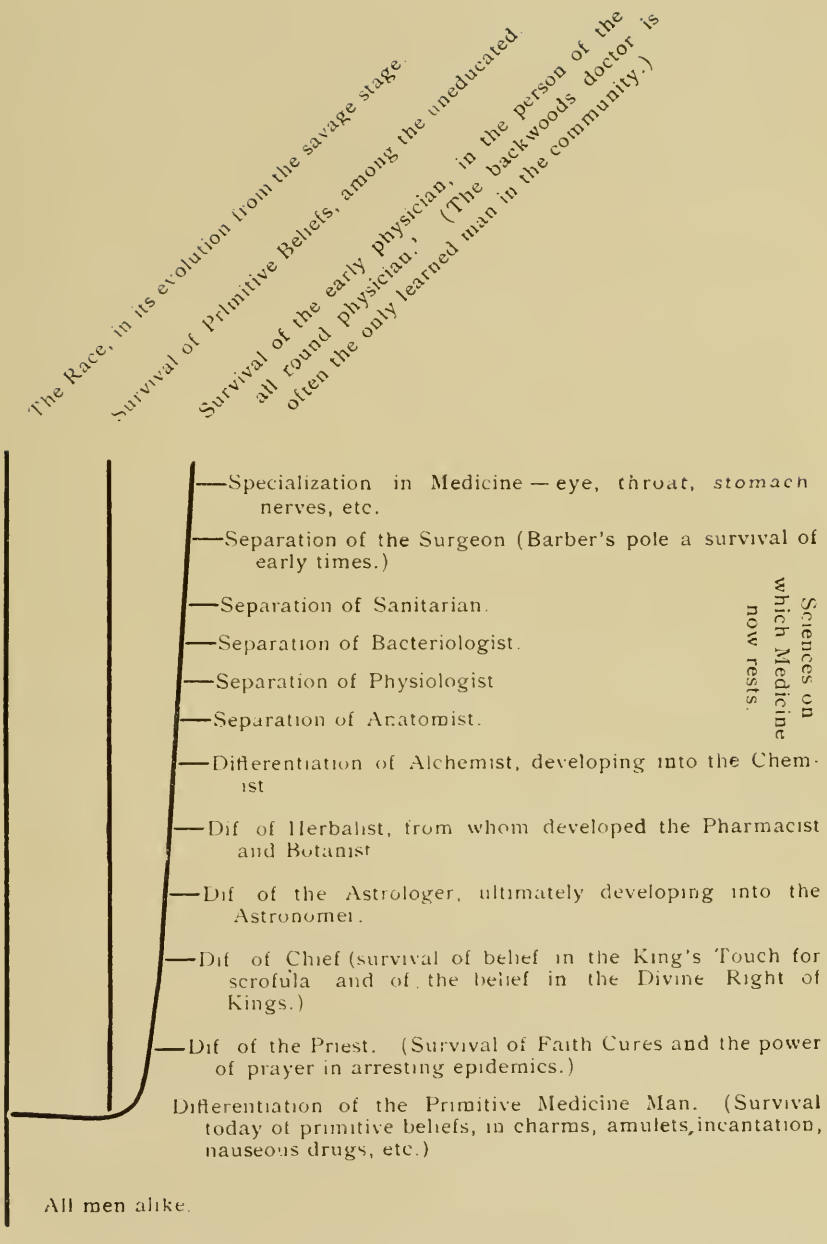
Art precedes science everywhere. Plants were used and cultivated before there was a science of botany; many of the processes underlying chemistry were known before there was a science of chemistry. Likewise the sick were treated before there was a science of medicine. There are not wanting those who deny that there is a science of medicine and who assert that it is simply an art based on many sciences—on anatomy, bacteriology, chemistry, and so on through the alphabet, but the prevailing view is that there is a science of medicine. Whichever view we adopt must lead to the conclusion that the greater a man's knowledge of science, the better a practitioner he will likely be, other things being equal.

What is the reason, I have been asked, so few of the Indiana physicians are members of the Indiana Academy of Science? If physicians are scientific men, why are so few members of the Academy? My usual reply is that our physicians are so busy fighting disease and giving relief to the sick that they have no time—such a reply satisfies many and places the doctors in a good light. But such a reply does not quite fit in case of the question: Why are so many doctors not members of a progressive medical society? Or, Why do so few contribute to the scientific medical literature of the State? Perhaps a brief review of the evolution of medicine in Indiana will enable us to draw some just conclusions.

As sciences do not spring up suddenly, but are a matter of slow growth, so likewise the accumulated stock of knowledge is not suddenly transferred to a new country; it takes a long time to bring it in, and our State is no exception.

The Primitive Medicine Man: The primitive medicine man was the first to differentiate from the race; when all hunted and fished, he alone stood apart and in the course of time separated more and more. As knowledge was brought together, there was a further differentiation, sciences crystallized out and pursued independent courses—but in their application are always of benefit to man. Where the early medicine man held all the knowledge of his race or tribe, in the course of time there arose a number of learned men. The man who studied the stars in time developed into an astrologer and later on into an astronomer, just as the herbalist developed in time into a pharmacist or botanist. (The diagram is intended to show this relationship in a general way. The survival of old time beliefs and methods of treating diseases being represented by a line parallel to the development of the race, we need only think of the use of charms and amulets, of faith-cures, the administration of nauseous drugs, and so on, to gain an idea of how much still survives.)

Indian Medicine Man: The native Indian medicine man belonged to a race still in the childhood of civilization, a race in the hunting and fishing stage, and his beliefs and methods of treating disease were on a level with such a stage: moreover at the time the white man first came in, the Indians had few diseases to contend with. Contrary to the popular belief, the modern physician can learn nothing from the Indian medicine man, though the life of the Indian can teach him many things pertaining to the value of simple food, pure water and air, with out-of-door exercise.


The Race, in its evolution from the savage stage.
Survival of Primitive Beliefs, among the uneducated.
Survival of the early physician, in the person of the all round physician.' (The backwoods doctor is often the only learned man in the community.)
—Specialization in Medicine — eye, throat, stomach nerves, etc.
—Separation of the Surgeon (Barber's pole a survival of early times.)
—Separation of Sanitarian.
—Separation of Bacteriologist.
—Separation of Physiologist
—Separation of Anatomist.
Sciences on which Medicine now rests.
—Differentiation of Alchemist, developing into the Chemist
—Dif of Herbalist, from whom developed the Pharmacist and Botanist
—Dif of the Astrologer, ultimately developing into the Astronomer.
—Dif of Chief (survival of belief in the King's Touch for scrofula and of the belief in the Divine Right of Kings.)
—Dif of the Priest. (Survival of Faith Cures and the power of prayer in arresting epidemics.)
Differentiation of the Primitive Medicine Man. (Survival today of primitive beliefs, in charms, amulets, incantation, nauseous drugs, etc.)
All men alike.

Early Indiana Physicians: When the pioneer came to our territory he left his old diseases behind, but in the course of time they followed him, and he had to make the best of it. Until a country is sufficiently settled to support an educated physician, none comes in. Men were influenced then by the same motives that influence them today. No well educated physician today thinks of settling in the backwoods; but as soon as a settlement is made and a village arises, some venturesome spirit is apt to come in. As a matter of fact the first Indiana physicians were men connected with the United States army posts along the Wabash river, little over a century ago; unfortunately they left no records of their observations.

Physicians proper began to come in during the first decade of the past century, but there are scarcely any medical records prior to the year 1820. The early physicians led a strenuous life; there were no roads and the sick were scattered over a large area; it was a horseback and saddlebag life. Few had time or inclination to write—to the few who did write we owe all our knowledge of those days. Medical books then were few and costly; a man with one book in each branch of medicine was indeed a rarity. Medical journals were equally rare, and the fact that some of the early Indiana physicians took the London Lancet speaks volumes for their learning and ambition.

The educated physician soon had apprentices; that is, farmers' sons, who learned the rudiments of the profession and then began their own work; few went to a medical school. For a long time there were only two medical schools this side of the Alleghanies—at Lexington, Ky., and at Cincinnati—and to attend these meant a long trip over roads at times almost impassable. At first there were simple medical laws, but these were abolished, and after 1843 the field was open to all. Just as bad money drives out the good, so bad physicians drove out the good, or prevented good ones from coming in, and for a long time medical affairs went backward. But we must not forget that Indiana retrograded generally during this time. In 1850 Indiana was the eighth State in point of number of inhabitants, but ranked twenty-third in illiteracy—lower than all the slave states but three. The term "Hoosier" was a term of reproach, from which our physicians did not escape, and sharp criticism was passed on some of our civil war surgeons.

The early Indiana physicians had few kinds of diseases to contend with, but these few made up in number of cases for the lack of kind. Malaria ravaged frightfully and dominated all diseases. The standard

treatment for malaria, as for most other diseases, was bleeding, purging and vomiting, and the use of calomel, whisky and bark, the latter in time displaced by quinine.

In the course of time the pains and aches of civilization came in. I have heard old settlers speak of them as "new-fangled diseases," and there came also a revulsion against old methods of treatment. In the absence of restraining medical laws, a host of practitioners soon appeared; some of these became quite skillful, but one is reminded of the story of the man who expressed his admiration at the skill of the oculist who had just operated on him; the oculist admitted that he was skilled, adding, "But I spoiled half a bushel of eyes in learning to perform that operation."

Gradually the "isms" and "pathies" of medicine appeared, most of them a protest against some of the absurdities of the old practitioners. There are no "isms" nor "pathies" among the sciences on which medicine rests—anatomy, bacteriology, chemistry, and so on, are free from them; but when it comes to therapeutics or treatment, one-half of the doctors think the other half wrong. However a number of established facts are gradually accumulating and in the course of time there will be a science of therapeutics, in which serum therapy will, no doubt, hold a prominent place, and many of the drugs of today only a minor one.

With the advance of civilization a number of well defined diseases tend to diminish, but with a massing of humanity a host of ills tend to increase. There are any number of affections that scarcely rise to the dignity of a disease. Prescribing becomes largely a prescribing for symptoms, and many of the sick do their own prescribing; some go to a physician only as a last resort. Many are unwilling to pay the physician for the time it takes to investigate, and so the physician himself simply prescribes for the symptoms. Some physicians are so busy doing this that they have no time for study or to attend the meetings of their medical society, much less attend and take part in the deliberations of any scientific society. The bane of the scientific physician is the busy practitioner who flits from one patient to another, never studying any case in detail nor taking time for study, or manifesting any interest in the progress of medicine. The number of men who have contributed to the annual Transactions of the Indiana State Medical Society is remarkably small; where a few make frequent contributions, many make none at all.

Medical Schools: For a long time our State had no school for the education of physicians and the more ambitious students of medicine had

to go elsewhere. More than fifty years ago the doctors of Indiana were discussing the advisability of establishing a medical college; there were arguments pro and con. Some believed that if we could not have a good school, we had best have none. Since then many medical colleges have come into existence and continued for variable periods of time. Some "went under" early, others experienced the hardships of existence as private institutions. The struggle is still going on. Indiana is behind the times; she is still without a medical school controlled by the State. Every civilized country sooner or later is compelled to assume control of medical education.

The art of medicine has made progress in Indiana, but the science lags behind; so far, our State has made little real addition to the science of medicine.

Although at the time of the passage of the common school law, only about fifty years ago, the term Hoosier was one of reproach, the advent of the schoolmaster and State education soon changed that, and today we take pride in being called Hoosiers—it is becoming a term of honor rather than of reproach. We have wholly outgrown our former reputation, and Indiana literary productions are known the world over.

The old medical schools did their work well; it was a practical work; but until the State takes charge of medical education and sets a good standard, little advance in medical science is to be expected.

Art precedes science everywhere. Our own physicians have been so busy applying the knowledge already extant that they have not had time to make original observations, and few have published their observations. But the time will come when our physicians will add to the scientific literature of medicine—the rise of general education and of literature in our State foreshadows it.

THE ADVENT OF DISEASES.

The coming in of new diseases can perhaps be best understood in the light of the analogy of the coming in of new weeds. Weeds and diseases can be compared in many ways, but after a time analogies fail and each must be studied separately. Pointing out analogies often leads men to think, and in this light they are justifiable.

EARLY BOTANISTS AND EARLY WEEDS—EARLY PHYSICIANS AND EARLY DISEASES: Of the prevalence of the early weeds of our State we know

but little; there were no competent observers. A farmer might fight weeds all his life and yet know but little about them, about their characteristics and properties, or their classification, and he is very apt to confound species. A farmer usually simply learns to do certain things, only a few inquire into the reason why or into the nature of the thing itself; we call these few progressive farmers.

The erratic Rafinesque was perhaps the first botanist who visited our State, but he left no records of Indiana plants. The first botanist to make a local list was Dr. A. Clapp, of New Albany, in the early thirties; at that time many European weeds had already wandered in. Since then a number of local lists have been made, some of them by physicians who botanized as a recreation. The first State Catalogue was that of Coulter, Barnes and Arthur, published in 1881. The complete State Catalogue of Stanley Coulter did not appear until 1900; since then a number of additional lists have appeared in the Proceedings of our Academy. New plants are constantly arriving, brought in from other States and countries; of these new arrivals many are weeds and of these some remain and become common. Where at first there were but few observers of new arrivals, now there are many, and new weeds are soon recognized and reported.

If it requires a botanist (even though only an amateur who submits to the superior knowledge of the expert) to distinguish between weeds, it must be evident that an educated physician is required to distinguish between diseases and to record the arrival of new ones. A man may fight disease or diseases all his life without knowing anything about Das Wesen der Krankheit; indeed, it is painful to admit that the best physicians have to fight diseases about whose real nature they know but little; like the farmer and his weeds, they can simply fight them in the way they have been taught or have learned how. Unfortunately the routinism of some physicians is on a plane little above that of the farmer's method; they are satisfied to live on without making any effort to find out and we do not look for any advance in learning from them.

The advent of the educated physician has already been referred to, so I shall proceed to give a few analogies between weeds and diseases. My remarks, as already mentioned, will be suggestive rather than exact scientific statements, mere outlines without dates. Of the many introduced diseases I can mention but a few. Animals and plants also have diseases but I shall refer only to disease in human beings.

ANALOGIES OF WEEDS AND DISEASES.

THE DAYS OF FEW WEEDS AND OF LITTLE DISEASE: The first settlers cultivated only small patches of ground, often only a "truck patch"; there were few kinds of weeds and these were natives and easily destroyed. The Ragweed (Ambrosia artemisiaefolia) was probably the chief among them.

Of the diseases of the native Indians at the time the white man first came among them, we know nothing, but we do know that their life was not conducive to the evolution and propagation and dissemination of diseases, and we can assume that, in all probability, they were practically free from disease. Men who live in isolation, and in proportion as they do live in isolation, are almost free from the common pus formers, the Staphylococci and Streptococci, with an absence of many of the common ailments of life dependent more or less on them.

The early settlers were a hardy set of men and women; they had left their weak and feeble behind, and they led a happy life, especially in the northern part of the State where the Indians were not savage or warlike, owing mainly to the influence of the French pioneers. There were few weeds and likewise few diseases; they had left both behind. But they found at least one native disease, namely milk sickness, or in other words, they found the cause of it, and when this got into the body, through the use of infected milk or the flesh of cattle with the trembles, a reaction came on, and this reaction was called Milk Sickness—a disease about which there has been much discussion.

THE DAYS OF DOG FENNEL AND JIMSON WEED—OF MALARIA AND TYPHOID FEVER: The Dog fennel came in early, from Europe. Jimson is a corruption of Jamestown, the early colonial settlement in Virginia. Both weeds flourish in neglected places, on farms, in villages and in towns; they disappear with the advance of progress and civilization. On clean farms and in clean villages and towns we see no Dog fennel today—but there are still Dog fennel towns in Indiana.

Malaria and Typhoid fever may appropriately be compared and contrasted with these two weeds; both were brought in by the white man. Malaria came first and was known as "The Fever." When typhoid fever came in it was called "Continued Fever," to distinguish it from malaria also known as "Periodical Fever." Until the decade 1840-1850, physicians the world over were not able to clearly differentiate typhoid fever, it was

long confused with typhus fever; very recently another disease has been differentiated, known as paratyphoid. Thus finer and finer distinctions are being made. In this connection I might refer to the analogous case of the plants Scrophularia nodosa, Scrophularia Marylandica, and Scrophularia leporella, and how the latter, a native Indiana plant, was for a long time confounded with the other, just as that in turn had been confused with the European form—a botanist will readily understand this simple allusion.

Malaria and typhoid fever both flourish under simple and primitive conditions, that is, under a neglect of sanitation. Malaria flourishes where the Anopheles mosquito breeds and is transferred from one individual to another by its bite. The drainage of wet places and the use of quinine are the chief factors that account for the subsidence of malaria and its present rarity. Typhoid fever differs markedly from malarial fever in that one attack protects the individual. The weak are killed off and those who survive are immune (second attacks of the disease being rare) and this fact has an important bearing. Typhoid fever is chiefly a water-borne disease, especially well water. Where wells and closets are close together or where the subsoil is porous, diffusion takes place. In a family where typhoid fever occurred there may be no further difficulty from the use of the well water, but any stranger or visitor using it may fall a victim. In cities dependent on wells there may be much typhoid fever, while on the other hand a city with a good municipal water supply, especially where the water is properly filtered, may have little of it. Cities dependent on a river supply without previous filtration may fare very well so long as the water is clear, but with the muddying of the river after a rain and with a resort of the citizens to the old wells, there may be a constant recurrence of the disease. In this connection we must not forget that many of our rivers are today nothing but open sewers full of infectious germs.

Malaria has disappeared from the cities (the Anopheles mosquito does not live in cities) but it still flourishes in backward, undrained, communities—communities that are still in the Dog fennel days. On the other hand, typhoid fever is all too common in some of our cities and towns—another indication of the survival of Dog fennel days.

Not so very long ago the chief diagnostic character for distinguishing between the two diseases was the fever, that is the elevation of temperature, but every now and then so-called atypical cases occurred which left

the diagnosis a matter of doubt. Today the scientific physician takes a few drops of blood from the finger of the patient, one drop he examines for the malarial parasite, the other is used for making the serum test for typhoid fever. In the one disease a few large doses of quinine usually cures outright; in the case of typhoid fever little medicine is given, little being required; with good nursing, proper diet, and an abundance of pure water and pure air, the patient is apt to recover. Although formerly no exact diagnosis was possible, yet the treatment of cases was simple; quinine, whisky, calomel and opium were standard remedies. Little attention was given to hygienic measures, the sickroom was often tightly closed, with the exclusion of fresh air, and as a consequence there was bronchial irritation, often bronchitis. Typhoid fever is not the fatal disease it was considered to be in the early days, and the nurse has largely taken the place of the doctor in the treatment.

In the early days of Indiana, bleeding was in order in the treatment of malaria, but this practice soon declined. Although the proper remedy is quinine, yet for a long time it was given in insufficient dosage. Just as too little water can be put on a fire, and fail to put it out, so too little quinine can be given to cure a patient—and if you wait too long the fire (or the disease) may become very destructive. It was customary to "prepare the patient for the quinine." Some died before the preparation was completed. The discovery of the Plasmodium malaria, the active cause of the disease, was a great advance in medicine. But to look for the parasite is not universal today; some physicians find it easier to prescribe before they are sure of the diagnosis—Dog fennel days still survive.

The Days of Common European Weeds: The white man in his wanderings over the world has brought together a miscellaneous collection of weeds, and these follow him wherever he goes. Today most of our common Indiana weeds are immigrants from Europe, where they have resisted destruction for ages. The Amaranths and Chenopodiums when cut down will sprout anew; pulled up by the roots they take fresh hold while lying prostrate on the ground; if but a single plant ripen seed, the surrounding country will soon be restocked.

The white man in his wanderings has likewise collected a miscellaneous lot of diseases, and these, like his weeds, follow him wherever he goes. A list of their names may be found in the daily mortality statistics in the newspapers or in the advertisements of patent medicines.

Man fights his common diseases by resorting to the use of medicines, especially patent medicines; he has not yet learned that diseases, like weeds, may be eradicated, or that prevention is easier than cure. An intelligent farming community is apt to make a combined attack on weeds, and the less seed scattered about the fewer weeds there will be. Perhaps after a time we will go after diseases as the good farmer goes after his weeds; indeed, we have already reached the stage where we keep a lookout for such formidable diseases as the plague, cholera, typhus fever and several others; we do not allow them to land. But we are so accustomed to some diseases that have already landed and that have gotten a foothold among us, that we seem to have forgotten that we could get rid of them if we only tried.

Among the diseases once common in civilized Europe but now becoming more and more rare, may be mentioned leprosy, cholera, plague, typhus fever, miliary fever, scurvy, smallpox, malaria, typhoid fever, and others. Some countries are even beginning to show a reduction in the number of deaths from tuberculosis, and some cities regard the presence of much typhoid fever as a municipal disgrace. Man's control over the spread of diseases is becoming more and more marked.

The Analogy of Weeds and Diseases Carried Further: A botanist can take his manual and check off plants, especially weeds, that are spreading or migrating, and confidently look forward to the time when they will appear in his own locality. Those who are on the lookout for new weeds are rewarded every now and then by finding new arrivals. The date of many arrivals is known. New weeds are introduced in impure garden seed, or in the packing of crates or boxes; some travel by rail, others by water. Some come to stay for but a single season; they may find the environment unfavorable, early or late frosts may be detrimental; some live for a few years and then die out; a few, however, may find conditions favorable and flourish to such an extent that they may be seen everywhere, and a man who did not know of their introduction might be led to conclude that they always grew in the locality. The list of naturalized weeds in our State is today quite large.

The date of the first appearance of some of our diseases is likewise known, but unless a disease has some marked or striking characteristic, it is apt to be overlooked. Influenza and cholera were readily identified when they arrived in our State and the date of their arrival is duly recorded.

but tuberculosis and typhoid fever came in so quietly and unobtrusively that no notice was at first taken of them, at least we have no records of their first appearance. People ordinarily do not reason about these things, but the early Indiana doctors realized that a change was going on and long ago the Indiana State Medical Society had appointed a committee to look into the matter. (In this connection I may say that only last week I reported to the Cass County Medical Society a case of tropical sprue, or psilosis, brought into the State by a missionary returned from Korea. New cases are, however, not apt to arise from it.)

Although there is an analogy between weeds and diseases, the former growing in the earth, the latter on or in the body, yet diseases are not entities that can be handled and examined. But in the childhood of the race disease was held to be a thing that had gotten into the body, had taken possession of it, and the early medicine man tried to drive it out by the use of all sorts of noises and nauseous drugs, even by torture. The Chinese and Korean medicine men of today are quite expert in thrusting long needles into the body of the sick; it is really wonderful how little damage they do—they have learned how to avoid the vital spots or organs. In some other countries the sick are filled up with all sorts of nauseous drugs, and the physicians are quite skilled in knowing what to give so that the patient may not die from the effect of the supposed remedy.

A specific disease is now regarded in the light of a reaction of the organism, of the body, toward some foreign cause, the reaction depending on the kind of cause. The reaction may be so definite that the disease may be diagnosed from the symptoms alone, without examining into the nature of the cause, though diagnoses based on a recognition of the cause are of course more exact than when based on symptoms.

The classification of diseases a hundred years ago, at the time when our State was first being settled, was by classes, orders, genera and species, just as in the case of botany and zoology. Many systems of classification have appeared, each one supposed to be an improvement over preceding ones, and physicians are just now working upon a new system which they believe will stand the test of time. Old systems were based on symptoms, the new is based on the recognition of the cause of the disease. Thus Osler's recent treatise takes up first the diseases due to animal parasites—those due, in order, to protozoa, parasitic infusoria, to flukes, cestodes, nematodes, and so on—followed by the specific infectious diseases, from typhoid and typhus fever running down to tuberculosis and leprosy, in-

cluding some whose causes have not been definitely identified, analogy admitting their inclusion. The reactions or intoxications due to the ingestion of chemical substances, such as alcohol, morphia and lead, follow, with a mention of sunstroke—and then all at once there is a classification riot. For want of something better, a number of diseases are described under the head of "Constitutional Diseases." Then follow a host of affections and diseases that for convenience are grouped under their respective organs, beginning with the diseases of the mouth and running down the alimentary tract, followed by the affections of the other organic systems—the respiratory, the nervous, etc. One-third of the book is thus definite, based on a scientific system, the rest is simply based on convenience of reference. Although we have here real progress, yet how much still remains to be done.

Some of you may recall the story of the amateur botanist who complained to Linneus of the poverty of Sweden in material for study, and how Linneus placed his hand over a tuft of moss and said, "Here is study for a life-time." To study diseases we need not go to unexplored Africa, where so many new and strange diseases are being found; our common every-day ailments and affections and diseases are worthy of the deepest study, much is still to be learned about them. Not all is known about common everyday coughs and colds, about rheumatic and neuralgic aches and pains, about anemia and fever, dyspepsia and nervousness.

The old physicians diagnosed diseases almost wholly from or by their symptoms, and they were close observers, with sharpened senses like those of the Indian. The modern physician relies to a great extent on so-called laboratory methods, and the influence of the college and university laboratories is being felt. Rough and ready methods are more and more being replaced by refined ones. But we must not undervalue the importance of simple observations, without the use of instruments, nor should we neglect the training of the sense organs.

Scientific classifications are for scientific minds, but we must not forget that "Nature makes transitions and naturalists make divisions." Hair splitting in medical classifications, or nosology, is not unknown. As a matter of fact each group of specialists has its own system and nomenclature, and when the average all-round physician takes up one of the special treatises he requires the aid of a medical dictionary.

Popularly we can classify the diseases of our State, including those we have had in the past and not excluding those still to come, according

to the way in which they are transmitted from one individual to another. It is perhaps needless to say that diseases are carried from one individual to another, from host to host, much after the fashion of weeds carried from one field to another. The seed of a weed may gain access to a field by being blown in by the wind, or it may have been brought in by an animal, especially by birds; many weeds have been brought in by impure garden seeds. Cheat or chess among wheat means that the seed was present; it does not mean the transformation of one species into another, nor does it mean a spontaneous generation.

The railways are important factors in the distribution of weeds, as they are of diseases. Before the days of railways new diseases traveled slowly, cholera and influenza required a long time to encircle the globe in their early migrations; today diseases may spread rapidly. In a thinly settled country, weeds and diseases spread slowly, while the massing of people in cities, especially in the absence of sanitation, favors dissemination.

Diseases due to specific causes can be grouped in various ways, like weeds; whether native or foreign; whether coming to stay, or to disappear after a short time; whether spreading rapidly and then dying out, or spreading slowly but surely and permanently, etc. Looked at in this light we might regard Milk Sickness as a native disease which is disappearing; Cholera as a disease which has come in repeatedly but on account of unfavorable conditions never gained a permanent foothold; Malaria as spreading rapidly and lasting for a long time and then declining; Tuberculosis as coming in and spreading slowly but surely and not yet having reached its maximum among us. Measles, scarlet fever, smallpox, whooping cough, etc., need only be referred to.

Classification of Diseases According to Their Modes of Transmission: In a general way we may classify diseases according to how they are carried from one individual to another thus:

1. By direct contact—from one host to another.
2. Transmited through insects. (Notably malaria.)
3. Diseases conveyed by or through food.
4. Water-borne diseases.
5. Air and dust-borne diseases and affections (notably tuberculosis and pneumonia, with a host of other respiratory affections and a variety of aches and pains and functional disturbances.)

Out of the many diseases and affections that come under one or the other of the above groups, I desire to make mention of only two, namely, malaria, already referred to, and tuberculosis—one a decreasing, the other an increasing disease.

Malaria: Malaria was the Grendel of the early Indianians. Today we can scarcely realize what the disease meant to the early settlers; in some localities it ravaged frightfully. Thus in the early history of our capital city we read that the forest was cleared in 1820 and lots laid out and in the spring of 1821 the immigrants rushed in to the number of six hundred or more. In the latter part of July malaria appeared, and, I quote from Drake, "Before the epidemic closed in October, nearly every person had been more or less indisposed, and seventy-two, or about an eighth of the population, had died." In some localities the disease was so severe that farming lands could not be sold, and for a long time immigration to our State was retarded; people went through to Illinois, to the prairies.

In an account of the diseases prevailing in Indiana in 1872, by Dr. Sutton, it was noted that the summer was dry, and in comparing reports from different counties of the State it was found that malaria had been more prevalent than usual in some of the rolling southern counties and in places along streams and rocky creeks, while, on the other hand, it was less common than usual in the northern counties where before it had been very common (but where drainage had made some of the worst places salubrious). At that time the view that decaying vegetation and moisture had a causative influence was universally believed, yet that theory did not explain the conditions. Today, in the light of the role the mosquito plays in the transmission of malaria, we can readily account for the facts.

In the rolling southern counties many of the small streams are fed by springs which flow a small volume at all times, but in dry seasons not sufficiently to create a current in the rocky creeks; hence many pools formed, and these pools served for breeding places for mosquitoes. Ordinarily even a small continuous current of water will prevent the development of mosquito eggs, and we must keep in mind the presence of fish and insects which feed on the mosquito larva, but which die off in times of low water, on account of its stagnacy. In the wet northern counties the drought meant a drying out of the breeding places of the mosquitoes, with a consequent reduction of the number of insects and of cases of malaria. The same reasoning holds for the increase of malaria along the larger streams; in ordinary stages of water there may be no stagnant pools

or isolated bayous, but such form in time of drought, resulting in a destruction of the minnows and the development of countless numbers of mosquitoes.

Mosquitoes: Mosquitoes occurred in immense numbers in the early days, when breeding places were plentiful. They were common along the canals, and an English traveler on the Wabash canal, in 1851, writes of them: "After tea, we all began a most murderous attack upon the mosquitoes that swarmed on the windows and inside our berths, in expectation of feasting upon us as soon as we should go to bed. But those on which we made war, were soon replaced by others; and the more we killed, the more they seemed to come to be killed, like Mrs. Bond's ducks; it was as though they would defy us to exterminate the race. At last, we gave up the task as hopeless, and resigned ourselves, as well as we could, to pass a sleepless night." He adds: "What with turning about on account of the heat and trying to catch the mosquitoes, who bit us dreadfully, we did not get much rest; and we rose the next morning unrefreshed."

Canals were a factor in the mosquito-malaria problem. In some of the older States it was noticed that malaria followed the canals, that the disease appeared where it had formerly been unknown; in other places it markedly increased its prevalence; some towns were almost depopulated. When Indiana undertook to build canals the malaria question was not overlooked; there was opposition. The reservoirs were considered especially obnoxious, and in places, notably in Clay County, the people began to destroy them; State troops had to be called out to protect the embankments; the Legislature even appointed a committee to inquire into the matter and report. This commission, and medical men generally, tried to minimize the supposed evil influence; in the light of the then prevalent decaying-vegetation theory they could not see how canals or reservoirs could increase the disease. Today we can readily see that the popular belief rested on good foundation; the reservoirs and the small ponds made on account of the embankments at gulleys or ravines, formed breeding places for mosquitoes. The larger ponds in the course of time became inhabited by fish and thereby lost their mosquitoes, but in the smaller ponds with a periodical drying out, fish could not live.

It was noticed that canal-boat men suffered less from the disease than the people along the banks, and this at first sight seems difficult to explain. But the explanation is simple; it is analogous to the explanation of why railway conductors and porters seem healthy in spite of their exposure to

infective dust from the coaches, especially the smoking cars. On our railways today, men who are constantly suffering from the evil effects of inhaling a polluted atmosphere, manifested by colds and coughs, and catarrhs, by weeping eyes and noses, and are inclined to be sickly and demand frequent vacations, such men are not long retained in these positions by the railway managers—the weeding out process goes on all the time. Similarly a canal-boat man who was readily attacked by malaria and who lost much time on account of it, was not long retained in the position; those who retained their positions were the more resistent ones.

Facts are sometimes explainable by different theories. In the following story, taken from Drake, the substitution of "mosquitoes" for "whisky," as the apparent cause, more satisfactorily accounts for the facts or conditions. It should be remembered that the Anopheles mosquitoes are night-biters, that ordinarily they fly low, and do not frequent rooms or houses in which tobacco is smoked.

A few miles to the east of Fort Wayne there was a densely wooded swamp, known as the Maumee or Black Swamp, which extended on into Ohio. This swamp seems to have been salubrious; it was free from malaria, and families who settled in it "enjoyed uninterrupted autumnal health for three or four years," until malaria was brought in by other settlers. In 1838 excavations were made in the eastern end of this wet section for a canal. "The laborers, four or five hundred in number, were chiefly Irish, who generally lodged in temporary shanties, while some occupied bowers formed out of the green limbs of trees. * * * One contractor kept a liquor store, and sold whisky to all whom he employed, which was drank freely * * * the mortality (from malaria) among them was very great. Another lodged his operatives on straw beds, in the upper room of a large frame house, made them retire early, kept them from the use of whisky, and nearly all escaped the disease."

In this connection it may be said that in the malaria prophylaxis of Italy, screens on houses, and an avoidance of the mosquitoes outside of the houses, are of the greatest importance. In our own country the use of screens in windows and doors is a most important factor in the diminution of many ailments and diseases that formerly prevailed during the time of mosquitoes and flies, cholera infantum not the least among them.

The belief in the injuriousness of night air, still so prevalent among us, is readily traced to the days of the night-biting Anopheles mosquitoes filled with the germs of malaria. These mosquitoes do not live in cities, or

at most only in the outskirts, and city night air is really better than that of the day time, because there is less dust in it.

The widespread use of quinine today is also traceable to the days of much malaria. Then it was given in almost every case of sickness, a sort of panacea, and this practice is simply kept up, not only by the people but by many doctors. Today quinine really has a very limited use. The so-called "False malaria" of our cities has no relationship to malaria proper; it is simply a reaction due to bad air, and not to the plasmodium malaria.

In the early days, when there was but little quinine, and that high priced, many of the native barks and herbs were used, notably the Dogwood, Yellow Poplar, Wild Cherry, Thoroughwort and American Centaury. They were steeped in whisky and formed "bitters;" bitters still survive and some are widely advertised in the newspapers; as a rule their value is nil. A number of other things concerning malaria might be mentioned, but I must desist and will close this account with a few remarks on Adaptation and Immunity.

We know that plants and animals are adapted to their surroundings and that few can bear any marked change of environment; wet soil and dry soil plants can not exchange places, nor can tropical animals exchange places with those of the frigid zones. But many of our cultivated plants and animals have been shifted about so much that they are able to flourish under a variety of surroundings, just as the white man flourishes because he has had such a varied experience in the past. Now there is also an adaptation in the case of diseases. Where a disease has long been in a country or locality, there is a mutual adaptation between the disease and the people, or in other words, between the parasite and the host. If a disease is so virulent that it kills off all the people, then the disease in turn is killed off, or dies out, for want of material. If on the other hand, a disease is not strong enough to attack at least some members of a community, then it is apt to be mild and to pick out and live only on the weak and feeble or aged or the very young, the robust adults escaping. But where a disease gets among a people who have never had it then it may be very destructive, many may perish and few survive, but the survivors may repeople the territory with a stock less susceptible, and we can see how, in the course of ages, with a killing off or weeding out of the susceptible, a strain may be produced that is able to live in the presence of the disease.

Examined in this light we get some clew to the original home of malaria. The negro of Africa is quite immune against malaria; there is an

MALARIA IN INDIANA.

Primeval conditions.

Ground covered by forest or herbage, retention of moisture or rain.

Streams running, clear, full of fish.

Coming in of the settlers.

Destruction of the forest, periodical drying up of the small streams.

Destruction of fish, increase of mosquitoes.

Advent of malaria.

Absence of physicians and remedies—antiperiodics.

Settling up of the country, malarial parasite more readily transferred.

Canal reservoirs and railway embankment ponds as factors.

Drainage of wet places, fewer mosquitoes.

Free use of quinine.

Isolation of the sick and use of screens.

Subsidence of malaria.

No malaria in large cities, little in suburbs.

Continuance of malaria in backward communities.

adaptation. The disease producing agent, the plasmodium, is there, and has been found in the blood of the people without apparently doing much harm, but when a white man gets into the country he may succumb very quickly. There may be even a marked difference in white men in their susceptibility to malaria, or other diseases, doubtless depending on the exposure of the ancestors in former times. The susceptibility of our native Indians is one of the chief arguments against the indigenous origin of malaria.

Malaria in Indiana has about run its course, as it has in older civilized countries; its mortality today is slight—our dog fennel days of malaria are about over.

Tuberculosis: If malaria was the Grendel of early Indiana, tuberculsis occupies that position in our State today. While there has been a steady decrease in mortality from malaria, there has been a steady increase in mortality from tuberculosis, and we have not yet reached the maximum. Tuberculosis is an air-borne disease, or, more strictly speaking, a dust-borne disease, and conditions in our State were never so bad as today. Although the mortality statistics of tuberculosis are a fair index of bad air conditions, they do not tell the whole truth; the deaths from a number of other affections must be included, notably those from pneumonia.

Tuberculosis is the slow protest of nature against bad air conditions, pneumonia is the sudden outcry. The approach of tuberculosis is heralded by many and repeated warnings—clinicians speak of a pre-tubercular stage, a stage of coughs and colds, of pains and aches. Pneumonia strikes suddenly, without warning. The stranger within the gates of the city has no time to flee; and to remain in the crowded city is too often synonymous with death. In the country where air conditions are good, pneumonia is neither frequent nor very fatal, and under good air conditions tuberculosis does not thrive at all; indeed, the city victim on going out into good air is apt to recover, if he goes in time. The ancient Greeks knew the value of good air, the ponderous volumes of the physicians of a hundred years ago testify to its value, a value which we are now but rediscovering—we do not yet fully appreciate it.

We as a matter of course look upon tuberculosis as the great enemy of the human race—but after all it may be a friend in disguise! Few may be able to look at it in that light, but some arguments may be made in support of such a statement.

The old herbalists believed that the Creator made no plant in vain; they believed that every plant had its uses, if we could only find it out. Looked at in this light the lowly plants that produce disease may have some use; the cholera bacillus teaches our cities to clean up, and in proportion as they clean up they escape the ravages of the disease. The typhoid bacillus teaches us to look after the purity of our water supply, and cities and individuals who heed the lesson escape the disease. Perhaps the tubercle bacillus may teach us to clean up our cities and our homes and meeting places; it may teach us the use of pure air. But if tuberculosis is a friend of the race, it needs watching as fire needs watching; like it, it may be an exceedingly bad master.

We must look at the pre-tubercular stage in the light of a warning to get out of the dusty and smoky city; the aches and pains and the coughs and colds may subside very promptly in good air. If the individual remains in the city the disease sets in in earnest, to attack the lungs, and then it generates hope, and the victim wants to be up and about. And he should heed the additional warning before it is too late; he should not lie about the house or the dusty city; he should go out into "God's green country" and into the sunshine and pure air.

When a man has an acute alimentary tract affection, not to say disease, nature takes away his appetite and makes him gloomy; he lies about and refuses food, thus imitating the lower animals; if he persists in eating she sends a violent pain and he will probably desist. Nature wants no food and no work to do with an impaired alimentary tract; she wants rest, just as a broken bone wants rest to repair the damage. Men who heed the warnings of nature, the little aches and pains that tell them to do this and avoid that, are apt to live longest; the chronic invalid who takes care of himself may live on to old age, while the so-called strong or robust man who never has an ache or a pain, no warnings from nature, may go to pieces all at once and prematurely.

The aches and pains of the pre-tubercular stage of consumption should be heeded, and the hope generated by the disease itself should be acted upon; nature is showing the way. The elimination of the imprudent, and of those not adapted to their surroundings, has been going on for countless ages. Diseases have killed off our weak, and the process still continues. Our Indians scarcely came within the range of disease elimination; their life was not conducive to the propagation of diseases, certainly not of tuberculosis. When the white man brought in tuberculosis the Indian was

scarcely attacked so long as he lived under old time conditions, an active out-door life; but when he tried to live under white man's conditions, in a fixed home, he promptly began to fail and is still failing—just as the negro fails when he crowds into the cities, and as the Italian fails who comes to our cities from the pure air of his mountain home. We may say the Italian is degenerate, that he has no stamina, but that does not explain his susceptibility, no more than to say the Chinaman is degenerate because he can live under filth conditions that the white man can not bear. The Jews coming from the old European cities, where their ancestors have for a long time lived in the ghettos and under extremely unsanitary conditions, are quite resistent to attacks of tuberculosis; they are simply the survival of the fittest; the Jew whose ancestry goes back to the open country, to a pure air life, can not hold up alongside the other, for his ancestors have not undergone the elimination process.

Tuberculosis is a protest against bad air conditions. We ought to be the healthiest and strongest people on the face of the earth; land is abundant and fertile, we have no years of famine, men are not tied down as in the old world; the poor food of Europe and the long hours of toil are unknown among us; at least there is no valid reason why long hours should be required. In spite of these conditions tuberculosis is on the increase among us, whereas in some European cities there is a decrease. Why should this be so?

If we write out statements of conditions, one line for clean European cities and another line for American city conditions, and make an equation by canceling conditions that equal each other, we have left the polluted air condition or factor; it offsets all our advantages.

Many individuals can thrive in the air of our cities today, others fail; thousands fail every year. Many contract the disease in the city and go to the country to die; many die from city diseases, other than tuberculosis and pneumonia, traceable to bad air conditions.

Shall we let bad air conditions go on, or even get worse, as they seem to be doing, and shall we let countless thousands die in the unceasing process of adaptation to environment, or shall we attempt to modify the abnormal environment and allow these thousands to live? We are told that tuberculosis is a curable disease, and that it is a preventable disease. It is an introduced disease which we have allowed to flourish unhindered. It is a disease that flourishes only under certain surroundings. We can make

TUBERCULOSIS IN INDIANA.

Primeval conditions.

Ground covered by vegetation—no dust. Indian had no name for dust.

Outdoor life not conducive to the propagation of tuberculosis.

Coming in of the white man, minus his weak, feeble and sick.

Clearing of the ground, formation of dust; Indian applied name of ashes to it.

Building of cabins and houses, formation of house dust.

Coming in of the feeble and sick; cared for in houses.

Advent of tuberculosis.—Tubercle bacillus.

Tuberculosis picking out the weak and those living indoors.

Settling up of the country, building of roads—formation of road dust.

Villages as factors, increased facilities for distributing the disease.

The village store, farmers crowded about the stove in winter, a factor.

Schools, churches, meeting halls, factors in polluted air.

Development of the tobacco chewing habit, an important factor —spitting.

Development of town conditions, shops and trades, confinement of men indoors.

Coming of the railroads and filthy cars and plush seats.

Development of city conditions—city dust.

Smoke from coal; paved streets and sidewalk dust.

Street cars as factors, crowding and bad air.

Tenements and flats, poor ventilation and little sunlight.

The trailing dress an important factor, filth dragged into the home.

Advent of the city slums, increase of poverty and neglect.

Blunting of sensibilities by the use of alcohol, opiates and anodynes.

Continued increase of tuberculosis.

these surroundings unfavorable for the disease; but it takes a combined effort, the individual is powerless.

Malaria is disappearing because the conditions favorable for its existence are disappearing; the opposite is true of tuberculosis. Moreover, quinine both prevents and cures malaria, and pure air prevents and cures tuberculosis. Whisky and calomel were popular prescriptions for malaria, neither cured; whisky and cod liver oil are popular prescriptions for tuberculosis today, yet neither cure, neither singly nor combined.

The administration of whisky, or of alcohol in any form, may be followed by a sense of well-being in tuberculosis, and in dust infection generally, and that is the reason why alcoholic preparations are so popular and so widely advertised as cures. But the sense of well-being is a false sense of security; to benumb the body and reduce the pain, the pain by which nature warns us, is poor treatment. As a matter of fact, alcohol is still one of the great eliminators of the human race; if we are wise we will avoid using it.

Over fifty years ago one of the pioneer physicians of Eastern Indiana wrote of the changes he had observed in his community and in the State; he said: "Phthisis, pneumonia and bronchitis are believed to be on the increase. Whether this is due, in any degree, to improved modes of living, such as tight houses, the general use of stoves, a less constant exercise in the open air, etc., it would be interesting to know." Today we know. Fifty years ago conditions in Indiana were quite primitive compared with conditions seen in our cities today, and yet the gradual increase of dust diseases was being noticed. (Tuberculosis in Indiana, page 45.)

(The chart of the evolution of different kinds of dust will explain itself.) (Dust chart, page 47.)

Tuberculosis, known also as phthisis and consumption, is among us; it came in with other diseases; it came in like some of the weeds of the fields. How soon will we make any attempt to get rid of it?

Our State Board of Health has been and is an important agent in diffusing a knowledge of diseases and of disease prevention among our people, and the recent establishment of laboratories for identifying diseases and for testing the purity of foods and drinks is of the greatest importance.

Physicians have been the prime movers in the establishment of these evidences of civilization, but it has been a long fight.

I am glad to see several papers on the program of our Academy this year that bear on the subject of sanitation; there have been some in the

THE EVOLUTION OF DUST.

	Cosmic Dust.	
	Volcanic Dust.	
Absence of Man.	Desert Dust.	
	Plant Pollen Dust.	
	Wild Animal Trail Dust.	
Hunting and Fishing Stage. (All men alike)	Traces of Dust due to Man.	Age of neglect of the Feeble, Aged and Sick.
Pastoral Stage.	Domestic Animal Dust.	
	Dust in Tents.	
Agricultural Stage.	House Dust.	Origin of House Diseases.
	Country Path or Road Dust.	Care taken of the weak, aged and sick; Greater development of Parasitism.
	Village Street Dust.	
Handicraft Stage.	Shop Dust.	Employment of the feeble in shops.
	Shop Dust with Spittle.	Rapid development of air-borne diseases. Homes for the aged and feeble.
	Paved Street Dust.	Free use of alcohol.
Industrial Stage.	Factory Dust in variety.	Large factories; crowded tenements; dusty and smoky air.
	Sidewalk Dust mixed with Spittle.	The age of hospitals and dispensaries, of throat and chest disease specialists.
	Tobacco Juice Dust.	
	Trailing Dress Dust.	No pure air in large cities.

past, and I hope to see more in the future; perhaps they could be grouped under a separate head, that of Sanitary Science.

Our Academy has a committee on "Legislation for the Restriction of Weeds." The popular conception of a weed is, a plant growing in the garden or field or meadow, of a plant out of place and more or less resisting destruction at the hands of man. That some plants grow on and in the human body, and in animals as well, is not so well known. The thought has suggested itself: Perhaps the scope of this committee could be enlarged by taking account of the minute weeds of the body. I would like to see the title of this committee read "Legislation for the Restriction of Weeds and Diseases."*

STATE HOSPITAL FOR TUBERCULOSIS.

In conclusion I desire to make a few remarks concerning the establishment of a State institution for the treatment of tuberculosis.

Modern medicine concerns itself more and more with disease prevention, in the individual and in the community. To give relief from disease and affliction has always been the aim and the practice of the physician, but so long as the active causes of diseases and the modes of their transmission were unknown, little could be done in disease prevention. The good Samaritan still has a place, but the physician who today is only a Samaritan in binding up wounds and who makes no effort to prevent the infliction of wounds, or who treats diseases and makes no effort to prevent the propagation of diseases,—such a physician does not fully represent modern medicine.

Modern medicine knows much about disease prevention, if the knowledge were only applied. Intelligence counts for much. The intelligent of a community often avoid much sickness, whereas the ignorant suffer; some of the latter are kept in a state of poverty on account of their lack of knowledge of diseases and disease prevention. As people become better educated in sanitary science and in hygiene, they will require more of their physicians. The high school graduate who has studied the human body in health and in disease is not apt to be a purchaser of quack medicines, or to consult an ignorant physician, much less one who has to herald his ac-

*On the day following this suggestion, the chairman of the above committee made a motion to enlarge this committee by adding two men who are physicians and changing the title as suggested; the motion was carried without a dissenting voice.

complishments in advertisements in the newspapers. Much is to be expected from the teaching of sanitary science in our schools.

Since it was discovered that tuberculosis is a curable disease, a number of countries and States have established institutions where such sick can be treated. Germany leads in this work. Some of the institutions are tent colonies in the forests. Out-of-door life, plain food and drink, pure air, little or no medicine, that is all that is required. The nostrums advertised in the newspapers are of no value. Nature simply needs a chance to correct the difficulty. When the disease has once fully taken hold, little is to be expected from any form of treatment, and only too often the real nature of the disease is not recognized until it is too late. It is possible to recognize the early stages of tuberculosis, and that is the time for beginning treatment; beginning in the pre-tubercular stage is still better. With flames bursting from every window, we do not look for the firemen to save the building, but we rather expect it of them when they arrive at the stage of much smoke and a tiny flame.

There are at least 25,000 individuals afflicted with tuberculosis in our State today, and 5,000 die annually in Indiana from this disease; in addition many die from pneumonia and other respiratory diseases, and of affections dependent on a polluted atmosphere. Shall we imitate Germany and a number of our sister States and attempt to save these lives, or shall we let disease elimination go on unhindered? Sooner or later the process of elimination will reach our own families, it may reach us individually.

But, you may say, it will require an immense institution to take care of so many sick. So it would if all were to be admitted, but we can at once exclude those who are mortally ill and who can not recover, and if we also exclude those who are able to pay for treatment at a private institution, the number would be considerably reduced. We need scarcely consider the argument that if the State allows its citizens to get sick from preventable disease, it should also take care of those sick.

As a matter of fact many institutions, even State institutions, can not take care of more than a hundred, or at most a few hundred of the acutely sick. What then, you say, is the use of attempting to save the few and let the many perish? That is one way of looking at it. But if we look at a State Hospital as being a school for missionaries in the cause of pure air and right living, we get a different conception of the problem. It is not a question of saving a few out of the many lives now going to waste and

leaving behind a trial of desolution, but it is a question of trying to bring about a change, in arresting the increase of the disease in our State. Every man and every woman who returns from such an institution would be a missionary in the cause of pure air and right living—and we need such missionaries more than do the heathen.