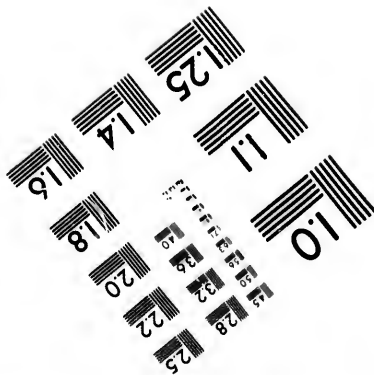
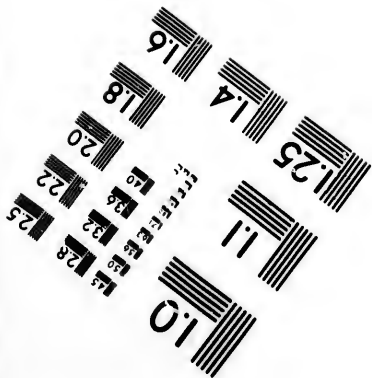
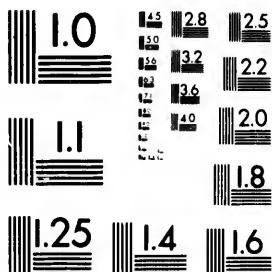


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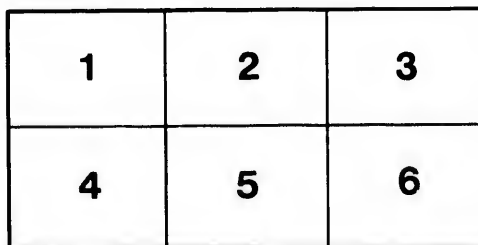
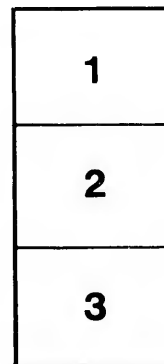
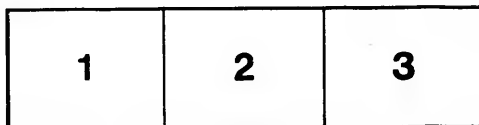
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AN ADDRESS  
UPON THE PROGRESS OF  
MEDICINE, SURGERY <sup>AND</sup> HYGIENE,  
DURING THE LAST 100 YEARS.

*Delivered by request at the St. John Mechanics' Institute, on Feb 4th, 1884.*

BY  
WILLIAM BAYARD, M. D., ETC.

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# AN ADDRESS

UPON THE

Progress of Medicine, Surgery and Hygiene.

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BY WILLIAM BAYARD, M.D.

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LADIES AND GENTLEMEN :—

The Governing Board of this Institute has deemed it right that the Centennial of our city shall be commemorated by an address, among others, upon "*The Progress of Medicine, Surgery and Hygiene during the last 100 years.*" I have been requested to perform that work, and I assure you I undertake it with much hesitation, doubting my ability to command your interest upon subjects seldom or never, to my knowledge, introduced before a popular audience.

Were I addressing a body of my "*confreres,*" my task would be comparatively easy; I could then make use of technical phraseology and enter into details such as would not be permissible here. Nor can I attempt to give you an exhaustive report upon the subjects named; time will not permit, and many of them are better fitted for the class room than this hall; consequently, a very superficial outline is all I can offer you, and I must necessarily repeat much that I said to my professional brethren upon a former occasion.

It must be acknowledged that the real nature of the medical art, and its actual power in ministering to the relief and cure of disease, is little understood, and can only be learned by continued and profound study. And while the truism that "a little learning is a dangerous thing" applies with equal force to medicine as to other subjects, still, a general knowledge of the healing art commends itself to the consideration of all. It would enable the possessor of it to form a more correct judgment as to the



capabilities of his medical adviser, teach him to avoid the causes of many diseases, and to recognize the approach of others. It would also teach him the fallacy of lending a credulous ear to the statements of "nostrum mongers" found in the daily papers, many of them as disgusting in expression as they are plainly devoid of honesty and truth.

It has often been asserted that the healing art has remained comparatively stationary, while all other departments of science and art have, during the same period, advanced with great rapidity. It is true that in 1760 every species of thread was spun on the single wheel, that wind and water were the chief inanimate motors, and the messengers the horse and the dromedary. Then came industrial inventions fabulous in their results, justifying statisticians in the assertion that within little more than a century the increased power obtained through labor-saving machinery equals the adult manual labor out of two worlds as populous as our own. It is also true the marvellous applications of steam are creations of the present century. Watt and others have taught mankind to subdue and harness that "docile monster" to different kinds of machinery. By the steamboat we are wafted with comparative safety from shore to shore, independent of wind or tide, and with the swift rush of the "iron horse" we are conveyed from place to place with the speed of the bird.

It is within the memory of most of us that a greater feat has been achieved. The "Electric Telegraph," that "railway of the mind," has annihilated space and enabled us instantly to whisper our very thoughts from one extremity of the world to the other. And more recently we have been taught that by the accumulation and storage of that wonderful and invisible agent, electricity, light, heat and motion can be produced to such an extent as will probably inaugurate a new era in our domestic economy.

By the Telephone we have learned that the intonations of the voice can be conveyed, enabling us at pleasure to converse, though separated by miles of distance.

And the science of Chemistry has taught the artist to convert that *sun* himself into a matchless painter, who, with wonderful

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rapidity, can elaborate the most difficult portraits and complex landscapes with a degree of perfection unattainable by the human hand.

Therefore, when Tennyson says,

“Science moves but slowly,  
Slowly creeping on from point to point,”

he forgets the extraordinary progress it has made during the present century.

Yet it may be confidently maintained that, during the period in which these brilliant discoveries have been accomplished, medicine has advanced, though silently and unobserved, in various directions and forms, by strides as marked and as great as those belonging to any other department of art.

It may be asked, What is Medicine? It has been called the art of diagnosing variations from health, of which it is estimated that there are 1146, and prescribing remedies. It is this and more. It is essentially the science of health, and, I may add, the prevention of those calamities which afflict mankind, and which have received the title of diseases, and the recognition of this fact has taken it out of the region of mere empiricism. In order to arrive at a correct conclusion as to its progress during the period named, we should possess some knowledge of its state prior to that period.

Anatomy, Physiology, Chemistry, Surgery and Physics had made some progress. Harvey had discovered the circulation of the blood. Haller had demonstrated that muscular irritability was connected with nervous action. Astruc had announced the reflex phenomena of the nervous system. Morgagni had founded the science of pathological anatomy. Sydenham, Mead, Hoffman and Boerhaave had contributed to the advance of practical medicine. Boerhaave was one of the most accomplished physicians of the eighteenth century, and, if we may judge from the legacy left by him to suffering humanity, he could not have had a high opinion of the efficacy of the drugs then in use. When he died he left a handsome volume, the title page of which declared that it contained all the secrets of medicine. When

the volume was opened, every page but one was blank ; on it was written : “ *Keep the head cool, the feet warm, and the bowels open,*” advice reminding us of that given by an old Scotch doctor, who said : “ There were but two things for here and for hereafter — for here, to keep the bowels open ; for hereafter, to keep the fear of God before our eyes.” Boerhaave’s legacy not inaptly typified the acquirements of the medical art at that period. To quiet the nervous system, to equalize the circulation, to provide for the normal action of the intestinal canal, and to leave the rest to nature, was the goal that had been reached 100 years ago by such cautious and wise men as Sydenham, Morgagni and Boerhaave.

The medical world was at this time governed by Theory, Empiricism, Authority, and Speculation. The majority of practitioners blindly followed the authority of the past, and bled and dosed by the book, or adopted some strange theory. For example: Doctor Letson, a practitioner of standing in London, read a paper to the Medical Society of that city in 1783, recommending lizards for the cure of cancer and other diseases. Well may the following lines be attributed to him. He is made to say :—

“ When patients comes to I,  
I physics, bleeds and sweats ’em,  
And if they choose to die  
What’s that to I, I lets ’em.”

A good illustration of the speculative tendency may be found in the theory formed by Hahnemann, at the close of the last century. He ignored all previous medical knowledge ; denied the existence of any curative power in the human system ; that any knowledge of anatomy, physiology, pathological anatomy, diagnosis, or the investigation of the nature of disease, was necessary to the physician, and claimed that symptoms alone should be treated, and that the more the medicine was diluted the greater its power over disease.

Doubtless very many recovered while swallowing his “ infinitesimal nothings.” But on account of its manifest absurdities,

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his theory was rejected by all scientific men. And while it displays a curious instance of the aberration of the human intellect, it has reminded the physician of the limits of his art, and of the great power which nature plays in the cure of disease.

Cullen, one of the most learned physicians of that period, founded his pathology and nosology upon pure theory, and declared it to be the duty of the philosophical inquirer in medicine to control his observations by his theories, not his theories by his observations. His views were generally accepted in England. The theory propounded by Brown, which appeared shortly after that of Cullen, is another illustration of the speculative tendency in medicine at that time. It rested upon assumptions, not facts. He substituted a stimulating for a lowering mode of treatment, which met with approval in Germany, France, and Italy. Such was the condition of the medical art and science at the close of the 18th century.

It was reserved for John Hunter, one of those remarkable men who appear at rare intervals, to recognize and teach that medicine is one of the natural sciences, and should be studied by rigid and careful observation; that theory was useless, except so far as it rested upon facts. Regarding a knowledge of the whole organic and inorganic world as necessary to a proper comprehension of the structure and functions of man, he contemplated nature as a united whole. The Hunterian Museum, in London, testifies to his industry and researches, and stands as a model for those who follow him.

While Hunter was at work in London, his great contemporary, Bichat, was following the same line in France, who, it is said, made upwards of 600 post mortem examinations in one winter. Such work killed him, for he died of typhoid fever at the age of 31 years. He and Hunter represent the turning point in medicine from theory, idealism, and speculation to accurate and close observation.

By observation, Cuvier, Owen, and others, ascertained the intimate relation of the teeth of an animal to its whole organiza-

tion ; and Agassiz made the discovery that the organization of fishes was connected with their tegumentary membrane.

I will now proceed to bring to your minds some of the advances and changes that have been produced during the present century.

By *Chemistry*, for example — the very language of which has been revolutionized — we have been taught the various antidotes to be used when poisons have been swallowed ; also by it we are enabled to detect the presence of such poisons in the human system. To such perfection has chemical analysis arrived, that many poisons can be detected in numerous parts of the body years after death — a warning and terror to evil-doers. Chemistry has also assisted and perfected our diagnosis in various diseases of the kidney. By it we have learned that nitrogen gas, one of the elements in the air we breathe, when forced into combination with other substances, produces most destructive compounds. When combined with oxygen gas, it gives us acids with teeth sharp enough to gnaw a file. When combined with potash, sulphur and charcoal, it gives us gunpowder. When associated with the sweet and bland substance, glycerine, it forms nitro-glycerine, dynamite, etc., agents so powerful as to appall mankind by their destructiveness. It comes out of its chemical unions with a crash, but at once floats in the air with all the harmlessness of the summer breeze. It also teaches that the chemical constitution of the oil, or attar of roses, is precisely similar to that of the ordinary illuminating gas of our cities. In the one case we have a volatile oil with a gratifying odor, while in the other an invisible gaseous body with an exceedingly offensive odor.

The chemist also knows that upon the sun, a body 93 millions of miles distant, the metal Iron exists in vast quantities in a volatilized condition, and that this earth of ours contains inflammable and explosive material enough to blow it into atoms at a moment. It has been shown that, of our 45 miles of atmosphere, one-fifth, or a stratum of nine miles in thickness, is oxygen gas. In pure oxygen, steel burns like a candle-wick. An

electrical or other convulsion which would disarrange or decompose this combination and send an increased quantity of oxygen—the heavier gas—to the earth, would wrap everything in flames. Or like effects might follow from any great change in the constitution of the water of the world. Water is composed of eight parts of oxygen and one of hydrogen, and the intensest heat ever produced is by a combination in which the two gases were in the exact proportions found in water.

The department of *Pathological Chemistry* has advanced much within the present century; it is advancing daily, and a vast amount of information may be expected from it. The beautiful theory of Liebreich, suggesting the adoption of the hydrate of chloral as a therapeutic agent, is due to it. He found that “the hydrate, treated with an alkali, is resolved into chloroform and a fomite. The blood being an alkaline fluid, therefore when the hydrate is introduced into the organism every particle of it will consume the surrounding quantity of alkali, and the decomposition will be completed only after the required amount of alkali had been furnished by the blood. Immediately a minimum quantity of chloroform is formed.” The researches of Dr. Richardson, based upon the suggestion of Liebreich and the practical experience of the medical profession respecting its use, illustrates what may be expected from a higher pathological chemistry.

By it the fact has been established that, in many inflammatory diseases, the fibrin of the blood is increased in quantity, thereby assisting our treatment of such diseases. Through it Pasteur made the great discovery that fermentation is due to the action of living organisms, a discovery which is rapidly revolutionizing our ideas of the causes of disease.

*Pathological Anatomy* may be said to have been founded by John Hunter, who bequeathed to England the best pathological museum in the world; and by the labors of Sir James Paget and others this museum has been supplemented, and kept pace with the advancement of pathological science.

By the light of pathological anatomy the nature of diseases previously all but unknown have been explained. Bright's disease, and very many others, can only be studied and elucidated by clinical and anatomical investigation. It has enabled us to separate into specific diseases affections formerly confounded together. With the aid of the microscope, it has taught that the parasites infesting some of the brute creation used as food of man, when taken into the human stomach alive, will produce a parasite of a different character, namely, the "tape-worm." For example, the "bladder worms," growing between the fibres of the lean flesh of a "measly pig," constitute a preparatory stage of the common human tape-worm, and when eaten by man are transformed into those animals.

*Physiology*, with the aid of clinical medicine, has made great progress, and is daily gaining additions to its domain.

*Materia Medica* has greatly improved during the present century. Many new medicines have been added to the pharmacopœia, and some have properly been expunged from it. The discovery of the active principles of our vegetable medicines, under the form of alkaloids, as quinine, morphia, salicine, atropine, etc., etc., has given the practitioner of the present day the means of exhibiting some of the most powerful and useful medicines in a concentrated form—not in the shape of large powders, nauseous tinctures, infusions and decoctions—but in the various elixirs, capsules, etc. And doubtless the work has only commenced. We may expect that the chemist will assist us in disarming most of our drugs of their revolting and disagreeable taste—a boon to both practitioner and patient.

While *Inhalation* has been occasionally practiced since the time of Galen, still, modern chemistry and ingenuity have done much towards establishing it as one of the methods of exhibiting medicine. The method of *Subcutaneous Injection* is of modern creation. Daily experience proves its value. By it we obtain a more rapid and certain effect from the remedy employed.

The practitioner of the present day can point with pride and satisfaction to the late improvements in *Practical Surgery*, with-

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out comparing its present state with the period at which the chafing-dish and the searing-iron were as indispensable to arrest bleeding as is now the ligature, and when the cries of the sufferer were smothered only by the hissing of the heated iron against the surface of the bleeding wound.

The most brilliant discovery in modern medicine, and one of the greatest boons ever conferred upon mankind, is the power the surgeon possesses of wrapping the patient in a painless sleep while he is subjected to the horrors of the operating table.

From time immemorial efforts have been made—some with partial success—to produce insensibility to pain. But it was reserved for *Morton*, a dentist in Boston, who, in 1846, practically established the fact that *sulphuric æther* possessed the power required. Shortly after that Sir J. Y. Simpson produced similar effects with chloroform. But, while accepting immunity from suffering, the patient incurs a certain amount of risk, statistics having proved that the deaths from æther are 1 in 23,204, and from chloroform 1 in 2,873; consequently, æther, being eight times less dangerous, should always be used. The effects from chloroform are more rapid than those from æther, but this should not justify its use in the face of the statistics named. Many other anæsthetics have been discovered. *Local Anæsthesia*, by freezing the part, or by the application of "*Cocaine*," is suitable alone for minor operations.

Pasteur, Tyndall, and others have established the fact that living organisms are constantly floating in the atmosphere, and when planted in a genial soil they multiply and induce decomposition. Some of these micro-organisms, as the *micrococci*, *bacteria*, and *bacilli*, are capable of producing disease in the human body.

Long experience has taught the surgeon that the obstacles to the speedy union of wounds are suppuration and fever. Professor Lister, a classmate of mine when in Edinburgh, realizing the truth of the germ theory of Pasteur, and believing that putrefaction in wounds is not a mere *chemical* change, but a *vital* one, devised a complete system to annihilate putrefaction at its



source, and thus do away with the obstacles to union. His system consists in treating the wound in such a way as to prevent decomposition, in providing for the entire disinfection of everything that can come in contact with it — fingers, sponges, instruments, etc., and taking care, by means of drainage, that no putrifying matter can be retained in the wound. This he accomplished by *antiseptic dressing*; in other words, by disinfecting every part of the wound with a solution of carbolic acid, or some other antiseptic — for there are many — by preventing the access of air to it, and by providing for the drainage.

So successful has the system proved that it has properly been called after him, and his name will be handed down to posterity, beside that of Jenner, as a benefactor to mankind; and I am glad to add that the Government of England, recognizing the good he has done, has recently created him a Baronet.

Prior to the antiseptic treatment of wounds, pyæmia, erysipelas, and hospital gangrene were the surgeon's terrors. He no longer dreads them, and, in the words of Professor Volkman, "he is responsible if either disease should appear."

While the insensibility produced by anæsthetics is a boon to the patient, it greatly aids the surgeon. His mind is no longer distracted by the cries and movements of the sufferer; he is not compelled to hurry his work, and his operative procedure becomes more or less mechanical, dependant upon his steadiness of hand and knowledge of anatomy. With the aid of anæsthetics, and the antiseptic treatment of wounds, he does not hesitate to perform operations which, fifteen years ago, would have been considered madness or crimes.

Under *Listerism*, the mortality from compound fractures and amputations of the thigh is between 4 and 5 per cent., while prior to its introduction the mortality was 40 per cent., and nearly the same result applies to other operations and injuries.

As an illustration of the progress of operative surgery, I may mention that a portion of the chest wall and ribs have been removed, leaving the heart and lungs exposed by an opening as large as a child's head, yet the patient recovered in four weeks.

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The stomach and intestines have been frequently opened,— the womb, kidney, and a portion of the wind-pipe removed. The surgeon no longer hesitates to open joints, or to remove fluid accumulated in the membrane covering the heart and lungs. Recently a man was taken to one of the hospitals in London, laboring under symptoms justifying the conclusion that a tumour existed in a particular part of the brain. A portion of the skull bone was removed, the brain substance cut into, the tumour found and removed. While the man did not survive the operation more than four months, the improvement in his symptoms was such as to justify the expectation of his ultimate recovery. The operation proved the correctness of the diagnosis, and what can be done to a vital organ like the brain, and doubtless this operation will be repeated with success.

The operation of *Ovariectomy*, first performed by Dr. McDowell in 1809, alarmed the medical world in consequence of the supposed risks attending it, and fell into disuse, but was revived and established as one of the common operations of the day by Sir Spencer Wells, who performed his first operation in 1858, since which time he has performed it 1000 times, with a mortality of 231. And it has been estimated that in Great Britain and the United States alone the operation has, within the last thirty years, directly contributed more than 30,000 years of active life to woman, all of which would have been lost had Ovariectomy never been performed.

*Practical Medicine* advances by the discovery of new facts, and by the application of such facts to the treatment of disease.

The *Microscope* has changed and corrected our ideas respecting certain maladies. It has revealed to us affections, the existence of which was previously unknown, and without it could never have been known.

The *Ophthalmoscope* has done more to increase our knowledge of the secrets of the eye than has been accomplished during a century by all other means, and the oculist can point to brilliant triumphs over diseases hitherto deemed incurable, and he is not now obliged to class a number of deep-seated diseases of the

eye under the head of "amaurosis,"—a condition where the patient saw nothing, and the doctor also — nothing. The Ophthalmoscope also teaches us that some states of the eye are pathognomonic of suspected conditions of other parts of the body.

The *Stethoscope* has taught us how to map out the condition of parts, the action of which we can hear but cannot see.

The *Laryngoscope* has exposed to view organs of the body before inscrutable,—the pharynx, the vocal cords, the wind-pipe, etc., etc.

The *Sphygmograph* has so supplemented the sense of touch that the wave phenomena of the pulse are registered, by which we can fathom the secrets of the circulatory apparatus.

The *Thermometer* has recently been brought to our aid, greatly facilitating our diagnosis and prognosis of disease.

Other instruments have been devised for the purpose of assisting the medical man of the present day in his diagnosis.

In proof of the progress of practical medicine, I may refer to consumption,—a disease destroying at present one-fifth of the adult population, and a disease in which the physician's duty consisted in watching the slow "gradations of disease," making a prognosis of *two* years duration, and alleviating suffering as best he could. But now, under the use of cod-liver oil, mineral acids, bitters, and supporting nourishment, he no longer regards the disease as hopeless, and treats it, looking for a cure; failing that, he confidently expects to prolong life. Experience and calculations justify the belief that the average duration of life of phthisical patients has been extended from *two* years — the limit assigned by Laennec and Louis — to *eight* years; and in not very few cases the disease is so permanently arrested that it may be called *cured*. Recent investigations, establishing the belief that the disease is caused by parasites infesting the lungs, induce us to hope that means may yet be devised to arrest its ravages. Indeed the "germ theory" has so changed our views respecting the causes of disease, that great results are expected from it. Pasteur's recent treatment of persons bitten by rabid animals is an illustration of what may be expected from it.

Let us glance at the treatment of diseases by *bleeding*. It is not many years since the lancet was in the hands of every practitioner, in daily, and I might almost say hourly use, whereas now it is one of the rarest operations; and instead of the loss of blood, we have the exhibition of stimulants; and in place of almost starvation, we have the abundant use of nutriment. Many of us can call to mind the time when cold water was forbidden to a person with fever; and, as for milk, he who gave it would have been accused of "feeding the fever," and thereby endangering the life of the patient. Now the question may be asked, What is the cause of this great change? The best authorities of the day—being unwilling to believe that all of our forefathers were bad observers—attribute it to the *change of type of disease*.

In pursuing this subject, let us contrast the state of the unfortunate lunatic of the present day with what it was 60 years ago, when, deemed incapable of human feelings, he was incarcerated in a dungeon, bound with chains, surrounded by filth, cut off from the friendship and charity of his fellow mortals, and treated with contumely, scorn, and stripes,—a human being buried, yet living. Need I say to you how changed all this is now, and with what happy results. With the knowledge that the poor sufferer possesses the feelings, impulses and affections of man, he is surrounded by comfort; all restraint is—or should be—removed, and he is put under proper medical and moral management.

Let me direct your attention to another advancement of practical medicine, one to which the physician can proudly point as the greatest discovery of the age: a victory of medicine over disease and death. I allude to the discovery of *Vaccination* by *Jenner*, to whom Providence, as it were, entrusted the office of teaching the surgeon, with an almost invisible speck of matter upon the point of his lancet, to defy, in a measure, one of the most fatal diseases that ever afflicted the human race.

The vast importance of this discovery can only be appreciated when we take into consideration the ravages produced by

small-pox prior to the introduction of vaccination. We are told that this disease was a terror to mankind: "sweeping over the land like fire over the prairies, smiting down prince and peasant;" that about the year 1519, in Mexico, it suddenly carried off three and a half millions of the population; that in Brazil, in the year 1563, it extirpated whole races of human beings; that about the same period, in the single province of Quito, it destroyed 100,000 Indians; that in France it caused one-tenth of all the deaths, and in England one-fourteenth; that the annual mortality from it in Europe alone amounted to half a million, and one-third of those attacked died, and that it destroyed, maimed or disfigured one-fourth of mankind.

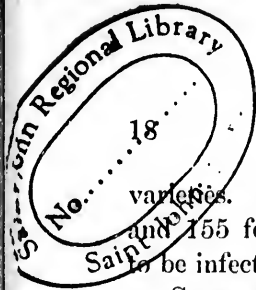
Let us now look at the pleasing side of the picture. Experience and statistics teach us that small-pox occasionally occurs among those who have been vaccinated,—that if 1000 persons who have been *well* vaccinated should be exposed to the contagion of the disease, about 26 will take it; that among vaccinated persons infected with small-pox, the danger of the disease is chiefly determined by the badness and insufficiency of their vaccination; that the fatality of small-pox, when it attacks the *unvaccinated*, is 350 per 1000; that its fatality to such vaccinated persons as it infects, is, taking them indiscriminately, 70 per 1000. But distinguishing vaccinated persons into two classes: first, those who have been vaccinated in the best known manner, and, second, those who have been badly vaccinated, the fatality of small-pox, if it infects the former, will be 5 per 1000; if it infects the latter, 150 per 1000, and that the risk of the one is 30 times that of the other. Or in other words, let an unvaccinated person contract small-pox and the chances are more than one in three that he dies. Let a very badly vaccinated person—a person with one imperfect cicatrix—contract small-pox, and the chances are not quite one in eight that he dies. Let a person with two good cicatrices have small-pox and his chance of dying are less than one in forty. But persons who have been vaccinated in the best and the most complete way will, if they get small-

pox afterwards, not die of it at the rate of much more than one in two hundred.

It may be safely asserted that the lancet of Jenner, armed with the cow-pox matter, has saved in the world more human lives than gunpowder and the sword were ever successful in slaying during any century in the history of mankind. And let us say honor to the man who found the way to arrest this dreadful scourge, and who taught us that the seeds of the disease, transplanted to another soil, might be made to germinate with a healthy and saving influence—a glory to our art and to the nation claiming him as her son. Yet that nation neglected to bestow any mark of distinction upon the doer of all this good, such favors being reserved for the inventor of instruments for the destruction of human life, the user of them, the courtier and the politician; the man whose life is spent in ministering to the suffering of his fellow man, however successfully, being generally the last to receive such honors. It is true, a monument was erected a few years ago to the memory of “this saver of millions of lives.” It was placed in Trafalgar Square, but has since been relegated to an obscure corner at the far end of the Serpentine, to be admired by nursemaids engaged in keeping erratic children from falling into its stagnant water—a disgrace to the nation claiming the honor of his work. It is well, therefore, that the charm of the medical profession does not lie in the shadowy prospect of honors.

Now, Ladies and Gentlemen, let me say a few words to you upon the subject of *Hygiene*, which signifies the art of preserving the health of body and mind during a period consistent with the laws of life. It aims at the prevention of disease by the removal of its avoidable causes.

Disease is a departure from a certain assumed standard of health, and has been divided into general and local. *General diseases* are such as affect the whole frame rather than a special part of it. *Local diseases*, such as occupy special parts of the body. There are 58 forms of general diseases, and 843 local



*Address Upon the Progress of Medicine.*

varieties. To these are added 91 of other conditions of disease and 155 forms of injuries. Of the whole diseases, 33 are said to be infectious or contagious.

So we may start with the fact in our minds that there are in detail before the scholar of the preventive art 1,147 diseases and injuries to which the human family are liable, and which he has to study with a view to their abatement or removal. Of the diseases, between 90 and 100 demand the attention of the sanitarian, as representing the more common maladies, and those which yield the ordinary mortalities, and which, successfully combatted, would leave little to be done in the way of prevention.

The preservation of human health, and the prolongation of human life, are two of the great and noble objects of practical medicine. These objects are to be obtained more by the prevention of disease than by its cure. But to enable us to prevent diseases we should be acquainted with their causes. These causes, and the best means of avoiding them, have, in a special manner, engaged the attention of the physician of modern days. By this study he has learned the vast benefits derived from "preventive medicine" — the triumph of vaccination over small-pox, the almost obliteration of that dread disease, scurvy, a disease known to have yielded 10,000 helpless sick from the Channel fleet after one voyage.

His investigations have taught him that the attacks of almost all diseases are increased in intensity and frequency in our households and communities by the want of sufficient air, light, water and drainage, as well as by the deleterious effects of decomposing animal and vegetable matters allowed to remain within and around our dwellings, and by the human effluvia concentrated in small and stifling bedrooms. They have taught him also that when the preceding causes of disease have been removed or abated in special localities by proper sanitary arrangements, human life, as a consequence, has been saved, misery avoided, and pauperism prevented.

To recognize an evil and the cause of it is half way to curing it. But the most sanguine mind could not have anticipated the

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wonderful improvement that has taken place during the last twenty-five years. As an illustration, I may tell you that the death-rate of the army in England is only two-fifths of what it was before the Crimean war, the death-rate in India is only one-third, and the death rate in the West Indies one-tenth. Indeed life in the West Indies is actually healthier, especially for young soldiers, than service in England, whereas sixty years ago a tour of service there was looked upon as almost a sentence of death.

In civil life, statistics teach us that the improvements of later days have resulted in "a diminution of 2 per 1000 in the general death rate; and with the knowledge we now have of the causes of disease, we may be sure that a general death-rate of "not more than 15 per 1000 may be confidently looked for."

*Class and Occupation* exercise their influence upon mortality. For example: In Liverpool it appears that the average age at death of the gentry was 43 years; for tradesmen, 19 years; and for labourers, 16 years — the average of all classes being 22 years.

*Locality* also exercises its influence, it having been found that the mortality in country districts is always less than in towns. In the country districts of England it is about one in 58, while in the towns it is seldom below 1 in 45.

*Temperature* exercises its influence. The mortality is increased in extreme cold weather and in extreme warm weather.

Registration reports in England show a steady decline in the death-rate. It is estimated that from 1870 to 1880 about a quarter of a million persons were saved from death and three millions saved from a sick-bed, as a result of a better general knowledge and enforcement of sanitary laws in that country. In London, for example, the death-rate in the seventeenth century was 80 per 1000, while in the present day it varies from 22 to 24 per 1000.

The span of individual life is progressively lengthening. Reliable statistics prove that in England, from 1838 to 1854, the average length of woman's life was 41.9, and of males, 39.9 years, while now the averages are for women 45.3, and for men 41.9 years.



The dead are not the only victims. Lyon Playfair states that for every death that takes place in the community of Glasgow, 34 people are ill, each on an average  $18\frac{1}{2}$  days; or, in other words, that for every death we must count 630 days of illness. In New York, taking working people alone, and tenement-house populations, where sound health is an exception, the constant ratio of the sick to the well is often as high as one-third.

In pursuing this subject, I may mention that it is estimated that there are 8000 preventable deaths in New York yearly. It is further estimated that for every death there are 27 cases of sickness, which would give a total of 216,000 cases of preventable sickness to be treated. It is also estimated that every case of sickness in a community is equivalent, on an average, to a loss of fifty dollars. When we reflect upon the misery, wretchedness and pauperism produced by these 216,000 cases of sickness capable of being prevented, it affords ample occupation for the mind of the physician, the philanthropist, and the statesman.

The mortality of infants is still very large, but of late it has greatly decreased. Towards the middle of the last century 60 out of every 100 children born in London died before they had reached their fifth year of age; but the mortality has steadily diminished so that now about 35 in every 100 die at that period. About 600,000 are born annually in Great Britain; of these, 300,000 would have perished. In New York the mortality is still very large — *one-third* of the children born die in the first year, and *one-half* before they have attained their fifth year of age.

About the middle of the seventeenth century one in every 40 or 50 women delivered in London died of child-birth and its consequences; but as medical science has advanced that mortality has decreased, till now about 1 in 150 or 200 die.

The present death-rate of fever in England amounts to nearly 385 per 10,000 of population, while a century ago its death-rate was nearly 539. At the middle of the last century the annual death-rate from all causes in London was 355 per 10,000 of population, but in the middle of the present century it was only 249.

It has been estimated by Mr. Simon "that the deaths which occur in England are fully a *third* more numerous than they would be if our existing knowledge of the chief causes of disease were reasonably well applied throughout the country."

*Pure air* is composed of oxygen, nitrogen, and carbonic acid gases in various proportions, with watery vapor and traces of ammonia. But the air we breathe is seldom pure, often containing certain impurities. It is so vitiated by respiration and transpiration that the changes produced in an occupied air space are as follows: The amount of oxygen is greatly lessened, the carbonic acid and watery vapor are largely increased, ammonia and organic matter are evolved, and suspended matter, in the shape of low forms of cell life and epithelium scales, thrown off. A decrease in the proportion of oxygen, with an increase of carbonic acid, together with the organic impurities, so vitiate the air as to render it one of the most potent of all the predisposing causes of disease. Among many other diseases developed by respired air, consumption holds a prominent place on the list.

About 30 cubic inches of air are carried into the lungs at each inspiration, to be brought in contact with that wonderful surface, said to occupy a space of from 10 to 20 square feet, covered with delicate tufts of blood-vessels, which stand upon the surface of between five or six millions of air-cells, and through which the blood flows with great velocity. The solid particles entering with the air may lodge in the mouth or nose, to pass into the stomach, or decompose or dissolve in the lungs, or remain there to become a source of irritation and perhaps disease. Many of them are inhaled without any knowledge on the part of those who breathe them. We can, therefore, readily understand the rapidity with which gaseous substances will enter the blood. As an example of the effect of vitiated air, I need only mention the sad mortality in the Black Hole of Calcutta, where 123 prisoners died in one night out of a total of 146.

The air in an inhabited room cannot be maintained in as pure a condition as the external air. To keep it at a healthy standard it should be renewed without perceptible draughts, at the rate of

3,000 cubic feet per hour for each adult. If the cubic space per head is small, the renewal of air must necessarily be more frequent. Thus, with a space of 100 cubic feet, it should be renewed 30 times per hour, whereas with one of 1000 feet, three renewals would be sufficient. You will therefore readily recognize the necessity for proper ventilation in our houses, in our bed-rooms, and in our public institutions, *particularly our schools*, where — very improperly — hundreds are congregated under one roof.

Recent investigations have taught us that the gases generated by the decomposition constantly taking place in sewers and cess-pools are carbonic acid, nitrogen, sulphurated hydrogen and ammonium sulphide. The particularly foetid smell of sewer-air is owing to the presence of organic matter. It contains bacteriae and other forms of cell life, and, like other organic effluvia, promotes the growth of fungi, infects water and milk, and taints meat, and is recognized as one of the most, if not the most, prolific causes of disease. There can be no question that the polluted air from cesspits, drains and sewers becomes the medium through which enteric fever and other diseases are frequently propagated, if not engendered. The sewer-air, laden with *morbific ferments* or *contagia*, rapidly finds its way into houses, especially in cold weather, in consequence of badly constructed drains and soil pipes. It may be imperceptible to the senses, but its baneful effects make themselves felt none the less. Therefore with our present knowledge of these facts it becomes the imperative duty of house-owners, architects and plumbers to so construct the drains and plumbing that the atmosphere of the house shall not be poisoned by this sewer air, and they assume a heavy responsibility when they neglect to do so.

The soil pipe should always be made of iron, well tarred inside and out; it should be perfectly air-tight, open at the upper end, and extend from the sewer to several feet above the roof of the house, but below the chimney and four or five feet from it, and ten feet from any window or opening in the roof. Special care should be taken that the part of it entering the house from

the drain be *thoroughly* closed, and every opening into it should be properly trapped. For any building without traps and vent pipes, itself becomes a vent for any common sewer it may connect with. No vent pipe should ever enter a chimney, for when there is no heat in it there will be a downward draught. I may further remark that street drains should be ventilated by shafts, so as to prevent the effluvia from them entering the windows, as they do, of many houses in this city.

While dwelling upon sanitary subjects, I may claim the right to say a word upon the treatment of the young in our schools.

The secret of a thorough education lies in the uniform development of all the powers. One should not be developed at the expense of others. Anatomy and physiology teach us that the brains of children under seven or eight years of age are imperfectly developed; their reflective faculties and powers of concentration are feeble. As a rule they learn from observation and memory, not from understanding. Their bodies and minds alike require frequent change, consequently they cannot perform long continued tasks without injury. It has been justly said that a task or lesson of 15 minutes duration is long enough for a child between the ages of five and seven years, and 20 minutes for one between seven and ten years.

In children at this early age the memory and attention should be stimulated, not taxed. The muscles should not be enfeebled by sitting or standing for hours, but should be invigorated by exercise. This cannot be accomplished by school restraints for three or four hours. Better let them be entertained in the "Kindergarten."

Daily observation teaches us the injurious effects of long continued and excessive mental strain upon fully developed brains. If such injury is produced—and I think few will dispute it—then how much more injurious must be the effect upon brains, the anatomical structure of which is in no way fitted for the work.

The rule in schools requiring or exacting *all* to accomplish a certain amount of work, regardless of the mental or physical ability to perform it, in many cases produces an injurious strain upon the mental faculties. And while a system of rank and rewards, based upon the possession of an arbitrary standard of acquirements, may be desirable as having a stimulating influence upon boys, I think it highly injurious for girls. The eagerness for success, the apprehension of failure, and the dread of disgrace in them, are so much more acute than in boys, that they are easily injured by appeals to these emotions. In my own experience I have repeatedly known the illness of young girls to be exaggerated and prolonged in consequence of the anxiety respecting the loss of place or marks at school.

Again, I think the health of teachers—who are largely composed of young females—is an element for consideration. It is well known that a large proportion of them fall from a condition of perfect health and energy into invalidism, too often followed by consumption. Many causes aid in producing this condition; some eat too little, or take tea and bread instead of meat, or go to bed hungry and cold, or neglect their noon meal, or hurry their breakfast, and some are weighted down with home cares. But the chief causes are excessive and long-continued mental strain in a vitiated atmosphere, and often at times when they should be on the sofa.

From a health standpoint, the “half-time” system, such as is largely adopted in England, should commend itself to all who are responsible in this matter. It consists in sending the children to school for three hours each day, and employing them in other pursuits, such as learning different trades, etc., for the rest of the working hours—six in all. “It has been found generally that “children thus employed make as good progress in study as “those who attend school for six hours each day.”

If this system were generally adopted, I believe it would prove of incaluable benefit to the rising generation. It would largely prevent the serious consequences of that *mental strain* which medical men are too often called upon to treat.

It cannot be doubted that a large number of lives would be saved yearly if our existing knowledge of the causes of disease were reasonably well applied. This knowledge is not applied, because people cannot be dragooned into cleanliness or made virtuous by police regulations. They must be educated upon the subject, and taught the benefits resulting from its application and the misery consequent upon the neglect of it.

As an illustration of the apathy displayed regarding sanitary measures, I may mention that vaccination is very generally acknowledged to be a protection against small-pox. Yet in 1871 when that disease appeared, in a malignant form, in this city, it was known that there were upwards of 5000 persons—chiefly children—who had not been vaccinated, while for years they had the privilege of having it done, free of charge, at the Board of Health office. So sluggish were they in this matter that the authorities were compelled to appoint physicians to visit every house and vaccinate all before the disease could be “stamped out.”

While I contend that medicine has advanced much, I must acknowledge the uncertainty of the art. The source of this uncertainty may be found partly in its imperfections, but more in the intractability of intense forms of disease, the ferments of which poison the system to such an extent that death must inevitably be the result. Take as an example malignant scarlet fever, or diphtheria; observe the utter prostration, rigors, swollen throat, offensive breath, and thready, failing pulse, which indicate intense blood poisoning. Here death is as certain as if the patient had taken a poisonous dose of prussic acid; medicine is foiled by the overwhelming power of its antagonist.

In conclusion, ladies and gentlemen, let me thank you for the patient hearing you have given this address. I freely acknowledge its many imperfections. The subject covers such a wide range that I have found it difficult to condense it: but I hope that enough has been shown to prove that the science of medicine has kept pace with other sciences in the march of improvement. And, it may be asked, who has achieved this

progress? I answer, The workers in the medical profession — men who, while earning a living, perform more gratuitous labor than all the other professions combined. It has been truly said by an eloquent writer: “Go into the abodes of the sick, and “the poor and deserted, wherever there is disease or distress, there “you will find some medical practitioner exercising his glorious “art, patiently, freely and fearlessly, for those whom poverty or “vice or the breath of pestilence has deprived of every other “friend. Or, again follow him among the higher classes of “patients, and you will find him there the friend and honest adviser of those who can seldom hear truth from any other lips.” And when their daily round has ended may be found committing their observations and experience to paper for the benefit of mankind.

“Such are the toils — the perils that he knows —  
Days without rest and nights without repose.  
Yet all unheeded for the love he bears  
His art, his kind, whose very grief he shares.”

An estimate may be formed of the literary work of the medical profession when I tell you that it comprises one-thirtieth of that of the world.

Again, follow them on the field of battle, where — without the excitement of contest, but in equal danger with the combatant — they are found ministering to the suffering wounded, or perhaps winning “Victoria crosses” by some act of heroism for the benefit of their disabled patients, and I am proud to say such examples are not few.

May I not therefore, in the words of Oliver Wendell Holmes, say :

“How blest is he who knows no meaner strife  
Than art's long battle with the foes of life.  
No doubt assails him, doing still his best,  
And trusting kindly nature for the rest.”

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## REPLY TO DR. PRESTON'S LETTER.

*To the Editor of the Sun:*

SIR:—In my lecture at the Mechanics' Institute I said that the medical world, at the close of the 18th century, was governed by theory, empiricism, authority, and speculation. In support of my assertion, I spoke of a strange theory propounded by Dr. Letsom, a so-called allopathic physician, and as an illustration of the speculative tendency of that age, I mentioned the theory formed by Dr. Hahnemann, the founder of homœopathy. I said that he ignored all previous medical knowledge, denied the existence of any curative power in the human system, claimed that symptoms alone should be treated, and that the more the medicine was diluted the greater its power over disease.

I also said that, on account of its manifest absurdities, his theory was rejected by all scientific men, and, while it displays a curious instance of the aberration of the human intellect, it has reminded the physician of the limits of his art, and of the great power which nature plays in the cure of disease.

These remarks do not appear to have pleased the friends of Dr. Preston, or himself, for he felt bound to animadvert upon them in your paper of the 22nd instant. He gave us an elaborate and well written history of Hahnemann from his cradle to his grave, an account of the books he wrote, and classed him "as the "greatest benefactor of the human race that the past century has "seen," but he forgot to inform us that at one time he deceived the world by selling at a high price, under the name of "*Pnœum*," a nostrum which contained nothing but borax.



However, the character of the man is not the question; his "speculative theory" is that with which we have to deal. All that Dr. Preston says of him may be true—though he must pardon me if I do not agree with him—but his theory may be absurd, nevertheless. I have classed it as such; if I am wrong, I must take the consequences; if right, no wrong is done.

It is not my intention to discuss the merits of Homœopathy; I have neither the time nor the inclination to do so. But I was under the impression that Homœopathy had progressed, like rational medicine, with time; and I give Dr. Preston credit for too much good sense to believe that he accepts *all* the theories propounded by his "benefactor."

Let us see what a few of them are. His system is expressed by the Latin aphorism, *similia similibus curantur*, or *like cures like*; that is, diseases are cured by substances capable of producing symptoms resembling those found in the disease under treatment.

The second great fact which Hahnemann professes to have established is the "*efficacy of medicinal substances reduced to a wonderful degree of minuteness or dilution.*" In his work on chronic diseases he gives us his mode of preparing his little doses. He tells us that one grain of the medicine is to be added to 100 grains of sugar of milk, and after just so many minutes devoted to rubbing and scraping it together, it constitutes the first dilution. Each grain of this powder contains the hundredth of a grain of the medicinal substance mingled with the sugar of milk. Continue the process, and the second dilution will be one ten-thousandth, the third dilution one-millionth, the sixth dilution one-billionth, and so on to the thirtieth, and even up to the two-hundredth dilution. It has been computed by Sir James Symson that one grain of arsenic, at the fifteenth dilution, would require material equal in bulk to sixty-one globes the size of this earth to absorb it. When liquids are to be used, the same process of dilution is to be observed.

Again, he informs us, at page 316, of his *Organon*, that "The homœopathic medicine becomes potentized at every division,

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“and diminution by trituration or succussion (shake), a develop-  
 “ment of the inherent powers of medicinal substances which  
 “was never dreamed of before my time, and which is of so  
 “powerful a character that of late years I have been compelled,  
 “by convincing experience, to reduce the *ten* succussions (shakes),  
 “formerly directed to be given after each attenuation, to *two*.  
 “There are, however, homœopathists who carry about with them,  
 “on their visits to patients, the homœopathic medicine in a fluid  
 “state, and yet who assert that they do not become more highly  
 “potentized in the course of time; but they thereby show their  
 “want of ability to observe correctly.” Is this reasonable or  
 absurd? Give it a ten-mile ride in the pocket of a doctor, on  
 the back of a hard trotting horse, and dynamite would be  
 nothing to it.

At page 822 of his *Lesser Writings* he says: “If we wish  
 “to attenuate a drop of the juice of sun-dew to the decillionth,  
 “shake each of the bottles with 20 or more succussions from a  
 “powerful arm, in the hand of which the bottle is held; in that  
 “case this medicine, which I have discovered to be the specific  
 “medicine for whooping cough, will have become so powerful in  
 “the fifteenth attenuation that a drop of it given in a teaspoon-  
 “ful of water would endanger the life of the child; whereas, if  
 “each dilution bottle were shaken but *twice* (with two strokes of  
 “the arm) and prepared in this manner up to the decillionth  
 “attenuation, a sugar globule the size of a *poppy seed, moistened*  
 “*with the last attenuation*, cures this terrible disease with this  
 “single dose, without endangering the health of the child in the  
 “slightest degree.” *Mirabile dictu!!*

At page 879 of his *Lesser Writings* he advocates another  
 mode—discovered by Korsakoff—of preparing his little glo-  
 bules. He says: “Thus much is deducible from his (Korsa-  
 “koff’s) experiments, that since a single dry globule, imbibed  
 “with a high medicinal dynamization, communicates to 13,500  
 “unmedicated globules, with which it is shaken for five minutes,  
 “*medicinal power fully equal to what power it possesses itself*, with-  
 “out suffering any diminution of power itself, it seems that this

"marvelous communication takes place by means of proximity and contact, and is a sort of *infection*, bearing a strong resemblance to the infection of healthy persons, by a contagion brought near or in contact with them." Wonderful indeed !!!

The third great doctrine of Hahnemann is that *seven-eighths at least of all chronic diseases* are produced by the existence in the system of that infectious disorder known in the language of science by the appellation of *Psora*, but in the less refined portion of the community by the unmentionable name of *Itch*.

In his *Organon*, page 183, he tells us "that *Common Itch* (Psora), is the *only real fundamental cause and producer of all the other numerous innumerable forms of disease* which, under the names of nervous debility, hysteria, hypochondriasis, epilepsy, mania, melancholia, imbecility, caries, convulsions of all sorts, cancer, fungus hæmatodes, malignant organic growths, gout, jaundice, dropsy, hæmorrhage from the lungs, nose, stomach, bladder, etc., asthma, barrenness, deafness, impotence, catarrh, paralysis, defect of the senses, and pains of a thousand kinds, etc., which figure in the systematic works on pathology, as peculiar independent diseases."

In his "*Lesser Writings*," page 831, we are informed that "*No one free from psora (itch) ever gets inflammation of the lungs.*"

He also informs us, at page 292 of his "*Organon*," "that even a primary itch eruption of recent origin, though it may have spread all over the body, may be perfectly cured in persons that are not too weakly, by a dose of sulphur, thirtieth dilution (or potency) given every *seven* days, in the course of from *ten to twelve weeks*, so that it will be seldom necessary to aid the cure with a few doses of *carbo vegetabilis*, thirtieth dilution, also given at the rate of one in the week, without the slightest external treatment, besides frequent changes of linen and good regimen."

He recommends another mode of giving his medicine, which he calls "*Olfaction*"—in other words, smelling. It is needless to describe it.

I have given the above extracts from the writings of Hahnemann, in vindication of the remarks I made in my lecture, not in a spirit of opposition to believers in homeopathy — they have a perfect right to their opinion, and I doubt not they will grant me the same privilege.

W. BAYARD, M. D., Etc.

ST. JOHN, Feb. 23, 1884.

